Fig. 4.Stirring hotplate (SP88857206)

Fig. 5. Oven (Model 10 Lab)

I. Morphological Examination on Prepared Bioplastic Films

Morphological structures of bioplastic films were measured at the University Research Center, Yangon by Scanning Electron Microscopic (SEM) examination.

J. Physical and Mechanical Properties of Prepared Bioplastic Films

Some physical and mechanical properties of bioplastic films obtained such as specificy gravity, tensile strength, elongation at break and thickness were determined at Rubber Research and Development Center, Department of Agriculture, Ministry of Agriculture, Livestock and Irrigation, Yangon by AOAC (Association of Official Analytical Chemists) and ASTM (The American Section of the international association for Testing Materials) methods.

III. Results and Discussion

A. Antimicrobial Properties of Straws and Seeds

Antimicrobial activity is one of the qualities of edible films and food packaging products. Therefore, examination of antimicrobial properties of straws and seeds were carried out and their resulting properties were shown in Figures 6 - 12.

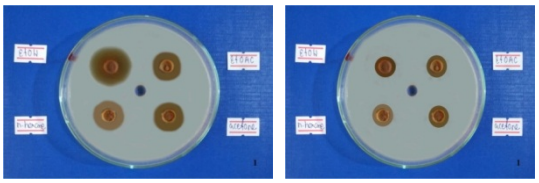

Fig.6. Examination of straws (left) and seeds powder extracts (right) with *Agrobacterium tumefaciens*

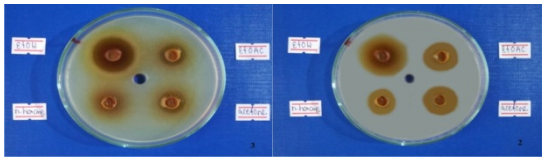

Fig.7. Examination of straws (left) and seeds powder extracts (right) with *Bacillus pumilus*

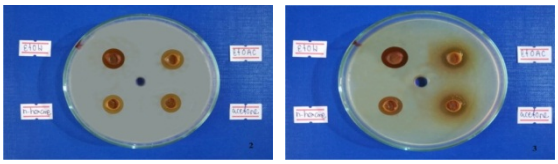

Fig. 8. Examination of straws (left) and seeds powder extracts (right) with *Bacillus subtilis*

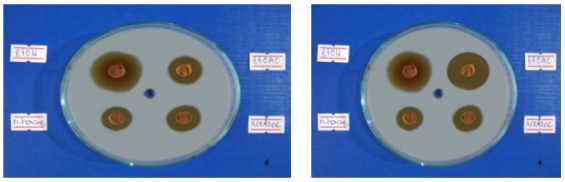

Fig.9. Examination on straws (left) and seeds powder extracts (right) with *Candida albicans*

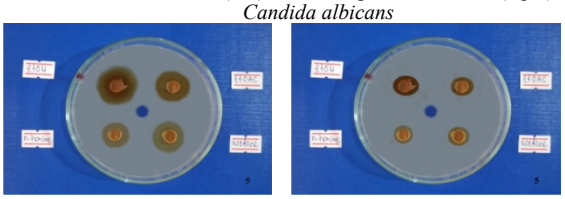

Fig.10. Examination on straws (left) and seeds powder extracts (right) with Escherichia coli

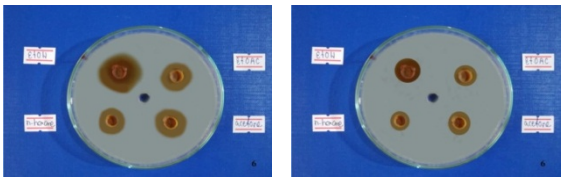

Fig.11. Examination on straws (left) and seeds powder extracts (right) with Pseudomonas fluorescens

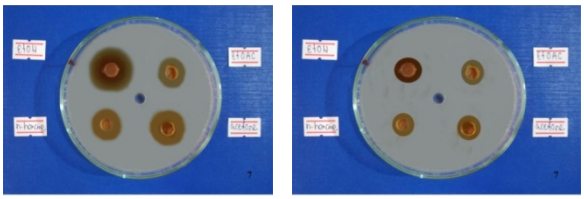

Fig.12. Examination on straws (left) and seeds powder extracts (right) with Staphylococcus aureus

EtOH extract of straws gave the highest activities among the seven selected microorganisms, it was followed by acetone extract with five highest activities and two moderate activities. Then EtOAc extract showed four highest activities and three moderate activities with the all tested microorganisms and n-hexane extract showed only

one highest activity, five moderate activities and one lowest activity respectively. Extracted solvents and their related activities for the tested of microorganisms were shown in Table I and II.

TABLE I. ANTIMICROBIAL ACTIVITIES OF STRAWS EXTRACT

No.	Microorganisms	Extracted Solvents and Related Activities			
		EtOH	EtOAc	n-hexane	Acetone
1	*Agrobacterium tumefaciens*	+++	++	+	++
2	*Bacillus pumilus*	+++	+++	+++	+++
3	*Bacillus subtilis*	+++	++	++	++
4	*Candida albicans*	+++	+++	++	+++
5	*Escherichia coli*	+++	+++	++	+++
6	*Pseudomonas fluorescens*	+++	++	++	+++
7	*Staphylococcus aureus*	+++	+++	++	+++

TABLE II ANTIMICROBIAL ACTIVITIES OF SEEDS EXTRACT

No.	Microorganisms	Extracted Solvents and Related Activities			
		EtOH	EtOAc	n-hexane	acetone
1	*Agrobacterium tumefaciens*	+	+	+	+
2	*Bacillus pumilus*	+	+	+	+
3	*Bacillus subtilis*	+	+	+	+
4	*Candida albicans*	+++	+++	++	++
5	*Escherichia coli*	+	+	+	+
6	*Pseudomonas fluorescens*	+	+	+	+
7	*Staphylococcus aureus*	+	+	+	+

8 mm - 12 mm (+), 13 mm - 17 mm (++), 18 mm above (+++), Agar Well - 8 mm

In the case of seeds extract, EtOH and EtOAc extracts showed their similar activities on seven tested microorganisms, the highest activities on Candida albicans, and the lowest activities on the six remaining microorganisms. Extracts of n-hexane and acetone also informed the medium activities on Candida albicans and the lowest activities on six remaining microorganisms. Therefore, it could be seen clearly that the antimicrobial activities of straws were better than seeds by comparing their activities results of seven selected microorganisms with four different solvent extracts.

B. Antioxidant Activity of Straws and Seeds

The antioxidant activity has important row in many types of applications of food packaging and therefore antioxidant activities of straws and seeds extracts were examined. According to the resulting data, better antioxidant activities of straws showed IC50 values of (157.18 mg/mL) than those of seeds with IC50 values of (782.60 mg/mL).

C. FT IR Spectroscopic Characterization

FT IR spectra of straws and seeds-starch were shown in Figures 13 and 14 and their assignments of characteristic peaks were tabulated in the Table III. It was found that both of characteristic functional groups of starch (biopolymer) were not different significantly and each showed the presence of -OH, -CH, -C-O and C-O-C bond formations in the FTIR spectral data.

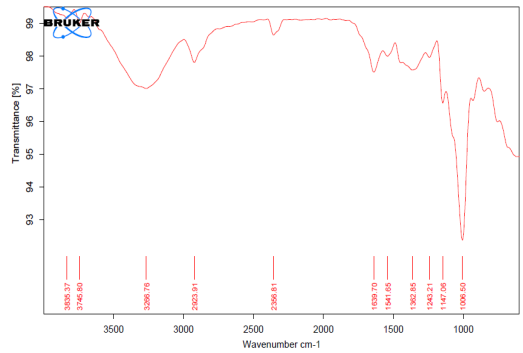

Fig. 13. FT IR spectrum of straws-starch

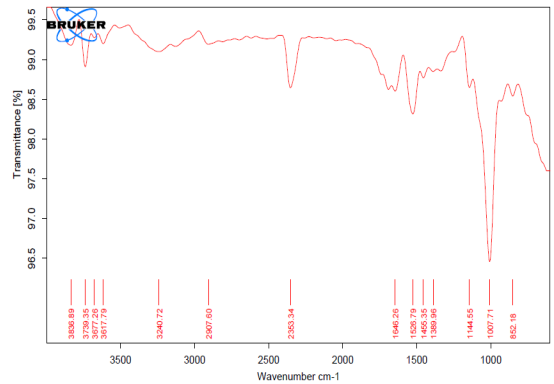

Fig. 14. FT IR spectrum of seeds-starch

TABLE III. CHARACTERISTIC PEAKS OF STRAWS AND SEEDS- STARCH

No	Wave Number (cm^{1})		Assignments
	Straws	Seeds	
1.	3835, 3745	3836, 3739	Stretching vibration of –OH group of starch/protein
2.	3266	3240	Stretching vibration of –OH group of alcohol group
3.	2923	2907	Assymmetric and symmetric stretching vibration of –CH
4.	1639, 1541	1646, 1526	-OH stretching vibration of absorbed water
5.	1362, 1243	1455, 1389	C-C-O stretching vibration
6.	1147	1144	C-O-C stretching vibration
7.	1006	1007	-C-O-H banding vibration

D. Some Physical and Mechanical Properties of Prepared Bioplastic Films

Bioplastic flims-based on straws and seeds powder of Artocarpus heterophyllus Lam. with four different ratios a, b, c and d were prepared and the resulting films obtained were shown in Figures 15 - 18 respectively.

Fig.15. Bioplastic films of straws (left) and seeds (right) using ratio (a)

Fig. 16. Bioplastic films of straws (left) and seeds (right) using ratio (b)

Fig.17. Bioplastic films of straws (left) and seeds (right) using ratio (c)

Fig.18. Bioplastic films of straws (left) and seeds (right) using ratio (d)

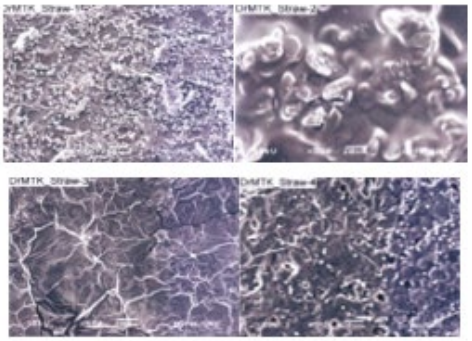

Fig.19. Morphological structures of bio-plastic films of straws using ratio a, b, c and d

SEM micrograms of all prepared bio-plastic films showed their characteristic morphological structures (Figures 19 and 20) with the related chemical constituents present. Morphological structures of the bio-plastic films indicated to the relation between the application of glycerol, polyol and ZnO and how much incorporation of these two plasticizers and inorganic nanofiller particles in the organic polymer matrix starch. In the case of straw films, it could be visually found that the appearance of more smooth films in the Figures 17 and 18 (left) than those of the Figures 15 and 16 (left). This fact was consistent with the more smooth and uniform dispersion of plasticizer, polyol and nanofiller, ZnO within the polymer matrix which could be seen in the micro-images of both of the ratios c and d (Figures 19 and 20). And also, the morphologies of the ratios b and c among the resulting seeds films could be observed as uniform spread and smoother appearance than the other two.

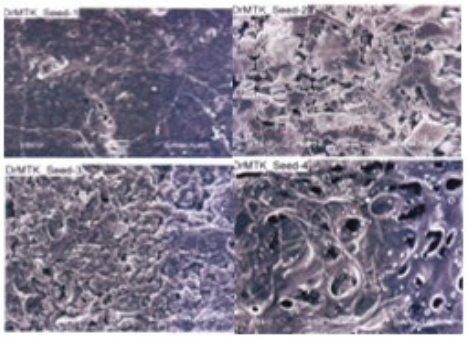

Fig.20. Morphological structures of bio-plastic films of seeds using ratio a, b, c and d

TABLE IV. SOME PHYSICAL AND MECHANICAL PROPERTIES OF BIO-PLASTIC FILMS OF STRAWS

Parameter	Combined Ratios for Straws				
	Raito a	Raito b	Raito c	Raito d	Reference
Specific gravity (SG)	0.98	1.30	1.22	1.11	BS 903 Pt A1
Tensile Strength (MPa)	1.80	1.20	0.45	2.00	BS 903 Pt A2
Elongation at Break (%)	6.00	6.00	40.00	11.00	BS 903 Pt A2
Thickness(mm)	0.40	0.74	0.41	0.54	BS 903 Pt A3

TABLE V. SOME PHYSICAL AND MECHANICAL PROPERTIES OF BIO PLASTIC FILMS OF SEEDS

Parameter	Combined Ratios for Seeds				
	Raito a	Raito b	Rati o c	Raito d	Reference
Specific gravity (SG)	1.15	1.46	1.25	1.16	BS 903 Pt A1
Tensile Strength (MPa)	1.8	3.6	1.1	0.1	BS 903 Pt A2
Elongation at Break (%)	5	85	360	8	BS 903 Pt A2
Thickness(mm)	0.50	0.41	0.30	0.51	BS 903 Pt A3

Specific gravity (SG), tensile strength (MPa), elongation at break (%) and thickness (mm) were measured as some physical and mechanical properties of bio-plastic films and the results obtained were shown in Table IV and V. All films of straws and seeds showed similar specific gravity values. Tensile strength is defined as the maximum load large unity initial cross-sectional area of the sample. Tensile strength can express the ability to accept load or tension without damaging the film which has a maximum tension before breaking so-called ultimate tensile strength. While the highest tensile strength was observed at ratio b

seeds films (3.6 MPa), ratio d straw film gave the highest tensile strength (2.00 MPa) but the resulting tensile values were lower than the literature values because starch-based films are brittle and difficult to handle. In addition, powdered particles of straws and seeds took more space in the matrix (starch), thus affected the tensile strength of the bio-plastic films. Elongation at Break can express the quantity of the change of maximum film length together with tensile strength until the film breaks, compare to the initial length. The highest elongation at break (360%) was shown by the ratio c seeds film which indicated the best addition tendency of polyol as plasticizer and it could increase elongation percentage and reduce tensile strength.

Then medium elongation at break (85%) in the ratio b showed better dispersion of particles within the liquid glycerol plasticizer than the ratios d and a, while the straws had 40.00% as the highest value in the ratio c and 11% was found as the second largest value in the ratio d possibly due to more adhesive activity between the particles and polyol plasticizer and nanofiller used than the ratios, a and b. In this research, it was found that the morphological structures of the seeds films ratios b and c had the relevant correlation with their mechanical properties, elongation at break. Straw films ratios c and d behaved the good match between their SEM micro-images and the elongation at break.

IV. Conclusion

In this research, the straws and seeds of Artocarpus heterophyllus Lam. (Pain-Nae) were used as raw materials for the preparation of bio-plastic films. Fresh straws and seeds samples were applied in the extraction of starch compounds. Straws and seeds dried powder samples were used not only in the determination of antimicrobial and antioxidant activities but also in the preparation of bio-plastic films. This study described about the preparation of bio-plastic films and the determination of its physical and mechanical properties. The addition of plasticizers such as Polyvinyl alcohol (PVA), glycerol and polyol and ZnO as inorganic nanofiller to the straws and seeds powder enhancing with the yam starch by applying ratios a, b, c and d resulted some changes in the mechanical behavior of bio-plastic films. Ratio c and b of seeds films were plasticized with polyol and glycerol liquids gave higher mechanical properties of the elongation at break associated with homogeneous, flexible, and easily handled than the ratios a and d films. Also in the ratios c and d of straws films, polyol liquid plasticizer and nanofiller particles, ZnO were applied and their elongation at break results showed the higher percentages than the ratios a and b films with the application of PVA particles and glycerol liquids plasticizers though their percentages are much lower than that of seed films. Bio-plastic films made from straws and seeds powder had no significant differences in the physical properties like specific gravity and thickness and also in the mechanical property of tensile strengths which were lower than normal due to the application of powder particles as the raw materials. In the antimicrobial screening and antioxidant activities tests, straw extract showed the better responses than the seeds extracts. FT IR spectroscopic characterization resulted similar functional groups given by straws and seeds starch compounds. Interesting morphological structures were clearly observed because of their different constituents in the four applied ratios. In conclusion, bio-plastic films were prepared successfully by applying straws and seeds powder of Artocarpus heterophyllus Lam. and could be considered as biodegradable alternative packaging material.

Acknowledgements

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Influence Of Boric Acid On The Un-Doped Strontium Aluminate By Sol-Gel Method For Phosphorescence Powder

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***Abstract*- In this paper, un-doped strontium aluminate ($SrAl_2O_4$) powder were prepared by sol-gel method using strontium nitrate and aluminium nitrate as main precursor at crystallization temperature 600°C. The average grain size of the phosphor powders is approximately 75 nm. In this method, strontium aluminate sample was added with a urea as the fuel and reducer assisted to the metal nitrate solution. Also boric acid as flux provided this solution for join the materials. In this paper, effects of fuel and flux agents have been also studied on the preparation process. The prepared strontium aluminate powder sample was characterized by using analytical techniques such as XRD, TG-DTA and SEM. The resultant sample might be useful in the luminescence processes such as phosphorescent pigments doping with rare earth materials.**

Keywords- phosphorescent, phosphor, strontium aluminate, pigment.

I. INTRODUCTION

Luminescence is a phenomenon of emission of electromagnetic radiation by a physical system in excess of energy following excitation by electrons or photons [4]. An example of such a physical system is a phosphor (luminescent materials) which essentially emits light by converting one type of energy into another. They can be crystalline or non-crystalline [10]. A phosphor is composed of a host lattice and one or more activators in amounts from parts per million to a few mole percent. Either the host or activator can determine the luminescent properties of a phosphor. For example in zinc sulphide or cadmium sulphide: silver (ZnS:Ag or CdS:Ag) the emitted colors range from blue at zero cadmium through green, to yellow and into red as the Cd content is increased. The phosphors are generally powders having average particle sizes ranging from micro to nano-scale [3,5].

Due to the defects and irregularities in the crystal lattice structure, these materials have the ability to absorb incident energy and convert it into light in other regions of the electromagnetic spectrum. This process involves energy transfer from the UV source to the electrons in the phosphor crystals. The phosphor electrons are thereby raised to levels higher than the ground state and light will be emitted when electrons return to the ground state [3]. The emission of light when the electrons return to the ground state can be classified in terms of fluorescence and phosphorescence.

Green emitting $SrAl_2O_4$ co-doped with Eu^{2+} ions has been considered one of the best and long lasting phosphorescent materials[8]. Until recent decade, strontium aluminate phosphors doped with europium and co-doped dysprosium ions have attracted much attention since they show excellent properties [6]. Compared with conventional sulfide phosphors, aluminates have also valuable properties: high radiation intensity, color purity, longer afterglow, chemically stabilization, safe and no radioactivity, etc. Together with the development of scientific technologies on materials, several chemical synthesis techniques, such as: co-precipitation, sol-gel and combustion synthesis methods have been applied to prepare $SrAl_2O_4$: Eu^{2+}, Dy^{3+}[2,7]. In this paper, the phosphor synthesized by sol-gel method using urea as reducer and fuel, flux such as boric acid, metal nitrate precursors as oxidizer.

Alkaline earth aluminate (MAl_2O_4) hosts belong to the stuffed tridymite structure and the three dimensional framework of corner sharing AlO_4 tethrahedra. Oxygen has one negative charge and the balance is accomplished by divalent cations (Sr) which occupy the interstitial sites within the tetrahedral framework. Strontium Aluminate ($SrAl_2O_4$) exists in two crystallographic forms and occurs at 650°C. The monoclinic $SrAl_2O_4$ which is stable at lower temperature is a distorted form of the hexagonal $SrAl_2O_4$. The distortion involves a reduction in the symmetry of trigonally distorted rings. The low temperature $SrAl_2O_4$ phase (monoclinic a=8.447Å, b = 8.816 Å, c = 5.163 Å, b = 93.24 Å) is well established, but that of high temperature (hexagonal, a = 5.140 Å, c = 8.462 Å) is not. The low temperature phase has a three dimensional network which is constructed by corner shared AlO_4 tetrahedra forming the strings and Sr penetrate the openings of the structure [1].

Rare earth ions are known to exist in various valence states although the trivalent state is the most prevalent. Europium ions are known to be stable in trivalent as well as divalent states. The trivalent Eu^{3+} ion exhibits strong luminescence in the red spectral region. The intense red sharp line emission near 610 nm is the result of electronic f-f transitions.

Divalent europium (Eu^{2+}) is the most well-known and widely applied example of rare earth ions, and gives a very intense and broad emission spectrum in the visible range [9]. The broad bands result from the inter-configurational electronic f transition which is responsible for the promotion of one f electron from f to d-orbital occurs between two configurations of opposite parity and therefore they are totally allowed at first order. The energy of the $4f^6 5d^1$ state depends on the crystal field, because unlike the 4f electrons the 5d electron is in the outer shell and not shielded by the $5s^2 5p^6$ electrons excited 5d energy levels are split by the crystal field. The Eu^{2+} emission is caused by the electronic transition from the lowest excited state to the $4f^7(^8S_{7/2})$ state[7].

In the present work, un-doped $SrAl_2O_4$ powder was synthesized with different concentration of boric acid by sol-gel method because the method was conducted from liquid phases to gel form so that each component can be accurately controlled and uniformly mixed and this process is very facile, safe, instantaneous and energy saving.

II. Aim

The aim of this research paper is to synthesis of strontium aluminate powder added with urea and boric acid as fuel, flux by sol-gel method and investigation of their properties effectively on the phosphorescence powder.

III. Experimental Part

In the experimental work, strontium aluminate powder was prepared by sol-gel synthesis method followed by calcination the precursor metal nitrates at crystallization temperature 600ºC. In a porcelain crucible (capacity 200ml), stoichiometric composition of aluminum nitrate (Al(NO3)3) and strontium nitrate (Sr(NO3)2) metal precursors were dissolved in 20 ml of distilled water. To obtain homogeneous mixed; this metal nitrate solution was stirred with magnetic stirrer for 1hour. Homogeneous mixtures were mixed at fixed molar ratio of urea as a fuel and reducer, also added boric acid as a flux in the metals only two samples.

In this mixing process prepared the urea (CH4N2O) (8 mol %) and boric acid (H3BO3) (0.16 and 0.25 mol %) were dissolved in 10 ml of distilled water. After obtained the urea and boric solution was added to the metal nitrate solution in order to react as reinforces materials. To occur entirely react with precursor solution was well mixed and formed gel type solution by using magnetic stirrer for 1hour. This gel form solution was dried in oven for 3hours in order to evaporate and form the consistence precipitate. After this process, white-gel was added into the alumina crucible to be calcined in muffle furnace maintained at 600ºC for 15 minutes. During the calcination process, unwanted water and gases decomposed with evolution amount, and produced white foamy of voluminous strontium aluminate. After cooling to room temperature, the resultant product was collected, and then it was easily milled with agate mortar to obtain fine powder. Finally, strontium aluminate powder was obtained.

In this experiment research work, the crystalline structure and the particle morphology of the phosphors were investigated using X-ray powder diffraction (XRD), thermal gravimetric and differential thermal analysis (TG-DTA) and scanning electron microscopy (SEM), respectively.

IV. Results And Discussion On The Analysis Methods

A. Examination of Crystallite Structure of Strontium Aluminate Samples by XRD Method

The crystallite structure of prepared strontium aluminate samples were analyzed from XRD. The figure 2(a), (b) and (c) represented XRD diffractogram of strontium aluminate samples synthesized using various mole ratios (1:1.5, 1:2 and 1:3). Various diffraction peaks were observed in the spectra and also described the strontium aluminate form or impurities.

In Figure 2(a), the diffraction pattern of strontium aluminate sample (SrAl2O4-01) showed characteristic peaks at 20° to 35.130°. In this result, main phase as SrAl2O4 was observed, and differences impurities peaks were detected in the XRD patterns. The XRD diffractogram of the prepared strontium aluminate sample (SrAl2O4-02) was shown in Figure 2(b) obviously showed that a series of characteristic peaks at 2θ value of 20°, 28.450°, 29.195°, 30° , and 35.0°. In these peaks not only can be seen clearly at the patterns but also represented the strontium aluminate phase without impurities phases. From the Figure 2(c) characteristic peaks of (SrAl2O4-03) can be seen at 2θ value of 14.12° to 36.12° respectively. In this diffractogram was observed many impurities peaks and strontium aluminium oxide (Sr4Al4O2), (SrAl4O7) and SrAl2O4 phases were covered from these impurities phases.

According to XRD results, the strontium aluminate (SrAl2O4) sample-2 was prepared with 1:2 mole ratios of strontium nitrate and aluminium nitrate, and their diffraction peaks performed to be obviously at each 2θ value, so sample was balanced monoclinic structure of strontium aluminate. Also the diffraction patterns and intensities of the main peaks of this sample resembled entirely to the standard card strontium aluminate (JCPDS file no 74-0794). Therefore, it was confirmed that the crystalline structure of obtained strontium aluminate (SrAl2O4).

B. Investigation on the Morphology of Strontium Aluminate Samples by SEM Method

The surface morphology of prepared strontium aluminate samples were investigated by SEM method. The figure 3(a),(b) and(c) represented SEM images of strontium aluminate samples. The strontium aluminate has a single phase or monoclinic structure. In the

monoclinic system, the crystal is described by vectors of unequal lengths and their form has a rectangular prism with a parallelogram as its base. According to the SEM images, this crystal structures can be seen nearly as a photograph.

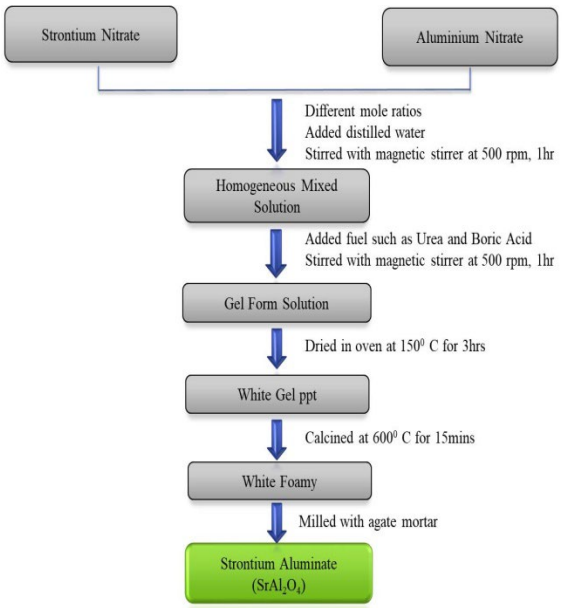
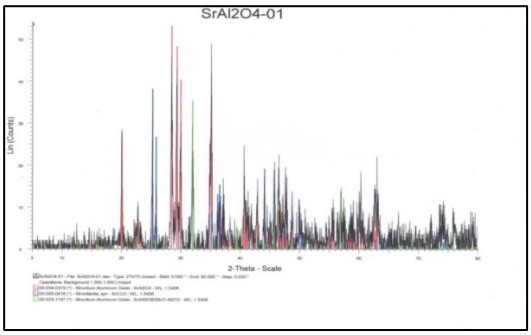
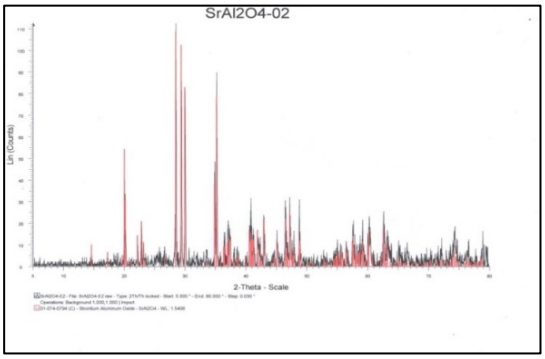


Fig. 1 Flow Chart of Synthesized Strontium Aluminate Sample



(a)



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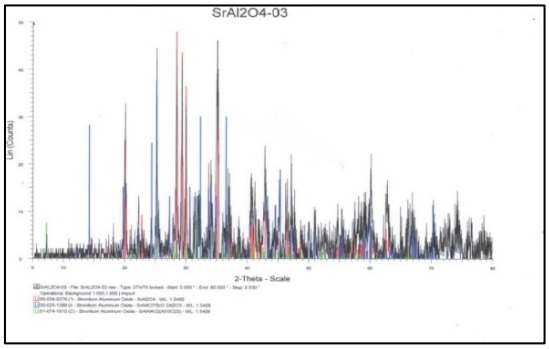


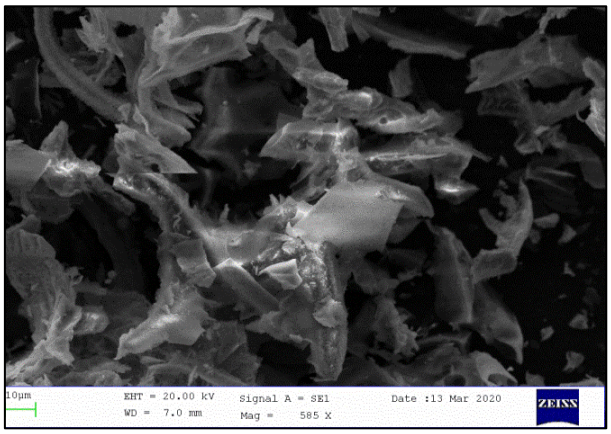
(c)

Fig. 2 XRD Results of Strontium Aluminate Samples Synthesized Various Mole Ratios (a) 1:1.5, (b) 1:2 and (c) 1:3

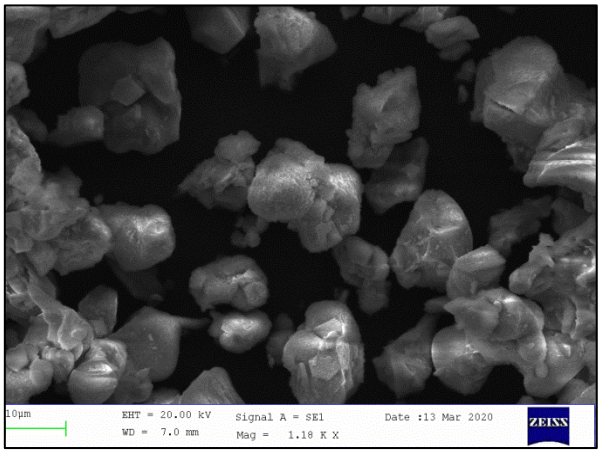
In Figure 3(a), the SEM surface of strontium aluminate sample-1 seems to be non-uniform and irregular shapes of the particles because of was not complete reaction. From this SEM result, prepared sample can be seen irregular and flake-shaped in this photograph due to the non-homogeneous and do not construct the form of SrAl2O4.

In the case of synthesis released the large volume of gases from mixed metal salts result in the production of fluffy form. In Figure 3(b), the SEM image resembled uniformly cylindrical-shaped particles of prepared sample. More voids and pores were observed that is due to evolution of oxide during the reaction. Moreover, uniform grain distribution was observed that morphology of prepared sample-2 (SrAl2O4 -02) was an agglomeration and can provide sufficient insight into the aluminate phosphor.

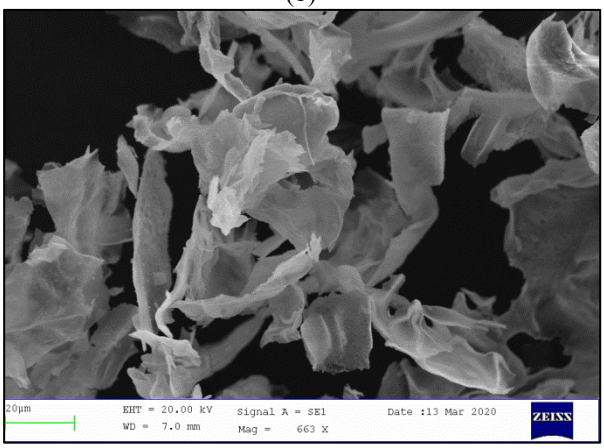
In the SEM photograph of prepared sample-3, irregularly rectangular grains with sizes of several tens of micrometers can be observed in Figure 3(c). The SEM image also can be seen ruffled sheet form and distortion of other crystal structures. The facts that this image represented to the mixture of strontium aluminium oxide was not a pure sample.



(a)



(b)



(c)

Fig. 3 SEM images of Strontium Aluminate Samples Synthesized Various Mole Ratios (a) 1:1.5, (b) 1:2 and (c) 1:3

C. Thermal Gravimetric and Differential Thermal Analysis (TG-DTA)

The decomposition, dehydration and phase change of the prepared sample SrAl2O4 and its structural evolutions had been investigated by thermal gravimetric and differential thermal analyses. TG-DTA curves of the thermal degradation of the strontium aluminate sample-2 were shown in Figure 4. The major steps of the decomposition were taken place between 100 ºC and 250 ºC. In the TG-DTA thermogram, exothermic and endothermic peaks were observed clearly. The weight loss steps were found between 70 ºC and 100 ºC due to decompose of water and the evaporations of volatile impurities. The exothermic peak at 112.5°C may be associated with the loss of nitrogen and removal of structural water.

Moreover, the large exothermic peak interpreted as the removal of structural water from inters layer and CO2. After the calcination temperature 300 ºC to 600 ºC, there is no change in the phase, which indicates the stable phase formation. According to the TG-DTA analysis showed that crystallization of prepared sample was occurred at 600 ºC because there was no apparent change in the weight loss and other impurities after that temperature. Absence of loss peaks in the TG-DTA curve was an indication of initiation of crystalline phase and purity of prepared sample SrAl2O4, which can also be verified by X-ray diffraction studies.

D. Influence of Boric Acid on the Crystallite Size and Morphology of Samples

The average crystallite size of the strontium aluminate powder samples was calculated using the Debye-Scherrer assuming resembled uniformly cylindrical-shaped particles can be seen in SEM images and was found to lie in the range 75 nm over the boric acid concentration range of 0.1 to 0.2 mol% examined, indicative of a minimal influence of the boric acid flux on crystallite growth when the samples calcined at 600 ºC.

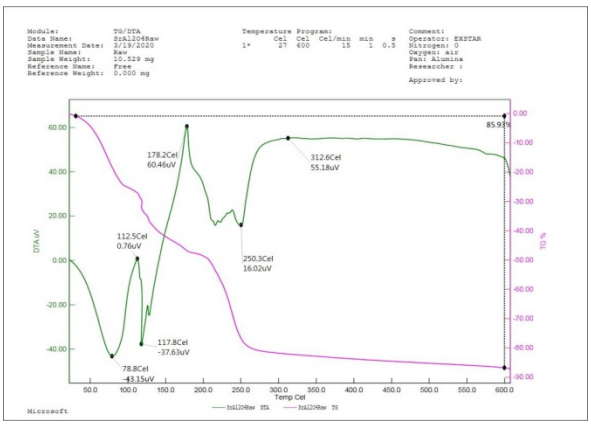


Fig. 4 TG-DTA Thermogram of synthesized Strontium Aluminate Sample-2

TABLE.1 OPTICAL PARAMETERS OF STRONTIUM ALUMINATE POWDER ADDED UREA AND BORIC ACID

No	Samples	Sr/Al mole%	Urea mole%	Boric Acid mole%
1	$SrAl_2O_4$-01	1:1.5	8	-
2	$SrAl_2O_4$-02	1:2	8	0.16
3	$SrAl_2O_4$-03	1:3	8	0.25

For the composition, SrAl2O4, without addition and added more content of boric acid, differences impurities peaks were detected in XRD result, non-uniform and irregular shapes of the particles because of not complete reaction were shown in SEM photograph. The addition of 0.16 mol% boric acid flux yields a small increase in particle size, with the average distribution from 50 to 90nm indicating the particles have a multiple crystallographic domain. Although the particles retain their uniformly spherical shape, aggregation of the particles was seemed to commence. At 0.25mol% the particle size increased even further, reaching a more range, with particles beginning to lose their spherical

morphology. From these results, no boric acid can be attributed to the lack of crystallinity and phase purity, but the presence of the non-emitting secondary crystallographic phase SrAl2O4 that indicated high levels of strontium aluminate powder.

V. CONCLUSIONS

In the synthesis of strontium aluminate powder were prepared by sol-gel method at 600ºC and its structural characterization and morphology of their properties were systematically investigated. The monoclinic structure of the prepared phosphor was confirmed by XRD analysis. The amount of boric acid had an important influence on the phase composition. At fixed 8 mol% of urea in the presence of a reducing agent produced strontium aluminate particles with higher purity to form the effective chelation of the cations conditions to reduce rare earth materials. Their activities in the process correlated with the crystallinity; higher crystallite size involves greater emission intensity. Highly crystalline particles having cylindrical shape morphology were obtained.

According to the experimental investigation, it is suggested that prepared strontium aluminate powder with boric acid 0.16 mol% was better than other powder samples in higher purity and observed uniformly grain size. Therefore, the strontium aluminate powder can be produced to supply the phosphor with high photoluminescence properties and applied for industrial field.

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Study on the Quality of the Well Water Sample for Traditional Textile Industry in Meiktila Township

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***Abstract*— Physical and chemical properties of the sample of well water from Tha-phay-Wa village, Meiktila Township in Mandalay Region were studied in this research. Turbidity and conductivity were examined and determined as physical properties. Total hardness, total alkalinity, methyl orange alkalinity, total dissolved solids, COD, chloride, sulphate and pH were determined for chemical analysis. For elemental analysis, EDXRF spectrophotometric method was used. According to the quality of well water sample from this area, the well water can be used only for domestic water but should not be used as drinking water. Moreover, the water sample should be used as industrial water for textile industry through water treatment processes to produce high quality fabric.**

***Keywords*—well water, hardness, alkalinity, COD, EDXRF**

I. Introduction

Water is Omni present on the earth. It is estimated that two-third of the human body is constituted of water. The use of water increases with increases in population. Water quality is based on the catchment area. Based on the quality, the usage of water differs such as drinking water, domestic water, irrigation water and industrial water [6].

Not only for drinking, quality of water usage is one of the important factors for quality of textile. Water is very important for the wet processing of textile industry such as bleaching, dying, boiling, printing, washing, etc. Some important parameter for water quality for textile industry are pH, Total Dissolve Solids, Color, Total Hardness, Turbidity, Suspended solids, COD, Iron, Chromium, Manganese, Aluminium, Chloride, Sulphate and Nitrite.

Mandalay region is well known for traditional fabric textile enterprises in Myanmar. Meiktila, Wundwin, Myin -Chan townships are famous for traditional textile and these areas are out of reach to riverbank. Therefore, well water is used as industrial water for textile industries in these townships. In this research, water quality of well water was determined as drinking water and industrial water related with textile industry from Tha-Phay-Wa Village, Meiktila Township. Physical characteristics such as color, turbidity, pH and conductivity were determined. Chemical characteristics such as Total Dissolve Solids, Total Hardness, Total Suspended solids, COD, Chloride, Sulphate, elemental analysis for Iron, Chromium, Manganese and Aluminium, were also determined.

II. Material and Methods

A. Sample Collection

The water samples were collected in June, 2019 from Tha-Phay-Wa Village, Meiktila township in Mandalay Region as shown in figure 1 and 2. The samples were collected in clean plastic bottles which had been washed with a detergent and rinsed with tap water, 1:1 nitric acid solution and distilled water. The bottle was filled completely and capped tightly.

Fig 1. Google Map for Sampling Site

Fig 2. Map of Tha-Phay-wa village, Meiktila Township, Myanmar

B. Determination of Physical Properties of Water Sample

(i) Determination of Turbidity by using Turbidity Meter

The turbidity of water sample was determined by using TURB 430 PORTABLE TURBIDITY METER with Accuracy: ±0.01 or ±2% of the measured value from 0 to 500 NTU [3].

(ii) Estimation of Color by Platinum-Cobalt Method

1.24 g potassium chloroplatinate, K2PtCl6 (equivalent to 500 mg metallic Pt) and 1.00 g crystallized cobaltous chloride, CoCl2.6H2O (equivalent to about 250 mg metallic Co) were dissolved in distilled water with 100 mL concentration HCl and dilute to 1000 mL with distilled water. This stock standard has a color of 500 units.

Standards having colors of 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, and 70 were prepared by diluting 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 6.0, and 7.0 mL stock color standard with distilled water to 50 mL in Nessler tubes. These standards were protected against evaporation and contamination when not in use.

Sample color was observed by filling a matched Nessler tube to the 50-mL mark with sample and comparing it with standards. Vertically downward was looked through tubes toward a white or specular surface placed at such an angle that light is reflected upward through the columns of liquid. If turbidity is present and has not been removed, it was reported as "apparent color." If the color exceeds 70 units, sample was diluted with distilled water in known proportions until the color is within the range of the standards [4].

Color units was calculated by the following equation:

$$\text{Color units} = \frac{A \times 50}{B}$$

Where:

A = estimated color of a diluted sample and

B = mL sample taken for dilution

(iii) Estimation of Total Dissolved Solid by Evaporation Method

The evaporation porcelain basin was cleaned thoroughly with concentrated nitric acid and washed with distilled water. The basin was dried in an oven at 200°C for 1 hour. The basin was cooled, desiccated, weighed and stored in a desiccator. 100ml of water sample was quantitatively transferred to the pre weight basin and evaporated to dryness on a steam bath. Then the sample in the basin was dried in an oven at 103°C to 105°C for 1 hour. The basin holding residue was cooled in a desiccator and weighed. The cycle of drying at 103°C to 105°C, cooling desiccating and weighing was repeated until the constant weight was obtained.

The total dissolved solids can be calculated using the formula:

$$\text{Total Dissolved solid, mg/L} = \frac{(A - B) \times 100}{mL\ sample}$$

Where, A = weight of sample and basin mg

B = weight of basin in mg

(iv) Estimation of pH value

The pH of water sample was determined by using digital pH meter DPM-3001 series. Electrodes were rinsed with distilled water and dried by gently cleaning with a soft tissue. The instrument was standardized with electrodes immersed in a buffer solution of pH 7. Then the pH of sample was measured by dipping electrodes after cleaning into well stirred sample for 1 minute.

(v) Estimation of conductivity

Conductivity of the sample was directly measured by the conductivity meter DCM- 3001 Series. Electrodes were rinsed with distilled water. Then the conductivity meter was measure by dipping electrode immersed in a sample solution.

C. Analysis of chemical Properties of water collected from Tha-Phay-wa well water

(i) Estimation of Total hardness by EDTA Titrimetric Analysis

50mL of sample was pipetted to the conical flask. 15mL of basic buffer solution was added 2 drops of EBT indicator was added and the sample was slowly titrated by standard EDTA solution titrant until the last reddish tinge disappears from the solution. The end point color was blue.

Calculation

$$\text{Hardness (EDTA) as mg } CaCO_3\text{/L} = \frac{A \times B \times 1000}{mL\ sample}$$

Where, A = mL titrant for sample

B = mg $CaCO_3$ equivalent to 100mL EDTA titrant.

(ii) Estimation of Total alkalinity by Acid-base Titrimetric Method

50mL sample was titrated with standard HCl using phenolphthalein indicator until the color changed from pink to colorless. Then 2 drops of methyl orange indicator were added and the titration was continued until the color turned to orange.

Phenolphthalein Alkalinity (P) as mg$CaCO_3$/L= $\frac{A \times N \times 50000}{mL\ sample}$

Total alkalinity (T) as $mgCaCO_3/L = \frac{B \times N \times 50000}{mL\ sample}$

Where,

A = mL standard acid used in phenolphthalein

B = Total ml titrant used in both titrations

N = Normality of standard acid

Hydroxide alkalinity, carbonate alkalinity and bicarbonate alkalinity were calculated from Phenolphthalein alkalinity (P) and Total alkalinity (T) [1].

(iii) Estimation of sulphate by gravimetric method

2 mL HCl was added to the 200 mL sample and then this solution was heated. After boiling, 50 mL solution was collected as residue. 50 mL of warm BaCl2 solution was added to this residual solution and it was allowed to cool at room temperature. Then it was diluted with distilled water and allowed to still the white precipitation appeared to be complete.

Calculation

$$W_2 - W_1 = A\ (_g)$$

W_1 = Crucible weight (g)

W_2 = Crucible and sample weight(g)

(iv) Estimation of chloride by Argentometric method

Accurately 20 mL of sample was pipetted to the conical flask. The sample was neutralized using dilute HCl and methyl orange indicator. One drop of K2CrO4 indicator solution was added and titrated with standard AgNO3 solution the color changes from yellow to red precipitate. Distilled water was used for blank titration.

$$N_w = \frac{N_A x V_A\ x\ 35.5}{V_w}\ x\ 1000$$

D. Determination of Elemental Composition of Tha-Phay-Wa well water

Elemental analysis of Tha- Phay-Wa water was measured at Department of Chemistry, University of Monywa, by applying EDXRF (Energy Dispersive X-ray Fluorescence Spectroscopy) method. Evaporation, stratification, and precipitation of liquid samples were done prior for elemental analyzing with EDXRF. The samples were irradiated in triplicate for 300 s under vacuum using an energy dispersive X-ray fluorescence spectrometer Shimadzu EDX-7000/8000). The samples were irradiated using a Rh X-ray tube operated at 15 kV (Na to Sc) and 50 kV (Ti to U). The current was automatically adjusted (maximum of 1 mA). A 10 mm collimator was chosen. The detection was carried out using the Si (Li) detector cooled with liquid nitrogen. Certified reference materials (CRMs) were analysed using the same method as described above in order to verify trueness and precision. The CRMs used were apple leaves (NIST 1515), peach leaves (NIST 1547) and tomato leaves (NIST 1573a). The intensity of element Kα counts per second (cps/μA) was obtained from the sample X-ray spectrum deconvolution using the EDX software package [8].

E. Determination of COD

25 mL of Sample water was thoroughly mixed with a trace amount of HgCl2 and AgNO3. Then 10 mL of 2M H2SO4 was added and it was refluxed with0.02M K2Cr2O7 for 1 ½ hour. The residual solution was then cooled and its absorbance was measured at 430 nm using Optima SP 300 colorimeter. Distilled water was used for blank reaction. The milligrams per liter of COD in each sample were calculated from a plot of absorbance of standards [7].

F. Estimation of Toxic Metals (As and Cu) by Atomic Absorption Spectro-photometric Method

The water samples were sent to Department of Research an Innovation, Yangon for estimation of toxic metals such as As and Cu by AAS method.

III. RESULTS AND DISCUSSION

A. Results of the Physical Examination

Results of physical examination such as pH, conductivity and total dissolved solid (TDS) are shown in table (1).

As shown in figure (3), no color was appeared in the water and the clarity of water was confirmed by its turbidity, less than 5 NTU using TURB 430 PORTABLE TURBIDITY METER. No odour was smelled on the water sample too. Therefore, it can be used for drinking as well as domestic purposes. However, the pH (>7.5) and TDS (>300 mg/L) of water sample shows the water is not suitable for wet processing in textile industry.

TABLE I. PHYSICAL EXAMINATION OF WATER SAMPLE

No	Properties	Quantity	WHO Standards for Drinking Water	Desirable water parameter for textile wet processing
1	Colour	Nil	Nil	<5 Hazen No
2	pH	8.0	6.5-8.4	6.5-7.5
3	Turbi-dity	1.18 NTU	<1.5 NTU	Nil
4	Condu-ctivity at 25°C	1703 uS/min	2500 uS/min	-
5	TDS	942 mg/L	1000 mg/L	300 mg/L

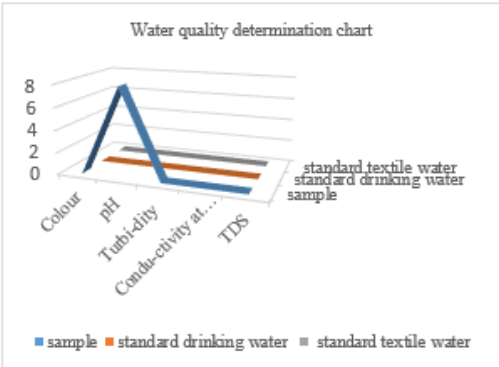

Fig 3. Water quality determination chart for drinking and textile industry purposes

B. Results of Chemical Examination

Textile industry is the third largest consumer of water in the world. Wet processing engineering is one of the major streams in textile industry. In every stages of wet processing, huge amount of water is used. Soft water is the life line of textile wet processing for better production quality. Brighter colors are said to be produced with soft waters, using less dye, than with other water containing large amounts of the alkali-earth elements. Hard water is not suitable for textile industry [5].

TABLE II. CHEMICAL PROPERTIES OF WATER SAMPLE.

No	*C. Parameters*	Quality in Rainy Season	*Desirable W.H.O Standards for Drinking Water	Desirable water parameter for textile wet processing
1	Total hardness (mg/L)	225 mg/L	0-75	30
2	Total alkalinity (mg/L)	515	200	-
3	Hydroxide alkalinity (mg/L)	Nil	-	-
4	Carbonate alkalinity (mg/L)	68	-	-
5	Bicarbonate alkalinity (mg/L)	447	-	-
6	Salinity (ppb)	0.9	1.5	-
7	Chloride (Cl^-) (mg/L)	63.9	200	150
8	Sulphate (SO_4^{2-}) (mg/L)	271.96	200	150

Chemical analysis data of the sample water were illustrated in table (2) and figure (4). From these results, it was found that the water is very hard water and it will cause the problems in dying process and printing process to produce good quality textile fabric.

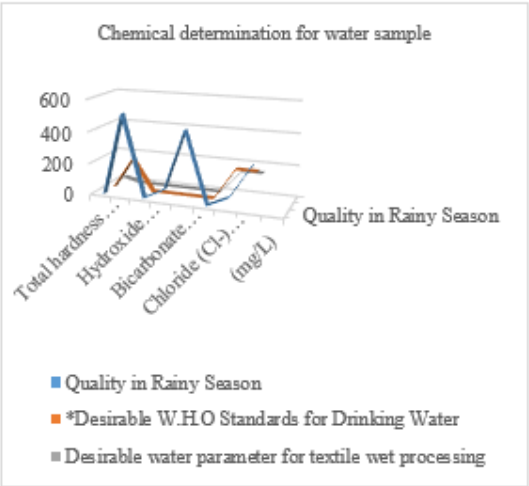

Fig 4. Determination of Chemical contamination in water sample

However, it can be changed to soft water by boiling the water or adding the slake lime since the temporary water hardness was taken by carbonate and bicarbonate alkalinity. Low chloride content and high sulphate content was also found in the sample water. Hardness, alkalinity and sulphate content of water limit the water for drinking purpose. As a domestic water source, presence of hardness causes wastage of soap. The boiler feed water should not contain excess of salts of calcium and magnesium, as they consume more heat due to insulation of containers and pipes by deposition of scales.

C. Elemental analysis of water

The fresh water is rarely used directly for drinking purposes, as the water gets contaminated with impurities during its natural and environmental processes. Even, the water which is to be used for textile industrial process also needs a pre-treatment. To do treatment, the elemental analysis is also one of the important processes. Not only for the drinking purposes but also for textile industrial purposes, toxic chemicals and heavy metals should be studied. The elemental analysis data are shown in Table 3.

TABLE III. RESULTS OF TOXIC METALS

No	*D. Parameters*	Quality in Rainy Season	Desirable W.H.O Standards for Drinking Water (mg/L)	Desirable water parameter for textile wet processing (mg/L)
1	Arsenic (As)(mg/L)	Nil	0.001	0.05
2	Copper (Cu)(mg/L)	0.004 % abundant	2	0.01
3	Lead (Pb) (mg/L)	Nil	0.001	-
4	Cadmium (Cd) (mg/L)	Nil	0.003	-
5	Mercury (Hg)(mg/L)	Nil	0.006	-
6	Iron (Fe) (mg/L)	0.003 % abundant	0.002	0.01
7	Chromium (Cr) (mg/L)	Nil	0.005	0.01
8	Manganese (Mn)(mg/L)	Nil	0.05	0.05
9	Aluminium (Al) (mg/L)	Nil	0.1	0.2

According to the EDXRF spectrum and data, Toxic metal such as Arsenic, Cadmium, Mercury and lead are not detected for water sample. Relative abundant of Si is the highest in the sample water. K, Cu and Fe were also detected in the water sample. Therefore, this water can be used for domestic purposes. But Ca was found in this data, the hardness of water is Ca related hardness. Ca related hard water can be softened by lime-soda treatment

method. Cold method can be used with Alum as coagulant and hot method can be used without any coagulant.

For instance, water for textile industry should not contain too much of iron, as it causes staining of fabric. Water for food industry cannot afford to have manganese, as it causes staining of containers and adversely affects the taste and quality of material cooked in that water. No heavy metals and other toxic chemicals were not found in the sample water and it was analyzed by ED-XRF which was shown in Fig 5. It was also confirmed with AAS method. The results were lower than acceptable values of metal content in raw water. As was not found and Cu was 0.001 ppm in AAS result. The acceptable value of Arsenic (As) is 0.01ppm and Copper (Cu) is 1.0 ppm in water.

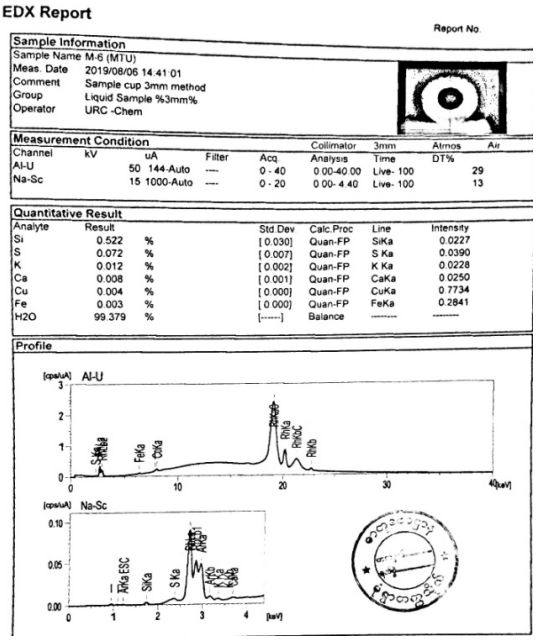

Fig 5. ED-XRF spectrum for Elemental analysis of water sample

E. Result of Chemical Oxygen Demand

The chemical oxygen demand (COD) is a measure of water and wastewater quality. The COD is the amount of oxygen consumed to chemically oxidize organic water contaminants to inorganic end products [6]. The test was taken to measures all organic contaminants, including those that are not biodegradable. There is a relationship between BOD and COD for each specific sample, but it must be established empirically. COD test results can then be used to estimate the BOD of a given sample. The result was shown in the Table 4.

TABLE IV. COD OF TESTED WATER SAMPLE

No	*F. Parameters*	Quality in raining season	W.H.O Desirable Standards for Drinking Water
1	Chemical Oxygen Demand (mg/L)	432	250

According to this data, the water sample contains some organic matters. Therefore, the water should not be used as drinking water. It can be used only as domestic water. For fabric making purposes, the water should be treated to reach the desire quality.

IV. CONCLUSION

In this research work the most common parameters were determined for water analysis. The pH value was 8.0. The value of total hardness and carbonate alkalinity is more than desirable value but not more than imperative value. The value of conductivity, chloride is lower than desirable value. Toxic metals such as Arsenic and Lead are not detected in water sample. For the study of the physical and chemical parameters, the observed values are in the range of International Standards for drinking water proposed by W.H.O. Therefore, the water sample can be assumed to the suitable for domestic purposed only. The textile fibers, including wool, silk and cotton is prepared for fabrication by scouring processes including washing, dying processes, printing processes, etc. need a huge amount of pure soft water. The quality of water is important parameter to making the good products in textile industry. Therefore, the treatment process to get purified soft water is desired for textile industry. Therefore, the well water sample should not be directly used without any treatment to produce high quality traditional fabric.

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Mining Methods Using in Gemstone Exploring of Nanyaseik Area, Kachin State, Myanmar

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***Abstract*-The Nanyaseik area is mainly composed of igneous and metamorphic rocks. The present study is mainly intended to describe the using methods in gemstone exploration. The principal gemstone is ruby. Other rare samples are recorded and studied in the favour of the gem's collectors. The data on primary occurrence of these gemstones are still uncertain. In this area, these minerals are recovered from secondary deposits (gravels). Ruby is found as detrital fragments in gem bearing soil horizons known as byones. Most of the workable gem worksites in Nanyaseik area applied open pit mining method. Moreover, hydraulic mining, gravel pumping and vibration jigging methods are also practiced to recover the gems. Finally, these gems are sorted out by hand with tweezers.**

Keywords - Nanyaseik, ruby, gravels, open pit mining, hydraulic mining

I. INTRODUCTION

The Nanyaseik area is situated in Hpakant Township, Myitkyina District, Kachin State. It can be accessed by automobiles from Mogaung, which is located on the Mandalay-Myitkyina car road and railway. The topographic feature occurred in the area is rugged. These ne limestone adjacent to the intrusive masses of granite. There is no in situ in order to find of gemstones. So, the secondary placer gem-bearing deposits are of economic interest. Some gemstones may be freed from the various softer parent rocks by weathering, eroded, transported, deposited and accumulated in the adjacent valleys and flat lowland areas. The gem materials are associated with other rock forming minerals in gravels. The gem bearing gravel beds are called byone layers in which ruby, sapphire, spinel, zircon, tourmaline, quartz, diopside and almandine garnet are found. Some gemologists stated that rubies and other precious stones are obtained from the alluvial deposits north of the village which are more productive than those to the south.

III. MINING METHODS

Mechanization is used wherever possible to ensure profitable yield. Mining methods applied in Nanyaseik area are as follows:

1. Open pit mining method (Inn Bye) (Fig. 1)
2. Square pit mining method (Lebin Twin) (Fig. 2)

hilly regions are covered with dense vegetation and bamboo forest. This area is mainly composed of igneous and metamorphic rocks namely granite, serpentinite, gneiss, and marble.

The present study is mainly intended to describe the methods in using for gemstone exploration. Detailed gemmological observations were done in the field lasted about three weeks. In the field periods, detailed investigations were done to cover up available data on some mining methods.

II. OCCURRENCES OF GEM MATERIALS

Immediate west of the jade mine area, there occurs phlogopite marble and granite occurs at Nanyaseik, associated with spinel and ruby. These may be part of the former western margin of the Mogok Metamorphic Belt, Mitchell (1987) [5]. References [1], [2], and [4] stated that the dismembered ophiolite and high pressure and low temperature metamorphic rocks are cut by middle Cretaceous plutons and unconformably overlain by Albian sediments. These gemstones were derived from the detritus, afforded by the disintegration of crystalli

Fig. 1 An open pit mine at Gem City worksite (N 25˚39′ 33.6″, E 96˚ 33′ 11.2″)

Fig. 2 Typical square pits in Khaing Kyin worksite (N 25˚41′ 34.2″, E 96˚ 32′ 25.1″)

A. Open pit mining method (Inn bye)

This method is mainly applied on secondary deposits. Almost all the mining activities in Nanyaseik area are carried out by means of this method for voluminous deposits. The mining operations involve:

(a) Removing the overburden

(b) Excavation of gem bearing gravel

(c) Sluicing techniques

(a) Removing the overburden - The removal of overburden is carried out aided by bulldozers where the top soil is removed until gem bearing gravels (byones) are exposed.

(b) Excavation of gem bearing gravels - It is carried out by means of excavators.

(c) Sluicing techniques - This sluicing method is very popular and carried throughout the year. It is commonly applied on hillsides and steep valleys. It is an open trench method, local people called Myaw-dwin which are being sluiced by making use of water power that drains from the higher levels. The water supply is very important, conventionally by passing it along suitably cut bamboos or by water pipes operated by diesel engines. The top soil is first removed until the byone layer is exposed. The byones are then washed on a nearby flat circular floor. Water is diverted into it along with the byone in the form of sprays and the washed up materials enter the trailing canal and the heavy materials are trapped in pits or sluices.

B. Square pit mining method (Lebin twin)

There are about three thousands of old and current square pits at Nanyaseik area. It is a small square pit about four square feet. The depth may vary from (5-20) feet depending on the byone layer and bed rock.

IV. GEM WORKSITES

In Nanyaseik area, the workable gem worksites are mostly situated in western environs of the Nanyaseik village. These worksites are generally N-S trending. Mine area extends about 8km in NS, 5km in EW directions. Based on the field evidences, rubies and other gemstones in Nanyaseik area are originated in marbles and associated igneous rocks. However, gemstones are extracted from byones, secondary deposits (gravels) rather than from insitu (primary deposits). Notably five gem worksites are outstanding and are listed below.

1. Khaing Kyin worksite (N 25°41' 34.2"/ E 96°32'25.1")
2. Lakha worksite (N 25° 38' 42.2" / E 96° 33' 17.6")
3. Warphu worksite (N 25° 38' 25.8"/E 96° 32' 59.4")
4. Sabaw worksite (N 25° 39' 38.1" / E 96° 32' 52.9")
5. Manaw worksite (N 25° 37' 25.5" /E 96° 32' 44.5")

Essential products of these gem worksites are primarily ruby and other semi-precious stones like tourmaline, spinel, garnet, zircon, quartz, etc.

A. Khaing Kyin worksite

The Khaing Kyin worksite is situated in the northern most part of the study area. It uses a square pit mining method (Fig. 3). It is quite small, about three square feet, locally called Lebin twin. The depth reaches to twenty five feet, producing only ruby and other gemstones. The workable period lasts only about five months producing about thirty carats of gem quality stones. The steps of gem extraction are shown in Figures 4, 5 and 6.

Fig. 3 A square pit (Lebin Twin).

Fig. 4 Byones in a wooden thank ready for washing.

Fig. 5 Washing and sieving byones in search of rubies.

Fig. 6 Rubies sorted out from the byones.

B. Lakha worksite

The Lakha worksite is close to the Warphu worksite. This worksite uses an open pit mining technique (Inn bye method) where byones are recovered by pulling process and hydraulic mining method. (Figs. 7 and 8). At this worksite, rubies and other associated gemstones are recovered from secondary placer deposits (Fig. 9).

Fig. 7 Recovery of byones by pulling process.

Fig. 8 Recovery of byones by hydraulic mining method.

Fig. 9 Sorted out gem quality rubies.

C. Warphu worksite

The Warphu Worksite is next to Lakha worksite. Out of three mining companies, only two are at work, namely Sai Khay Company and Hlan Hlann Company. The two mining companies use open pit technique to extract rubies and other gemstones. At Sai Khay Company, byones are recovered by hydraulic mining method (Fig. 10). The sorted out rubies and gold particles can be seen in Figures 11 and 12. At Hlan Hlann Company, byones are recovered by also hydraulic mining method (Fig. 13) and wahsing and sieving for gem extraction (Fig. 14).

Fig. 10 Recovery of byones by hydraulic mining method.

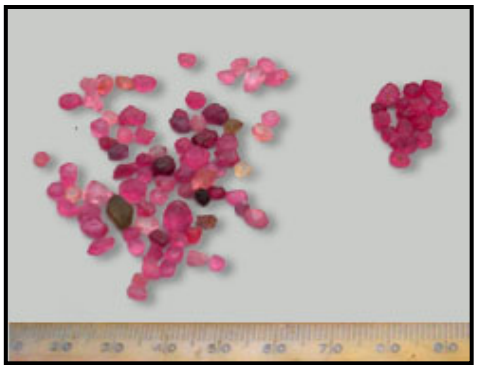

Fig. 11 A collection of sorted out rubies.

Fig. 12 Gold particles on wooden pan.

Fig. 13 Byones are recovered by also hydraulic mining method at Hlan Hlann Company.

Fig. 14 Wahsing and sieving byones for gem extraction.

D. Sabaw worksite

The Sabaw worksite lies in the central part of the Nanyaseik area. There are six mine Companies in Sabaw village namely: Aung Lan Nagar Company, Myat Noe San Eain Company, Gem City Company, Myanmar Htun Company, Tetlone Htoe Kyin Company, and Htaik Tan Aung Company. All these mines use open pit mining method. At Aung Lan Nagar Company, byones are washing by water cannons and myaw (Figs. 15, and 16). A collection of rubies from Aung Lan Nagar Company is shown in Figure 17. At Myat Noe San Eain Company, byones are mined out by open pit method (Fig. 18) and rubies and other assorted gems are shown in Figure 19). At Gem City Company, byones are recovered by hydraulic mining method (Fig. 20). Rubies and other assorted crystals are shown in Figure 21. At Myanmar Htun Company, byones are recovered by open pit mining and shaking with vibrating jig (Figs. 22 and 23). Recovered rubies are shown in figure 24. At Tetlone Htoe Kyin Company, byones are recovered by also open pit mining. Then they are washed and sievied and rubies are picked by tweezers (Figs. 25 and 26). Numerous old shallow pits and open cut mines are elsewhere to be found in Sabaw village. The clear cut sections of these mines sites commonly show:

(a) Overburden soil, locally called 'Khaungmoe' with brownish, reddish or yellowish colours.

(b) Gem bearing pebbly layers.

(c) Bed rocks (local name "Phah") gneiss in which marbles may be found as lensoids.

It is noteworthy that Tetlone Htoe Kyin at Sabaw village produced gemstones of forty pieces per day after working for eight hours. At Gem City Company, carbolate crystals and several other semi-opaque gemstones are plentiful.

Fig. 15 Washing byones by water cannons at Aung Lan Nagar Company.

Fig. 16 Washing byones by myaw at Aung Lan Nagar Company.

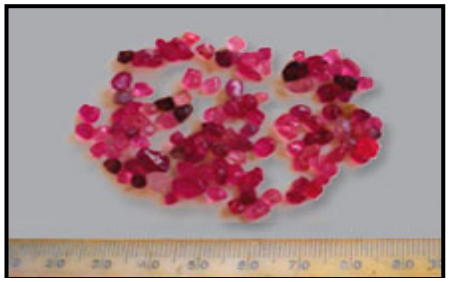

Fig. 17 A collection of rubies from Aung Lan Nagar Company.

Fig. 18 An open pit mine at Myat Noe San Eain Company.

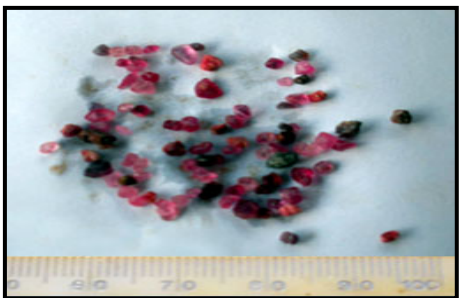

Fig. 19 Rubies and other assorted gems from Myat Noe San Eain Company.

Fig. 20 Recovery of byones by hydraulic mining method at Gem City Company.

Fig. 21 Rubies and other assorted crystals from Gem City Company.

Fig. 22 Open pit mining at Myanmar Htun Company.

Fig. 23 Byones are shaking with vibrating jig at Myanmar Htun Company.

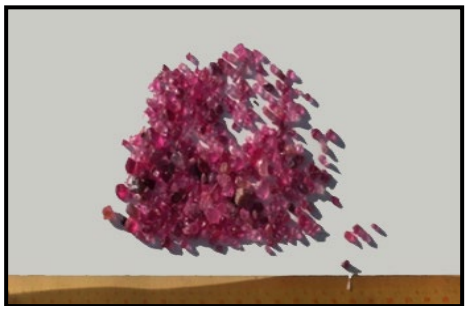

Fig. 24 Recovered rubies from Myanmar Htun Company.

Fig. 25 Washing and sieving byones at Tetlone Htoe Kyin Company.

Fig. 26 Picking rubies by tweezers at Tetlone Htoe Kyin Company.

E. Manaw worksite

The Manaw worksite is situated in the southernmost part of the study area. Local people said that it was a famous worksite prior to the Sabaw worksite. The gem bearing byone layer also mixed with reddish brown and whitish clayey soils in addition to rock fragments. The thickness of gem bearing byone layer is about two to five feet and it is overlain by one to four feet thick non-gem bearing reddish soil layer. There are three workable mine Companies in Manaw village namely: Lwe Nguu Phwan Company, Zabu Kyaw Aung Company and U Sai Maung Kwe worksite. These mines also applied the open pit mining technique. At Lwe Nguu Phwan Company, the two step out ways from vibration jigs are used in recovering byones (Fig. 27). The sorted rubies are shown in figure 28. Zabu Kyaw Aung Company uses open pit mining (Fig. 29). Rubies and pink sapphires from this mine are shown in figure 30. At U Sai Maung Kwe worksite, the byones are washed with water cannon (Fig. 31) and ruby and assorted gems are shown in figure 32.

Fig. 27 Two step out ways from vibration jigs at Lwe Nguu Phwan Company.

Fig. 28 Sorted out rubies from Lwe Nguu Phwan Company.

Fig. 29 Open pit mining at Zabu Kyaw Aung Company.

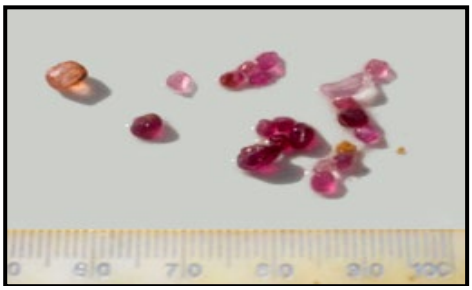

Fig. 30 Rubies and pink sapphires from Zabu Kyaw Aung Company.

Fig. 31 Washing byones with water canon U Sai Maung Kwe worksite.

Fig. 32 Ruby and assorted gems from U Sai Maung Kwe worksite.

5. CONCLUSIONS

All gemstone occurrences from Nanyaseik area are mainly recovered from secondary deposits (gravels). Gemstones are found as detrital fragments in gem bearing soil horizons known as byones. The maximum depth of byone is very shallow, never exceeds one hundred feet. In some places, byones have been found within the reach of one foot depth from the surface. According to DGSE's staff report (1995), those rubies and some assorted gemstones were obtained from the detritus, disintegration of crystalline limestones surrounded by intrusive body in the Nanyaseik area [3].

Most of the workable gem worksites in Nanyaseik area applied open pit mining method due to the swampy lowland with very gentle slopes (5°-10°). Moreover, hydraulic mining, gravel pumping and vibration jigging methods are also practiced to recover the gems which include ruby and other precious gemstones like sapphire, spinel, garnet, diopside, zircon, tourmaline, quartz, etc from byones. Finally these gems are sorted out by hand with tweezers. Inferior quality gemstones are also encountered in byones, elsewhere in gem worksites within shallow depths.

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Petrologic Analysis of The Sedimentary Rocks of The Molohein Group in Kyaung - Hkam Area, Hsi - Seng Township, Southern Shan State

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***Abstract*- The Kyaung - hkam area is the southern part of the Menetaung range situated in Hsi-seng township, southern Shan State. The present study is mainly intended to analyze the sedimentary rocks of the Molohein Group. The representative samples were prepared and analyzed by Polarizing Microscope. The Molohein Group mainly consists of pinkish or purplish, micaceous, fine- to medium-grained sandstones and minor amount of white, pinkish white or purplish white quartzites. On the basis of the petrofabric data, they can be differentiated into two types such as sublithic arenite and subarkosic arenite. Based on the lithologic characters and stratigraphic position, the sedimentary rocks of the Molohein Group were probably deposited under high agitated and near shore environment condition during Late Cambrian. It can be correlated with the Pangyun Formation of northern Shan State.**

Keywords: Molohein Group, subithic arenite, subarkosic arenite, near shore

I. INTRODUCTION

The Kyaung - hkam area is situated in the His-seng township, southern Shan State. It lies between Latitude 20º 28' N to 20º 35' N and Longitude 97º 15' E to 97º 23' E in one-inch topographic maps 93 H/6 and H/7 (UTM map 2097-06 and 2097-07). It is also the southern part of the Menetaung Range. It is also accessible from Wan-yin by Htan-yang – Wan-yin road. Location of the Kyaung-hkam area is shown in (Figure 1). Nu Nu Lwin (2007) described the presence of Chaung Magyi Group, Molohein Group, and Pindaya Group at the Samphu-Horhwe area, northern part of the Menetaung range [5]. Sandi Lwin, Than Than Oo, Zaw Win Lwin, and Win Min Oo (2007) investigated and mapped the geology of the northwestern part of the Menetaung range [6]. Htay Aung (2010) described the detailed geology of the northern part of the Menetaung area in his PhD Thesis [2]. The detailed geological information of the present study area is still lacking. Therefore, the present study is mainly intended to investigate, describe, and to make a generalized petrologic analysis of the sedimentary rock units including in Molohein Group.

II. MATERIALS AND METHODS

Outcrop mapping was accomplished mainly with the aid of Brunton compass and GPS Map 76. The representative samples were thin-sectioned and prepared for petrographic interpretations. The optical characteristics of the samples were analyzed by the Polarizing Microscope and determined according to William, H., F.J., Turner, and C., Gilbert (1953) [3]. The visual estimation of the component grains was carried out to obtain the modal composition, and the petrographic classification. Hydrochloric acid was used especially for rock identification.

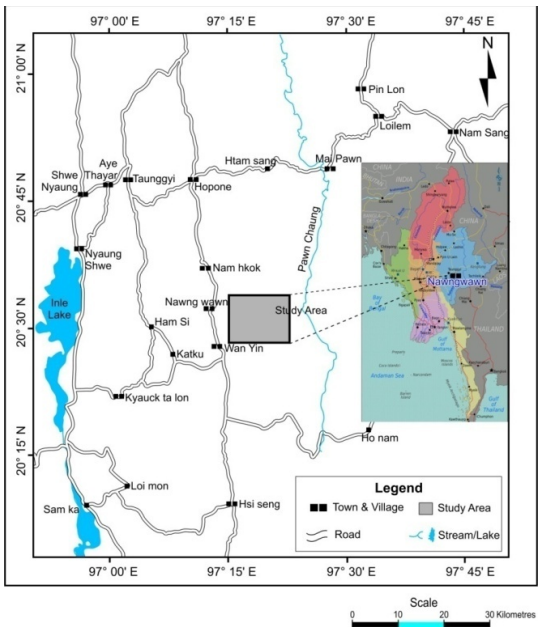

Fig.1 Location map of the Kyaung-hkam Area.

III. DISTRIBUTION AND LITHOLOGY OF MOLOHEIN GROUP

A. Distribution

The Molohein Group was first introduced by Myint Lwin Thein (1973), is derived from the Molohein Peak (7307 feet, 2227 m above sea level), Pindaya Range, Yarksawk township [4]. He described that this group

consists of pinkish, purplish or reddish brown, highly micaceous sandstones and white, pinkish white or purplish white quartzites.

In the present study, the term Molohein Group of Myint Lwin Thein is used to describe the rock group of mainly pinkish or purplish, micaceous, fine- to medium-grained sandstones and minor amount of white, pinkish white or purplish white quartzites. The Molohein Group is distributed in the eastern part of the study area. The micaceous sandstones are well exposed at the northeastern part of the Hti-on-sawk village. Quartzite occurs around the vicinity of Hti-on-sawk village. Generally, it is trending nearly NNE-SSW direction and dipping towards east with amount of 28°.

B. Lithology

In the Kyaung - hkam area, the Molohein Group is mainly involved of the medium- to thick-bedded, micaceous, fine- to medium-grained sandstones, and thick-bedded to massive quartzites. Sandstones exhibit buff to pinkish or purplish colour on weathered surface and pinkish or purplish on fresh one. Quartzites are well indurated and have whitish, pinkish colour. The whole unit is highly weathered, and jointed. Various width of quartz veins cross cut in different directions throughout this unit. Buff to purplish coloured siltstone intercalates with the pinkish colour sandstone in some places. In the study area, the sandstone and quartzite units are the dominant and siltstone and mudstone units are rare.

Many of the micaceous sandstones are laminated sandstones and sometimes show cross-bedding on the surface (Figure 2). Notably about 1feet of quartz vein discordantly cuts across the pinkish or purplish micaceous sandstone near Hti-on-sawk village (Figure 3). Some cubic pyrite crystals and black iron patches are also observed in thin- to medium- bedded, buff coloured fine-grained micaceous sandstones. The slickenside is also occurred on the surface of some outcrops. The sedimentary structure of flute cast is observed on some sandstone beds (Figure 4).

Very thick-bedded to massive, whitish to pinkish coloured indurated quartzites are interbedded with micaceous sandstone at the northeastern part of the study area (Figure 5). In some places sedimentary structure of the ripple mark appears on the surface of it. Local people quarry these sandstone and quartzite to use as road material.

Fig.2 Planar type cross-bedding on laminated buff to pinkish, medium- to thick-bedded, micaceous sandstone of the Molohein Group. (20º 33' 41.70" N 97º 21' 11.1" E, Facing 350°)

Fig. 3 Milky white quartz vein (1 ft) cuts across the highly jointed medium- to thick- bedded buff to pinkish micaceous sandstone of the Molohein Group at northeastern part of Hti on sawk village. (20º 33' 42.6" N 97º 21' 09.6" E, Facing 5º)

Fig.4 Ripple mark on thick-bedded to massive, whitish to pinkish colour indurated quartzite of the Molohein Group (20º 34' 43.56" N 97º 19' 57.93" E, Facing 270°)

Fig.5 Thick-bedded whitish to pinkish coloured, indurated quartzite of the Molohein Group. (20º 34' 43.56" N 97º 19' 57.93" E, Facing 230º)

C. Stratigraphic relationship

The contact with the underlying Chaung Magyi Group is unconformable and this unit passes upward gradationally to the overlying Lokepyin Formation.

D. Fossil, age and correlation

No fossil has been found in the Molohein Group of the present study area. But this unit unconformably overlies the Chaung Magyi Group and underlies the Early Ordovician rocks of the Lokepyin Formation.

Based on the lithologic characters and stratigraphic position, the age of Molohein Group of the study area is probably Late Cambrian and can be correlated with the Pangyun Formation of northern Shan State.

IV. PETROGRAPHY

Petrographic studies of the selected sandstone samples collected from the Molohein Group were carried out in detail. Modal composition of the various grain types was estimated by comparing the percentage estimation comparison charts, and the classification scheme of Pettijohn, et al. (1987) was used in this petrographic study [1]. On the basis of petrographic characteristic, sedimentary structures and fossil assemblage, the depositional environments of the rocks were interpreted. On the basis of the petrofabric data, they can be differentiated into two types such as sublithic arenite and subarkosic arenite.

A. Sublithic arenite

Sublithic arenite sandstones of the Molohein Group have 95 to 88 percent detrital frameworks and 5 to 12 percent matrix. These rocks are mainly composed of quartz, and minor amount of feldspar, mica, hematite and rock fragments. Maximum diameter of the grains ranges from 0.2 mm to 0.25mm and the minimum diameter ranges from 0.02 mm to 0.1mm. Most of the grains are subangular to subrounded and moderately sorted. Generally, quartz and feldspar grains are less rounded than the rock fragments. Mineral composition of the sandstones is shown in Table 1.

TABLE 1 MINERAL COMPOSITION AND DETRITAL PERCENTAGES OF THE SANDSTONES OF THE MOLOHEIN GROUP

Sample no.	Quartz	Feldspar		Mica	Rock fragment	Heavy mineral	Detrital matrix	Cement
		K	P					
ML- 1	75	2	5	5	2	1	2	8
ML- 2	80	3	4	4	3	1	1	4
ML- 3	72	2	3	10	2	1	4	6

B. Sublithic arenite

Quartz is the most common mineral which comprises 70 to 80 percent of the total rock volume. Nearly three fourth of the total quartz grains are monocrystalline with unit extinction (Figure 6). Inclusions are often seen in these quartz grains. Most of the quartz grains were derived from igneous rocks. Quartz grains of the older metasedimentary rocks constitute about 5 to 10 percent of the total quartz.

Feldspar comprises about 7 to 10 percent of total detrital grains and composed of orthoclase and plagioclase feldspar. Plagioclase is more dominant and shows polysynthetic twin (Figure 7). Dull or sericitized feldspars are occurred in these sandstones.

3 to 4 percent of the detrital fraction is composed of quartzite, and igneous rock fragments

Mica contains 4 to 10 percent of the total framework. Biotite is more common than the muscovite which occurs as anhedral or elongated flakes.

Hematite can be observed as anhedral grains and cementing materials. Grains of hematite comprise about 2 percent of the total detrital grains.

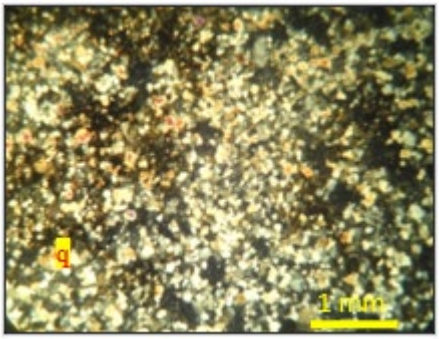

Fig.6 Subangular to subrounded quartz grains (q) in sublithic arenite of the Molohein Group (XN)

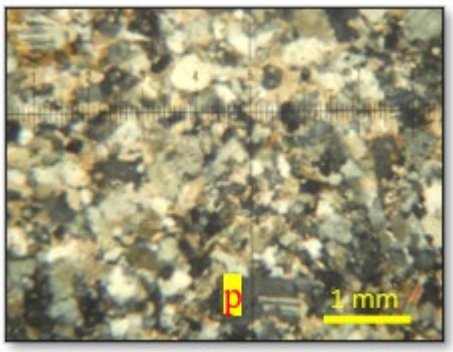

Fig.7 Plagioclase (p) shows polysynthetic twin in sublithic arenite of the Molohein Group (XN)

C. Cementation

Hematite and sericite occur as cementing agent in these sandstones and forms 5 to 12 percent of the total rock volume.

D. Subarkosic arenite

The subarkosic arenite sandstone of the Molohein Group has 92 to 90 percent of detrital framework and 5 to 10 percent detrital matrix. Cement is scanty and it contains about 2 percent of the total rock volume. The detrital grains are composed of quartz, feldspar, mica, rock fragments, iron ore minerals and very little heavy minerals. The maximum diameter of grains ranges from 0.2 mm to 0.5 mm and minimum diameter of grains, 0.05mm to 0.1 mm. Most grains are angular to subrounded and they generally have moderately to poor sorted nature. As the grain contacts are tangential to concavo-convex, the sandstones of the Molohein Group have grain-supported frameworks. Detrital grains are set in sericite and minute quartz grains matrix and hematite cements. Mineral composition and detrital percentages of these sandstones are shown in Table 2.

TABLE 2 MINERAL COMPOSITION AND DETRITAL PERCENTAGES OF THE SANDSTONES OF THE MOLOHEIN GROUP

Sample no.	Quartz	Feldspar		Rock fragment	Mica	Heavy mineral	Detrital matrix	Cement
		K	P					
ML- 4	70	2	3	3	10	2	8	2
ML- 5	65	3	5	5	13	1	5	3
ML- 6	60	4	6	5	15	1	7	2

E. Detrital fraction

Quartz is the most abundant mineral in these sandstones and it comprises 70 to 85 percent of the total grains. Most of the quartz grains are monocrystalline (Figure 8). They show undulatory extinction and some have minute inclusions. Some of the quartz grains are corroded by the cement and are often fractured. Nearly two thirds of the total quartz grains are of igneous origin and the rest are derived from metamorphic rocks.

Feldspar comprises 5 to 15 percent of the total fractions. Among the different types of feldspar, plagioclase feldspars are more common than the orthoclase. Nearly all of the feldspars show a dull or cloudy nature and some grains include the bright specks formed by sericitization process. Some plagioclase feldspars show polysynthetic twin (Figure 9).

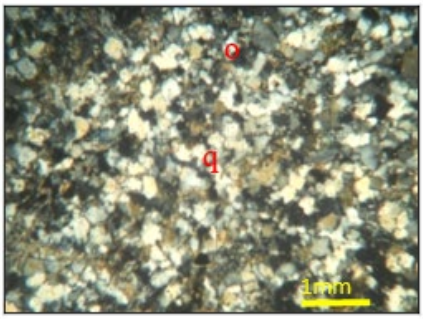

Fig.8 Poorly sorted monocrystalline quartz(q), and hornblende (h) grains in subarkosic arenite sandstone of the Molohein Group (XN)

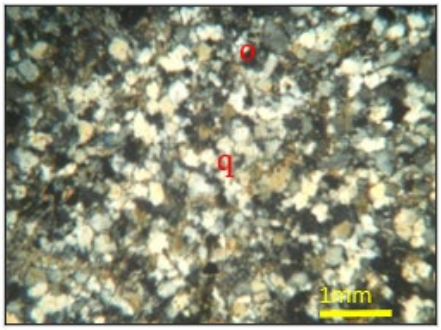

Fig.9 Clear quartz(q), cloudy orthoclase(o) formed by sericitization in subarkosic arenite of the Molohein Group (XN)

Lithic fragments comprise 2 to 7 percent of the total detrital fraction. The most common lithic fragments are quartzite, igneous rock fragments, and elongated phyllite. Stable fragments of quartzite grains are more abundant than the other unstable rock fragments.

Mostly muscovite comprises 8 to 15 percent of the framework. Bending and contorting of muscovite are frequently observed.

Less than 2 percent of the detrital fraction is composed of heavy mineral grains of hematite, magnetite and epidote.

F. Cementation

Matrix made a major role in each sample. It composes of sericite, minute quartz grains and ultra-fine-grained, undifferentiated clay minerals. Matrix constitutes between 5 to 8 percent of the total rock volume. They show bright mottled colour appearance between cross-nicols.

V. CONCLUSIONS

According to Pettijohn, et al. (1987) the sandstones of the Molohein Group may be put under the name of "Sublithic arenite" and Subarkosic arenite (Figure 10) [1]. In sublithic arenite, quartz content is more than 70 percent and the total feldspar does not exceed the total rock fragments. But the rock fragments comprise 3 to 4 percent of the total detrital grains. All the grains are cemented by the chemical cements of hematite. These sediments are composed of about 80 percent of quartz grains and are moderately sorted. Therefore, the depositional environment of this rock may be high agitated and near shore environment. In subarkosic arenite, it is composed of about 65 % to 70% of quartz grains and they vary in size. The grains are cemented by the detrital clay matrix. So, the depositional environment of this rock may be shallow marine environment.

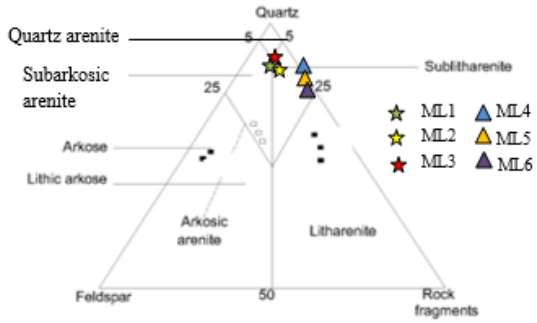

Fig.10 QFR triangular plot of the sandstones of the Molohein Group (After Pettijohn, et al. 1987)

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The influence of maternal size on the eggs, clutch size and hatchling size of Burmese star tortoise *Geochelone platynota* (Blyth, 1863) in Minzontaung Wildlife Sanctuary, Myanmar

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Abstract- **The present study was done to assess the influence of maternal size on the eggs, clutch size and hatchling size of *Geochelone platynota* from Natogyi Township, Myingyan District, Mandalay Region in Minzontaung Wildlife Sanctuary. The study period was July 2017 to August 2018. A total of 30 female were laid 30 nests. A total of 202 eggs were collected from 30 nests. The mean carapace length of maternal tortoise was 4.27 cm and body weight was 30.52 kg. Among these eggs 117 tortoises were hatched. The mean length of hatchling was 3.80mm and weight was 20.54g. Many species of reptiles exhibit complex interrelationships among maternal body size, clutch size, and hatchling size. The highest carapace length of *Geochelone platynota* was ID 49 (32.50cm) and the lowest was ID 47 (24.00cm). The highest clutch size was also ID 49 (10 eggs). The highest length and weight of hatchlings was occurred ID 32 (4.2 mm and 26.20g). *Geochelone platynota* was recorded that increasing female body length was generally associated with higher clutch size. Although maternal size and hatchling size were negatively correlated. Body size variation among populations showed a temperature, productivity, and seasonality and geographical factors of habitats of the species and genetic.**

Keywords **- size, egg, clutch, maternal, *Geochelone platynota***

I. INTRODUCTION

Burmese Star Tortoise (*Geochelone platynota)* is one of the endemic to the dry zone of central Myanmar and Critically Endangerd by the IUCN. Turtles and tortoises are major biodiversity components of our environment. They often serve as keystone species from which other animals and plants benefit where they inhabit. They are the oldest living group of reptiles on earth, with fossil evidence suggesting they were alive over 200 million years ago (Rhodin *et.al.,*2010). Although turtles are survived on this planet for millions of years, they are threatened to an extinct level by human impacts such as illegal marketing, habitat loss and global climate change. The International Union for Conservation of Nature noted that the forty percent of all turtles are threatened.

A considerable body of data indicates that clutch or brood size increases with maternal body size within many populations of reptiles (Congdon *et.al*.,1987). However, despite considerable theoretical interest in the evolution of offspring size (Brockelman,

1975; Smith *et.al*., 1974), the interrelationships among female body size, clutch size, and offspring size in reptiles are still unclear. Oviparous reptiles are particularly useful for studying maternal effects on offspring growth and survival. Female size in turtles, for example, is correlated with clutch size and egg size (Congdon *et al*., 1983). Female body size is thus thought to have important consequences for reproductive success in turtles (Turner *et al.,* 1986). Egg mass is generally also positively correlated with hatchling mass in turtles (Congdon *et al*., 1983). There is little evidence, however, that maternal body size is directly linked to post-hatching offspring size. Evidence that maternal choice, such as nest timing or site selection, or other maternal characteristics, including genetics and age, affect post-hatching growth rates or offspring survival is likewise mixed (Brooks *et al*., 1991). The present research is carried out with the following objective is to compare the relationship between maternal body size, clutch size, egg size and offspring size

II. MATERIALS AND METHODS

A. Studying area and study period

Minsontaung Wildlife Sanctuary is a protected area of Myanmar. It is located in the Natogyi Township, Myingyan District, Mandalay Region. It occupies an area of 22.6 square kilometres (8.7 sq mi) and was established in 1998-99. The study was undertaken between July 2017 to August 2018.

B. Study method

The present study was carried out based on field study. Observer location was chosen based upon preliminary observation of tortoise egg numbers, hatchlings size and maternal size. The present study was carried out based on field study. The field trips

were conducted once a month of study site. Morphometric measurement (carapace length (CL), shell depth (SD)and weight (WT)) of 30 female tortoises were measured. Eggs laying number of 30 female (clutch size), total clutch mass, egg length, egg width, and egg mass were recorded during the breeding seasons. Eggs laying number, clutch size and body weight and length of hatchlings were recorded. Maternal body size and eggs size were studied in the captive farm of Minzontaung Wildlife Sanctuary.

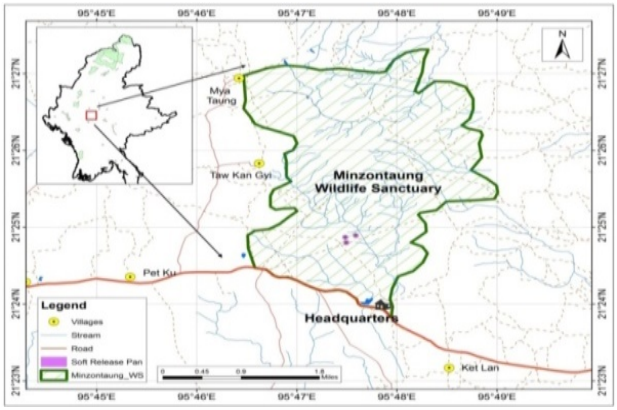
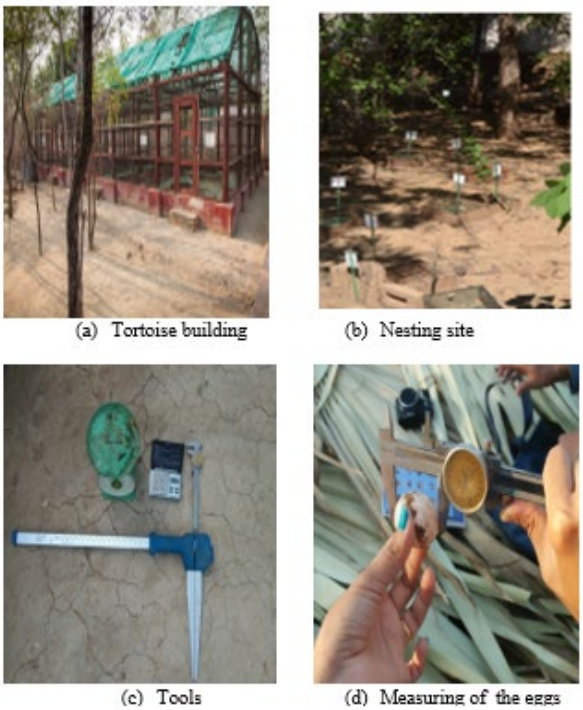


Fig 1. Map of the study area



III. RESULTS

A total of 30 nests collected from the 30 female. The measurement of 30 female tortoises were found vary in differences . The highest carapace length of female was ID 49 (32.50cm) and the lowest was ID 47 (24.00cm). The highest weight was also ID 49 (5.20 Kg) and the smallest weight was ID 58 (2.70 Kg) (Table 1) and (Figure 2).

The highest clutch size was occurred ID 49 (10 eggs). The lowest clutch size was ID 25 (3 eggs). The highest weight was 42.08g (ID 39). The largest length was 4.92cm (ID 48) and width was 3.98 cm (ID 33) .The mean of clutch size was 6.73. The mean of egg length, width and weight were 4.27 mm, 3.52 mm and 30.52g (Table 2) , (Figure 3) (Figure 4) and (Figure 5).

TABLE I. OBSERVED THE MEASUREMENT OF MATERNAL BURMESE STAR TORTOISES

No.	ID	CL(cm)	SD(cm)	Wt (Kg)
1.	58	29.40	10.90	2.70
2.	67	27.00	13.40	4.10
3.	38	27.00	12.70	3.50
4.	48	28.00	14.20	4.52
5.	33	29.10	13.10	4.10
6.	39	26.60	13.70	3.50
7.	59	26.20	10.90	2.68
8.	41	26.70	11.20	3.91
9.	8	29.00	13.30	4.10
10.	62	23.20	11.10	3.90
11.	49	32.50	15.90	5.20
12.	34	28.90	12.30	4.20
13.	28	28.60	14.10	4.53
14.	14	28.40	14.00	4.00
15.	2	30.40	15.60	5.00
16.	61	25.50	12.20	3.80
17.	4	27.30	13.90	4.12
18.	30	28.00	14.50	4.70
19.	15	27.40	14.30	3.20
20.	20	27.90	13.20	4.10
21.	25	27.00	14.20	4.50
22.	43	29.00	12.40	3.80
23.	47	24.00	10.90	2.90
24.	21	29.40	13.00	4.10
25.	50	25.50	11.40	4.00
26.	27	27.00	13.30	4.12
27.	67	27.00	13.40	4.12
28.	5	32.00	15.00	5.00
29.	22	30.40	14.00	4.84
30.	32	25.43	12.10	3.90
Total		833.83	394.2	74.09
Mean		27.79	13.14	4.11
SD		±2.06	±1.38	±0.61

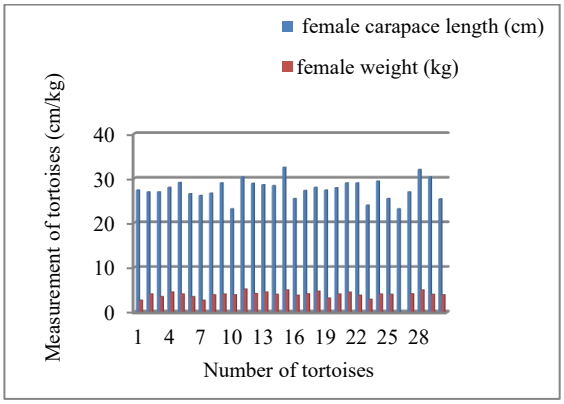


Fig 2.Comparison between carapace length and weight of maternal tortoises

TABLE II. CLUTCH SIZE AND MEAN OF EGG SIZE OF BURMESE STAR TORTOISES

No.	ID	Clutch size	Length (mm)	Width (mm)	Weight (g)
1.	58	7	4.26	3.16	25.79
2.	67	6	4.53	3.70	33.26
3.	38	7	4.55	3.68	36.23
4.	48	5	4.92	3.97	40.70
5.	33	9	4.30	3.98	33.18
6.	39	7	4.06	3.91	42.08
7.	59	5	4.52	3.38	31.53
8.	41	6	4.51	3.35	32.45
9.	8	8	4.45	3.67	35.44
10.	62	4	3.94	3.35	23.70
11.	49	10	4.14	3.42	32.67
12.	34	8	4.52	3.10	32.99
13.	28	7	4.31	3.67	28.61
14.	14	8	3.93	3.60	30.53
15.	2	9	3.90	3.48	25.08
16.	61	9	4.05	3.54	23.08
17.	4	7	4.20	3.49	31.25
18.	30	9	4.00	3.39	24.74
19.	15	8	4.00	3.36	28.30
20.	20	8	4.06	3.78	33.26
21.	25	3	4.05	3.59	32.01
22.	43	9	4.18	3.42	27.05
23.	47	2	4.54	3.35	30.21
24.	21	8	4.18	3.67	31.88
25.	50	5	4.51	3.30	27.20
26.	27	5	4.02	3.53	26.20
27.	67	7	4.38	3.49	29.20
28.	5	4	4.91	3.26	28.50
29.	22	8	4.20	3.51	29.50
30.	32	4	4.00	3.50	29.00
. Total		202	128.12	105.60	915.62
Mean		6.73	4.27	3.52	30.52
SD		±2.88	±0.27	±0.21	±4.48

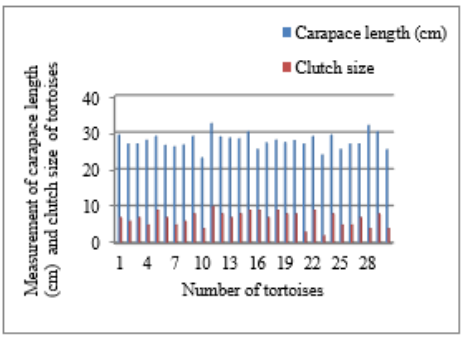


Fig.3. Comparison between carapace length and clutch size of maternal Burmese star tortoises

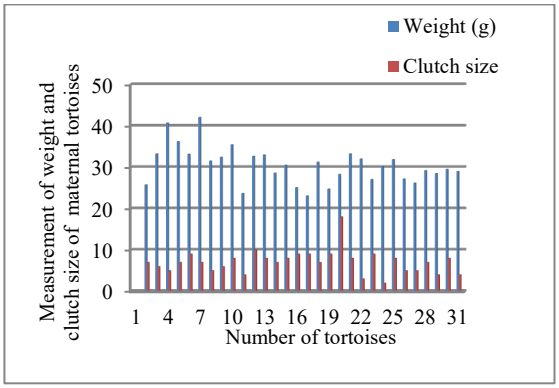


Fig.4. Comparison between maternal weight and clutch size of Burmese star tortoises

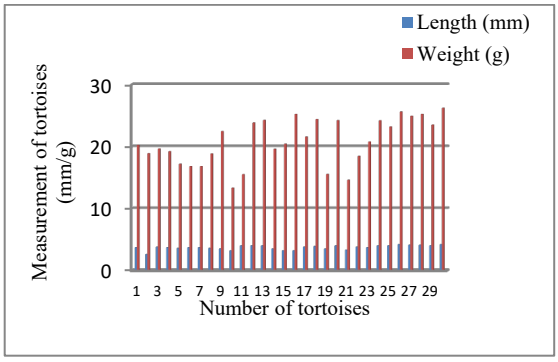


Fig. 5. Comparison between the mean of egg length and weight of Burmese star tortoises

A total of 117 tortoises were hatched. The highest hatchlings were occurred ID 49 and ID 2. The mean length of tortoises were 3.80 mm and weight were 20.54 g. The maximum weight was 26.20 g and the minimum weight was 12.40g (Table 3), (Figure 6) and (Figure 7).

TABLE 3. WEIGHT AND LENGTH OF HATCHLING BURM STAR TORTOISES

No.	ID	Number of hatchlings	Length (mm)	Weight (g)
1.	58	2	3.7	20.22
2.	67	2	2.6	18.87
3.	38	3	3.8	19.62
4.	48	4	3.7	19.2
5.	33	8	3.6	17.17
6.	39	5	3.7	16.78
7.	59	3	3.7	16.79
8.	41	2	3.6	18.82
9.	8	4	3.5	22.44
10.	62	4	3.2	13.31
11.	49	7	4.1	23.49
12.	34	4	4.0	23.83
13.	28	4	4.0	24.24
14.	14	0	3.5	19.59
15.	2	7	3.2	12.40
16.	61	6	3.2	20.41
17.	4	3	3.8	21.56
18.	30	8	3.9	24.38
19.	15	5	3.5	15.52

20.	20	6	4.0	24.21
21.	25	2	3.3	14.59
22.	43	5	3.8	18.44
23.	47	4	3.7	20.75
24.	21	2	4.0	24.18
25.	50	2	4.0	23.18
26.	27	4	4.2	25.61
27.	67	2	4.1	24.91
28.	5	2	4.1	25.21
29.	22	5	4.0	23.49
30.	32	2	4.2	26.20
Total		117	107.22	616.2
Average		3.9	3.80	20.54
SD		±2.20	±0.25	±4.00

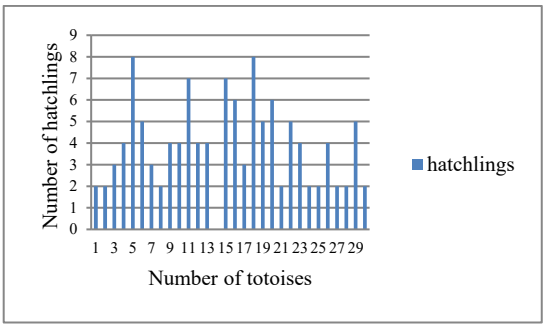


Fig. 6. Hatchlings numbers of Burmese star tortoise Geochelone platynota

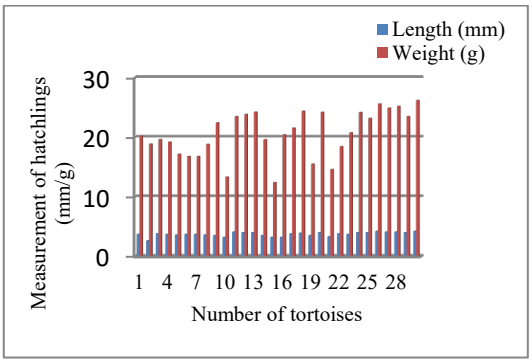


Fig.7. Measurement of hatchlings Burmese star tortoise Geochelone platynota

IV. DISCUSSION

Overall data indicated that the values for the reproductive parameters were measured in the Minzontaung wildlife sanctuary. The mean carapace length and weight of maternal was 4.27cm and 30.52 kg. The mean of clutch size was occurred 6.73. According to the result, the larger females were produced larger clutches size. *Geochelone platynota* were found that negative correlation between maternal size and offspring size. Although maternal size and clutch size were positively correlated. Fox and Czesak (2000) reported that a positive correlation between maternal size and offspring size (even within a population). Rollinson and Brooks (2008) found that negative correlation between maternal size and offspring size. It is assumed that female size, age, species and condition are correlated within populations.

Stewarts (1979) model suggests that this variability in the body size and egg mass relationship is the result of interspecific differences in the body size and clutch size regression. Positive correlations between egg size and hatchling size have been reported in numerous species, including several species of freshwater turtles (reviewed by Rollinson and Brooks 2008). Froese (1987) suggested that the larger hatchlings may have increased fitness especially in a resource poor however, Congdon (1999) was not able to detect any benefit of increased hatchling size. In *Geochelone platynota*, hatchlings size were negatively correlated with clutch size and egg size. Mousseau and Fox (1998) described that developing embryos are greatly impacted by numerous maternal or environmental factors that influence developmental trajectories, embryo survival and fitness-relevant phenotypes of neonates . It is assumed that physiological maturity, biological, abiotic factors, ecological and geographical factors of habitats of the species and genetic.

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Antimicrobial Activity of Lactic Acid Bacteria from Yogurt and Their Effects on *Cucumis Sativus* L. (Tha Khwar)

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***Abstract*- Lactic Acid Bacteria (LAB) were isolated from yogurt samples. These samples were cultured on five specific mediums. A total of thirty-one strains were isolated from these culture media and were labelled as MM 1 to 31. Antimicrobial activities of isolated all strains were carried out by five test organisms. Among them, ten strains showed the activity. Therefore, these ten strains were characterized by morphological, cultural and biochemical tests. Their colony morphology was circular, flat, entire, smooth texture, dull and shiny appearance and colony's color was cream, white, pale brown and yellow. MM 2 to 6 were coccobacilli, catalase negative, gram positive and non motile. MM 8, 9, 17, 19 and 20 were rod, gram positive, catalase negative, and non motile. According to the results, ten strains were characterized as genus *Lactobacillus* and *Streptococcus*. Moreover, Lactic Acid Bacteria were used as fertilizer and seed germination was undertaken. Selected four strains increased significantly seeds germination. Their effects were studied on *Cucumis sativus* L. and there were prominent increases in root depth, shoot length, leaf area and plant height. These selected strains (LAB) can be used as antimicrobial agents and plant growth promoting bacteria.**

Keywords*: *Lactic acid bacteria, antimicrobial activity, biofertilizer

I. Introduction

Lactic acid bacteria (LAB) play an important role in food, agricultural, and clinical applications. The general description of the bacteria included in the group is gram-positive, nonsporing, nonrespiring, cocci or rods, which produce lactic acid as the major end product during the fermentation of carbohydrates [14]. The common agreement is that there is a core group consisting of four genera; *Lactobacillus, Leuconostoc, Pediococcus* and *Streptococcus*. *Lactobacillus* spp. are often found in commercially-available microbial inoculants that are reported to have beneficial effects on the growth and yield of crop plants [8].

Cucumber (*Cucumis sativus*) is one of the most important vegetable crops in the world grown under greenhouses that it has demanded all around the year. This particular beneficial microorganism is popularly used in composting that specifically arrest foul odors associated with anaerobic decomposition and its application in organic farming is enormous [6]. The aim and objectives of this paper were to isolate naturally occurring the Lactic acid bacteria from yogurt, to study the cultural characteristics and colony morphology of isolated bacteria, to find out antimicrobial activity of selected bacteria on five test organisms and to observe the effects of Lactic acid bacteria on the growth and yield of *Cucumis sativus* L. (Tha khwar).

II. Materials and Methods

A. Isolation of Lactic Acid Bacteria

Lactic acid bacteria were isolated from local yogurt samples. The experiments were carried out at the microbiology laboratory of Botany Department, Pathein University. Serial dilutions of fermented, plating and streaking techniques were used to isolate the Lactic acid bacteria according to Reference [15, 4, 10]. Isolation of Lactic acid bacteria was done by using Lactic Streak Agar (LS) medium, Tomato Juice Agar (TA) medium, Nutrient Tomato Juice (NA) Agar medium, Lactobacilli de Man-Rogosa Sharpe (MRS) Agar medium and Lactobacillus bulgaricus (LB) Medium [1].

B. Agar Well Method for Antimicrobial Activity [4]

Isolated strains were tested by agar well method for antimicrobial activity on Agrobacterium tumefaciens NITE 09678, Salmonella typhi AHU 7943, Escherichia coli AHU 5436, Candida albicans NITE 09542 and Saccharomyces cerevisiae AHU 8465. Test organisms were provided by Pharmaceutical Research Development (Ministry of Industry) and NITE (National Institute of Technology Evaluation, Japan).

C. Characterization of Lactic Acid Bacteria

The identification of selected bacterial strains were carried out by using their colony morphology, gram staining methods [7] and biochemical tests which include the catalase test [15], sugar fermentation test (glucose, sucrose, maltose, xylose and lactose) [5], salt tolerance test [11], hydrogen sulphide production [5], citrate utilization test [11], motility test [12], mannitol test [11], urea hydrolysis test [16], methyl red test [2], casein

hydrolysis [10], starch hydrolysis test (soluble starch, tapioca, wheat, rice and sticky rice) [10] respectively.

D. Cultivation of Tha Khwar

The effect of microbial biofertilizer on the growth of Tha Khwar was investigated by sand cultures in the plastic bag container of equal sizes holding about 3g of sterile sand. In this container about 5 seeds were sown. Selected bacterial mixtures (2:8) were applied every weekly intervals until two months. The height of experimental plants was recorded.

The measurements of the plant height seedling, length of radical, leaf area, day to first flowering and Tnumber of fruit per plant were recorded at one-week intervals according to the methods of [17].

III. Results and Discussion

A. Isolation of Lactic Acid Bacteria

In the present work, all isolated bacteria were obtained from five different culture media and designated into MM 1 to MM 31 and the results were shown in Table 1.

TABLE I. ISOLATION OF LACTIC ACID BACTERIA (LAB) ON FIVE SELECTED MEDIUM

No	Culture Media	Isolated bacteria
1	Lactic Streak Agar	MM 1-7
2	Tomato Juice Agar	MM 8-12
3	Nutrient tomato Juice Agar	MM 13-20
4	Lactobacilli de Man-Rogosa Sharpe Agar	MM 21-29
5	*Lactobacillusbulgaricus* Agar	MM 30-31

B. Antimicrobial Activity of Isolated Lactic Acid Bacteria

Antimicrobial activity of all isolated strains was performed by five test organisms. Ten strains (MM 2 to 6, 8, 9, 17, 19 and 20) showed the antimicrobial activity and MM 20 reached the highest activity (35.24 mm) on E. coli followed by 29.48 mm on S. cerevisiae. These results were shown in Table 2.

C. Colony, Cultural and Cell Morphology of Selected Bacteria

In the colony morphology, MM 2 to MM 6 were circular, flat, entire, undulate, lobate, pale brown and white in colour, opaque optical on Lactic Streak Agar medium. These bacteria were Gram positive, rod and coccobacilli shape. In the Tomato Juice Agar medium, MM 8 and 9 were circular, raised and flat, entire, white and brown colour, Gram positive, rod and coccobacilli shape. In the Nutrient Tomato Juice Agar medium, the colony of MM 17, 19 and 20

were circular, flat, entire, cream, white and pale brown colour. Reference [3] described that colonies of lactic acid bacteria were smooth, white to very light yellow, flat, circular or irregular and variable in size. These results were shown in Table 3 and figure 1.

TABLE 2. ANTIMICROBIAL ACTIVITY OF LACTIC ACID BACTERIA (LAB)

Isolated strains	Test Organisms and Antimicrobial Activity (mm)				
	A. tumefaciens	*S. typhi*	*E. coli*	*C. albicans*	*S. cerevisiae*
MM 2	-	+	+	13.15	14.55
MM 3	+	14.20	13.65	13.15	13.26
MM 4	+	16.78	17.28	15.00	16.79
MM 5	13.24	18.30	13.81	16.73	18.60
MM 6	-	+	+	13.58	17.45
MM 8	15.03	+	+	-	13.22
MM 9	14.25	+	+	-	13.09
MM 17	15.60	+	+	18.46	14.5
MM 19	17.33	17.20	20.86	19.02	18.47
MM 20	24.23	24.49	**35.24**	21.34	29.48

Well size 8 mm

TABLE 3. COLONY CHARACTER AND CELL MORPHOLOGY OF SELECTED BACTERIA

Selected bacteria	Form	Elevation	Margin	Gram Reaction	Cell shape
MM 2	circular	flat	entire	+	R
MM 3	circular	flat	entire	+	C
MM 4	circular	flat	entire	+	R
MM 5	circular	flat	Undulate	+	R
MM 6	irregular	flat	lobate	+	C
MM 8	circular	raised	entire	+	C
MM 9	circular	flat	entire	+	R
MM 17	circular	raised	entire	+	C
MM 19	circular	flat	entire	+	C
MM 20	irregular	flat	entire	+	C

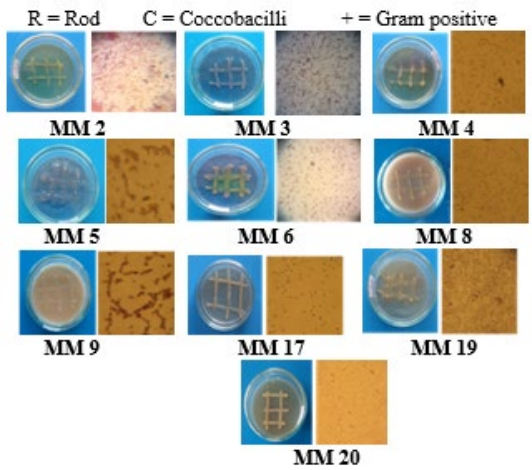

Fig 1. Cultural characters and Cell Morphology of Selected Lactic Acid Bacteria

D. Biochemical Characters of Ten Selected Bacteria

In the biochemical characters, MM 2 to 6 were catalase negative, acid was produced from glucose,

sucrose, maltose, lactose and xylose. Other selected bacteria (MM 8, 9, 17, 19 and 20) were also catalase negative, acid was produced from five sugar. The isolated lactic acid bacteria (MM 2 to 6) were cocobacilli, rod, gram positive, acid was produced from glucose, sucrose and lactose and xylose except five strains, mannitol positive, H2S did not produce, urea and citrate test negative except MM 2, did not hydrolyze the soluble starch and sticky rice powder. These results were the same to the previous research of [3] and these isolated bacteria were classified as genus Streptococcus. Other isolates (MM 8, 9, 17, 19 and 20) were gram positive, rod, catalase negative and acid was produced from glucose, sucrose, lactose and xylose, H2S did not produced, mannitol positive, urea and citrate test negative except MM 19 and only MM 8 hydrolyzed both soluble starch and sticky rice powder. Above all results were matched with the descriptions of Reference [3] and these strains were characterized as genus Lactobacillus. Reference [13] reported that the characteristics of Lactobacillus are rods, usually long and slender, Gram positive and catalase negative, mannitol positive, acid fermentation was in glucose, sucrose, xylose, maltose and lactose. These results were shown in Table 4.

TABLE 4. BIOCHEMICAL CHARACTERISTICS OF TEN SELECTED LACTIC ACID BACTERIA FROM YOGURT

Biochemical Tests	Ten Selected Lactic Acid Bacteria									
	2	3	4	5	6	8	9	17	19	20
Catalase Test	-	-	-	-	-	-	-	-	-	-
Sugar fermentation glucose	+	+	+	-	+	+	+	+	+	+
Sucrose	+	+	+	+	+	+	+	+	+	+
Maltose	-	+	+	+	+	+	+	+	+	-
Lactose	+	+	+	+	+	+	+	+	+	+
Xylose	-	-	-	+	-	+	+	+	+	-
NaCl tolerance (2 %)	+	+	+	+	+	+	+	+	+	+
NaCl tolerance (4%)	+	+	+	+	+	+	+	+	+	+
NaCl tolerance (6%)	-	-	-	-	-	-	-	-	-	-
H_2S production	-	-	-	-	-	-	-	-	-	-
Citrate utilization	-	-	-	-	-	-	-	-	+	-
Motility test	-	-	-	-	-	-	-	-	-	-
Mannitol salt broth	+	+	+	+	+	+	+	+	+	+
Urea hydrolysis	-	-	-	-	-	-	-	-	-	-
Methyl red test	-	-	-	-	-	-	-	-	-	-
Casein hydrolysis	+	-	+	+	+	-	+	-	+	+
starch hydrolysis	-	-	-	-	-	+	-	-	-	-
Wheat powder	-	-	-	-	-	-	-	-	-	-
StickyRice powder	-	-	-	-	-	+	-	-	-	-

(+) positive reaction (-) non reaction

TABLE 5. EFFECT OF FOUR SELECTED STRAINS ON CUCUMIS SATIVUS L. (THA KHWAR)

Selected strains	Water and Bacterial Suspension (2:8)	Height of hypocotyl (cm)	Plant height(cm) of week				Agronomic			Leaf area (cm) For Four weeks
			2	4	6	8	NF	WF (g)	DW of root (g)	
Con-trol	10	5	11.4	27	40	47	1	123.4	0.4	12.5
MM 5	2:8	6	12	30	48	60	1	203.6	0.5	14
MM 8	2:8	6	13	38	50	65	1	177.5	0.5	14
MM 15	2:8	15	14	40	48.5	62	1	122.1	0.7	15.3
MM 30	2:8	10	17	40	48	53	1	148.1	0.3	14

NF-Number of Fruits, WF-Weight of Fruits, DW-Dry Weight

E. Effect of Selected Bacterial Strains on Cucumis sativus L.

In this study, four kinds of lactic acid bacteria (MM 5, 8, 15 and 30) were selected according to the germination results and used as fertilizer. In the germination percentage, seeds of Cucumis sativus L. gave the best results in MM 8, 15 and 30. Reference [9] reported that the strain Lactobacillus lactis significantly activated the shoot and root growth of rice variety when the strain was applied to rice seeds prior to growing in plotting medium.

IV. CONCLUSION

The present study was focused on the isolation of Lactic acid bacteria and their effects on Cucumis sativus L.

The yogurt sample was cultured on five specific culture medium and thirty one strains were obtained. Their colony morphology was circular, flat, entire, variable size, smooth texture, dull and shiny appearance and colony's color was cream, white, pale brown and yellow.

And then, antimicrobial activity of LAB was observed by five test organisms. Among them, ten isolated bacteria showed the activities and MM 19 and 20 killed all test organisms. MM 20 showed the highest activity (35. 24 mm) on Saccharomyces cerevisiae, (24.49) mm on Salmonella typhi, (21.34 mm) on Candia albicans and (24.23) on Agrobacterium tumefaciens respectively. Therefore, these ten bacteria were selected and characterized by biochemical tests.

Moreover, all isolated bacteria were used as fertilizer in the germination test. Among them, four isolates gave the best germination percentage. Therefore, these four isolates were selected and observed by the addition of selected bacteria (MM 5, 8, 15 and 30) to the experimental plants increased their growth over the control.

After application of four selected bacterial strains, tha khwar plants treated with MM 30 showed the plant

height 17cm / plant to 40cm / plant within four weeks of growing period. After 8 weeks, plant treated with MM 8 reached the tallest plant height (65 cm / plant) followed by MM 15 and MM 5. In the leaf area, plant treated with MM 15 showed the widest area (15.3 cm / plant) followed by other three strains (each 14cm). Fruits weight of plants treated with MM 5 reached the maximum weight (203.6g) followed by MM 8 (177.5g).

These findings suggest that the utilization of lactic acid bacteria in cucumber cultivation fields may represent a valuable tool for enhancing plant growth.

The search of a new lactic acid bacteria with the antimicrobial activities which can be used in human health, agriculture, food industry and its outstanding importance have been studied by many researchers. According to the results of strong antimicrobial activity, selected lactic acid bacteria (MM 2 to 6, 8, 9, 17, 19 and 20) can be applied in the protection of human health and other four strains (MM 5, 8, 15 and 20) can be used as fertilizer.

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Effects of *Spirulina* Biofertilizer on Morphological Parameters of Lablab *purpureus* (L.) Sweet Cultivar (Tatkone) in Plot Experiment

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***Abstract*- An investigation was conducted to find out the biofertilizer effect of Spirulina on growth parameters of Lablab Purpureus (L.) Sweet cultivar (Tatkone) (lablab bean) at Yadanabon University during 2017 and 2018. Plot experiments were using Randomized Complete Block Design (RCBD) with 3 replications and Spirulina suspension ST_3 (3 g l^{-1}) and ST_4 (4 g l^{-1}) were treated with lablab bean seeds. From these results Spirulina suspensions 4 gl^{-1} was produced the best treatment and Spirulina biofertilizer improves the growth parameters of Lablab purpureus (L.) Sweet cultivar (Tatkone).**

***Keywords*: Biofertilizer, Suspension, Spirulina, Lablab purpureus, morphological parameters**

I. Introduction

Legumes are among the world's most important crops. They play an ever-increasing role as a supplier of protein for millions of people. They not only provide nutritious food, but also increase soil fertility [8]. These valuable crops are of great importance in Myanmar Agriculture and occupy the second largest position of crop cultivated due to the increasing demands for domestic consumption and exports [3].Food legumes cover about 3.3 million hectares out of 9.8 million hectares of total cultivated land in Myanmar [4].*Lablab purpureus* (L.) Sweet (Lablab bean) is a fast growing annual legume. Extensive production of *Lablab purpureus* (L.) as a high protein grain food and forage legume [14].

Intensive farming practices that warrant high yield and quality, required the extensive use of chemical fertilizers, which are costly and create environmental problems. Therefore, more recently there has been a resurgence of interest in environmentally friendly, sustainable and organic agricultural practices [5].

Organic agriculture is a production system, which avoids or largely excludes the use of synthetically compounded fertilizers and as far as possible, organic agricultural system rely upon bio-fertilization, however yield reduction is an important problem in organic production system [10].

Using biofertilizers containing beneficial microorganisms instead of synthetic chemical improve plant growth through supplying plant nutrients and may help to sustain environmental health and soil productivity [11].

In 1981, the FAO [7] documented the possibilities of blue-green algae replacing chemical fertilizers and rebuilding the structure of depleted soils. In India, blue-green are grown in shallow earthen ponds. When the water evaporates, the dried algae are scooped up and sold to rice farmers. This natural nitrogen source is only one third the cost of chemical fertilizer and it increases annual rice yield in India by an average of 22% where chemical fertilizers are not used, algae give the same benefit as 25 to 30 kg of chemical nitrogen fertilizer per acre. Where chemicals are used, algae use allows the reduction of an equivalent amount of inorganic fertilizer [6].

Spirulina is one the photosynthetic blue green microalga. Nowadays it is producted commercially as a food source, animal feed and biofertilizer with high nutritional value [1]. *Spirulina* has been used as biofertilizer for many crops in different application methods individually or combined with other organic fertilizers [2].

The present investigation was to find out the effect of *Spirulina* biofertilizer on morphological parameters of *Lablab purpureus* (L.) Sweet cultivar (Tatkone) in plot experiment.

II. Materials and Methods

Lablab purpureus (L.) Sweet cultivar (Tatkone) obtained from Department of Agricultural Research (DAR), Naypyitaw, Pyinmana and Spirulina biomass (Lot No.S.391) obtained from Myanmar Pharmaceutical Factory (MPF), Ye Kharr, Sagaing were used in these experiments. Spirulina suspension 0 (control), ST4 (4 gl-1) and ST3 (3 gl-1) (w/v) were used for lablab bean cultivar and sown on 19th September, 2017 and 2018 in Taung Ywa Thit, Amarapura Township, near the Yadanabon University. The land used for the experimental study was not used for planting crop previously. The land

was thoroughly prepared before the experiment started. The experiment was designed as randomized complete blocks with three replications. Each plot was 3.20 m × 4.11 m in size and it consists of eight rows with spacing of 0.49 m (45.72 cm) between rows and plants. The outermost two rows were bordered and the second outermost four rows were used for destructive sampling and innermost two rows for harvest area. The total experimental area was 320.61 m2 including 1 m of platform area and 0.60 m of the space between plots.

Lablab bean seeds were sown at the rate of three seeds per hole in rows at different concentrations of Spirulina suspension and control with a uniform depth of about 2 to 4 cm. Thinning was done two weeks after emergence and one plant per stand was kept.

A. Collection of Data

Crop age of Lablab purpureus (L.) Sweet cultivar (Tatkone) is usually about 180 DAS. All treatments and control were collected at the end of 30 day after sowing (DAS) and plants were collected at intervals of 30 days for three consecutive plants from each replication for dry weight determination. To determine the morphological characters, leaves were counted and then average was worked out and length and breadth of each leaf were measured and then multipled by adjustment factor 0.65 for average leaf area. Leaves, stem and root were separated, dried and weighed to record data on dry weight of leaf, stem and root. Plant growth was determined by dry weight to determination the efficacy of Spirulina suspension.

Leaf Area (cm2) = leaf length × leaf breadth × adjustment factor (K).

K = 0.65 [13]

B. Statistical Analysis

All of the data are analyzed by using Gen Stat, Version 1 [9].

III. Results

A. Effect on Morphological Parameters

Plant height; Plot experiment were carried out with the seeds of Lablab purpureus (L.) Sweet cultivar (Tatkone).The results of the effect of different concentrations of Spirulina suspension on plant height of Lablab purpureus (L.) Sweet cultivar (Tatkone) at 30, 60, 90, 120, 150 and 180 DAS were shown in Table 1.

Dry Weight of stem; The effects of Spirulina suspension on dry weight of stem in lablab bean cultivar are shown in Table 2. Dry weight of stem in all treatments increased with age until harvest time. Effect of ST4 (4 gl-1) on dry weight of stem produced highest values and followed by ST3 (3gl-1) and control. These results are statistically significant.

TABLE I. EFFECT OF *SPIRULINA* SUSPENSION ON MEAN PLANT HEIGHT OF *LABLABPURPUREUS*(L.) SWEET CULTIVAR (TATKONE)

Treatment	30 DAS (cm plant^{-1})	60 DAS (cm plant^{-1})	90 DAS (cm plant^{-1})	120 DAS (cm plant^{-1})	150 DAS (cm plant^{-1})	180 DAS (cm plant^{-1})
Control	37.33	88.7	97.6	104.4	106.8	104.7
ST_4(4gl^{-1})	52.5	109.9	112.7	122.7	125.3	126.7
ST_3(3gl^{-1})	40.7	94.2	100.7	109.3	111.7	112.3
F value	2.14	1.90	0.19	3.08	0.52	0.67
Fpr	0.020	0.003	0.26	<0.001	0.11	<0.001
$LSD_{0.005}$	12.40	9.78	10.62	6.56	10.82	7.38
CV%	9.2	6.9	7.0	4.0	6.5	4.4

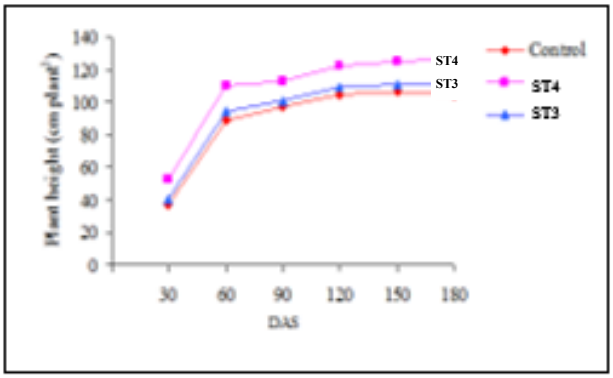

Fig 1. Effect of *Spirulina* suspension on mean plant height of *Lablab purpureus* (L.) Sweet cultivar (Tatkone)

Dry Weight of Leaves; Initially, dry weight of total leaves was slowly and steadily increased until the maximum dry weight at 150 DAS. It declined the total dry weight of leaves at 180 DAS. It was due to the death of some leaves at the base of the stem. ST4 (4 gl-1) produced the highest dry weight of leaves than other treatments and control (Table 3).

TABLE 2. EFFECT OF SPIRULINA SUSPENSION ON MEAN DRY WEIGHT OF STEM OF LABLAB PURPUREUS (L.) SWEET CULTIVAR

Treatment	30 DAS (g plant^{-1})	60 DAS (g plant^{-1})	90 DAS (g plant^{-1})	120 DAS (g plant^{-1})	150 DAS (g plant^{-1})	180 DAS (g plant^{-1})
Control	2.932	4.26	5.980	7.43	8.29	9.05
ST_4(4gl^{-1})	4.210	5.84	7.236	10.30	10.39	12.23
ST_3(3gl^{-1})	3.548	4.63	6.438	8.27	8.82	10.03
F value	2.79	0.13	0.77	0.91	1.82	0.24
Fpr	<0.001	0.083	<0.001	0.001	<0.001	<0.001
$LSD_{0.005}$	0.32	45.2	0.4735	1.122	0.711	0.989
CV%	6.2	20.3	5.0	8.9	5.3	6.5

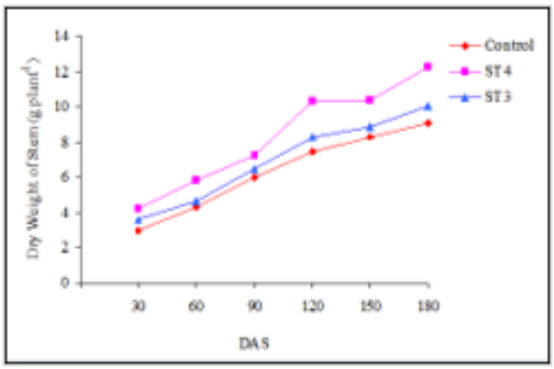

Fig 2. Effect of Spirulina suspension on mean dry weight of stem of Lablab purpureus (L.) Sweet cultivar

TABLE 3. EFFECT OF SPIRULINA SUSPENSION ON MEAN DRY WEIGHT OF LEAVES OF LABLAB PURPUREUS (L.) SWEET CULTIVAR

Treatments	30 DAS (cm^2 $plant^{-1}$)	60 DAS (cm^2 $plant^{-1}$)	90 DAS (cm^2 $plant^{-1}$)	120 DAS (cm^2 $plant^{-1}$)	150 DAS (cm^2 $plant^{-1}$)	180 DAS (cm^2 $plant^{-1}$)
Control	3.062	5.052	7.30	11.08	12.11	10.58
$ST_4(4gl^{-1})$	4.246	5.914	10.87	13.33	14.85	12.84
$ST_3(3gl^{-1})$	3.340	5.142	9.20	11.66	13.54	11.00
F value	1.52	6.24	0.31	1.90	1.10	1.05
Fpr	<0.001	<0.001	<0.001	0.010	<0.001	<0.001
$LSD_{0.005}$	0.4440	0.3007	1.178	1.287	0.856	0.832
CV%	8.6	3.8	8.9	7.3	4.3	5.0

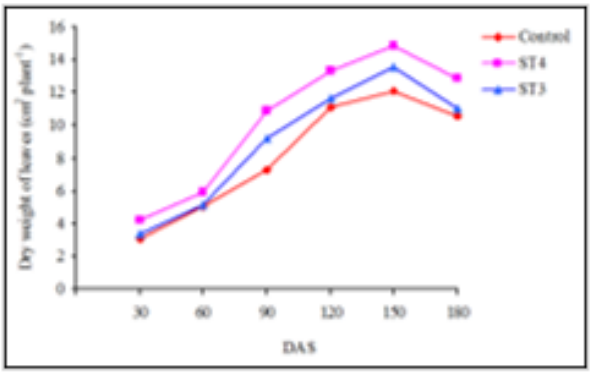

Fig 3. Effect of Spirulina suspension on mean dry weight of leaves of Lablab purpureus (L.) Sweet cultivar

Dry Weight of Root; The dry weight of root in all treatments generally increased with increasing age. The maximum mean dry weight of root 3.826 gplant-1 was produced by ST4 (4 gl-1) (Table 4).

TABLE 4. EFFECT OF SPIRULINA SUSPENSION ON MEAN DRY WEIGHT OF ROOT OF LABLAB PURPUREUS (L.) SWEET CULTIVAR

Treatment	30 DAS (g $plant^{-1}$)	60 DAS (g $plant^{-1}$)	90 DAS (g $plant^{-1}$)	120 DAS (g $plant^{-1}$)	150 DAS (g $plant^{-1}$)	180 DAS (g $plant^{-1}$)
Control	0.511	1.328	1.328	2.190	2.574	2.836
$ST_4(4gl^{-1})$	0.856	2.104	2.104	2.890	3.228	3.826
$ST_3(3gl^{-1})$	0.678	1.806	1.806	2.276	2.866	3.158
F value	0.20	1.85	1.85	0.01	1.03	0.53
Fpr	<0.001	<0.001	<0.001	0.003	0.004	<0.001
$LSD_{0.005}$	0115	0.2216	0.2216	0.3853	0.3112	0.3553
CV%	11.2	8.7	8.7	6.3	7.4	7.4

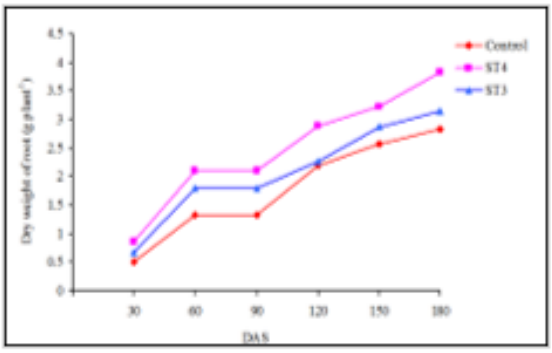

Fig 4. Effect of Spirulina suspension on mean dry weight of root of Lablab purpureus (L.) Sweet cultivar (Tatkone)

Total Dry Matter; Data concerning the amount of TDM on effect of Spirulina suspension treatments and controls were shown in Table 5. In all successive period, the amount of TDM steadily increase from 30-150 DAS and drastically increase of 180 DAS. Effect of ST4on TDM (g plant-1) were obviously increased at harvest time. It was 40 % higher than control (94.27 g plant-1 vs 67.05 g plant-1) in lablab bean cultivar.

TABLE 5. EFFECT OF SPIRULINA SUSPENSION ON TOTAL DRY MATTER OF LABLAB PURPUREUS (L.) SWEET CULTIVAR (TATKONE)

Treatment	30 DAS (g $plant^{-1}$)	60 DAS (g $plant^{-1}$)	90 DAS (g $plant^{-1}$)	120 DAS (g $plant^{-1}$)	150 DAS (g $plant^{-1}$)	180 DAS (g $plant^{-1}$)
Control	7.33	10.48	14.93	20.60	25.40	67.05
$ST_4(4gl^{-1})$	11.04	13.86	20.45	26.45	32.03	94.27
$ST_3(3gl^{-1})$	8.74	11.89	17.48	22.20	27.84	73.08
F value	0.42	0.13	1.32	1.06	2.03	2.44
Fpr	<0.001	0.008	<0.001	<0.001	<0.001	<0.001
$LSD_{0.005}$	0.708	1.817	1.155	1.442	1.422	4.762
CV%	5.3	10.3	4.5	4.3	3.4	4.2

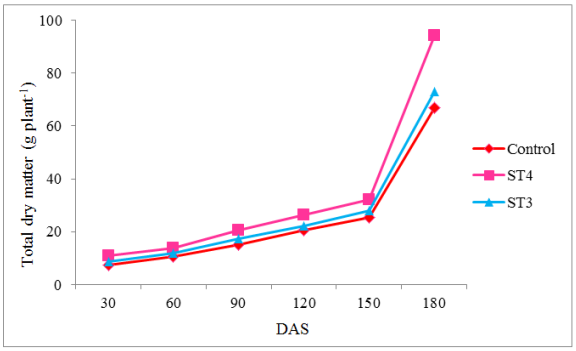

Figure 5. Effect of Spirulina suspension on total dry matter of Lablab purpureus (L.) Sweet cultivar (Tatkone)

Total Leaf Area; Total leaf area increased with increase in age for all treatments. The increase of grand mean of total leaf area was clear from 30-150 DAS and it declined after 150 up to 180 DAS (Table 6). It was due to the death of some leaves at the base of the stem. Mean total leaf area on lablab cultivar

(Tatkone) was produced the best treatment ST4 and it was greater than control due to the proper effect of Spirulina suspension treatment.

TABLE 6. EFFECT OF SPIRULINA SUSPENSION ON TOTAL LEAF AREA OF LABLAB PURPUREUS (L.) SWEET CULTIVAR (TATKONE)

Treatment	30 DAS (cm^2 $pant^{-1}$)	60 DAS (cm^2 $pant^{-1}$)	90 DAS (cm^2 $pant^{-1}$)	120 DAS (cm^2 $pant^{-1}$)	150 DAS (cm^2 $pant^{-1}$)	180 DAS (cm^2 $pant^{-1}$)
Control	609	1104	1681	1984	2367	1637
$ST_4(4gl^{-1})$	1098	1508	2121	2579	2739	2224
$ST_3(3gl^{-1})$	750	1224	1912	2127	2588	1824
F value	0.37	1.38	1.21	0.91	0.42	1.18
Fpr	<0.001	0.033	0.025	0.003	0.477	0.019
$LSD_{0.005}$	182.0	291.6	29.4	277.7	676.4	375.5
CV%	15.2	15.6	10.5	8.5	18.1	13.6

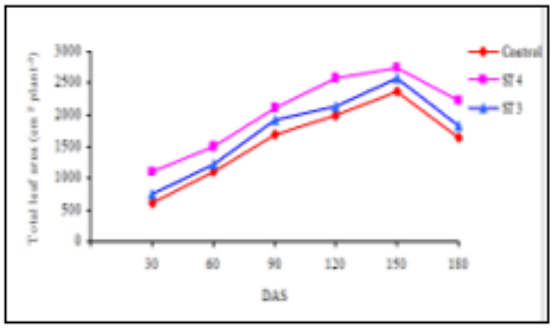

Fig 6. Effect of Spirulina suspension on total leaf area of Lablab purpureus (L.) Sweet cultivar (Tatkone)

IV. DISCUSSION AND CONCLUSION

In plot experiment, the effectiveness of Spirulina suspension on plant height, dry weight of stem, leaves, root, total plant dry matter and total leaf area of Lablab purpureus (L.) Sweet cultivar (Tatkone) was presented in Table 1 to 6 and Figure 1 to 6. From these results Spirulina suspensions 4 gl-1 was produced the best treatment for lablab bean cultivar. In view of plant height, all treatments clearly showed that Spirulina suspension 4 gl–1 produced the highest value than 3gl-1and control. Plant height increased with age in all treatments. The change of plant heights was significantly increased from 30-60 DAS in Spirulina treatments then control and it steadily increased until 180 DAS. Effect of Spirulina suspension 4 gl-1 on mean plant height was 21 % higher than control (126.7cm vs 104.7 cm). Total dry matter (TDM) and total leaf area (TLA) were also increased in all treatments. And then, the increment of TDM and TLA were clear from 30-150 DAS and it declined after 150 DAS.

The rich chemical composition of the suspension probably contributed a wide-ranging effect in a great number of plant species [12]. In these comparative results, all treatments were enhanced significantly in plant height, dry weight of root, stem, leaves, total plant dry weight and total leave area.

In conclusion, Spiulina biofertilizer treatments significantly increased the fresh and dry matter of plant. It is recommended to apply biofertilizer to the crop plant produced the positive environmental effects. So, this can prevent pollution of soil and water and excessive accumulation of chemical fertilizer. We suggest that some other study should be carried out on the biofertilizer. Finally, Spirulina biofertilizer improves the growth parameters of Lablab purpureus (L.) Sweet cultivar (Tatkone).

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Teaching English through Famous Movies in Flipped Classroom

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***Abstract* – In this paper, famous English movies are introduced in flipped classroom for English Language Teaching (ELT). The aim of this paper is to update English language teaching and to create more interactive teaching methods at universities, in Myanmar. This paper analyses the effectiveness of using famous movies and flipped classroom in teaching tertiary level students English. The investigation was performed on two groups: the students of experimental setting and the students of control setting at the University of Medicine, Magway. The participants were medical students of foundation year and four English teachers. The outcomes prove that the students of experimental setting learn more enthusiastically and more interactively and their language skills are superior to the students of control setting because the use of famous movies in flipped classroom can integrate listening and speaking skills with writing skill. The result also shows that students and teachers have positive perceptions towards the use of famous movies in flipped classroom.**

***Keywords* – movies, flipped classroom, the internet, language skills, motivation, perceptions**

I. Introduction

The conventional way of teaching English cannot motivate students to learn enthusiastically. That's why English teachers keep attempting to utilize technology-based methods in teaching English. There is a growing trend towards student-centered class from teacher-centered and textbook-centered class to be engaging for students. Students gradually prefer small group discussion to lecture. Benjaman Franklin said, "Tell me and I'll forget. Show me and I may remember. Involve me and I learn." John.G.Palfrey quoted, "Television didn't transform education. Neither will the internet. But it will be another tool for teachers to use in their effort to reach students in the classroom. It will also be a means by which students learn outside of the classroom." That's why it is high time English teachers started using teaching methods that focus on students' involvement in teaching and learning process so that students can improve their language skills.

A. Background

At the universities of medicine in Myanmar, teaching English mostly focuses on reading, writing and grammar. Medical students learn English just to pass the examinations and they have no opportunity to learn English as a language for communication. As a result, medical students are good at reading and writing skills, but most of them have difficulties in listening and speaking when they have to apply English as a language in real context. Therefore, English teachers need to update their teaching methods that can integrate receptive skills with productive skills. To update teaching methods at the medical universities in Myanmar, lecture periods have been reduced and periods of small group discussion have developed to enhance student-centered approach. However, most students take no interest in the contents of the course book and materials to discuss in small group periods and their discussions are not so lively. To cope with this problem, famous movies can be used as materials in teaching English. In this day and age, the number of university students who enjoy watching English movies is developing more and more. English teachers need to exploit students' enjoyment to teach English effectively.

II. Flipped Classroom

Flipped classroom is a method of teaching in which students study new material at home, for example, with videos over the internet, and then discuss and practise it with teachers in class, instead of the usual method where teachers present new material in school and students practise at home. The main objective of flipped teaching is to create interactive teaching and learning, meaningful discussion, activities and application of course content during face to face classroom.

As cited by Mehmet URFA in "Flipped Classroom Model and Practical Suggestions," flipped classroom was first applied in the field of chemistry in 2007 by (Sams & Bergmann, 2012). However, (Guan, 2013) stated that flipped classroom already existed in 1990s; flipped classroom was applied by Eric Mazur as reading activities at home due to lack of the necessary technological sub-structure; that flipped classroom basically requires teachers to prepare course-related videos in advance, requires learners to watch these videos at their out-of-class time to prepare for the lessons (Sams & Bergmann, 2012); (Bristol, 2014).

Flipped teaching involves students watching lecture videos as homework before class which enables for meaningful discussion, interaction and activities during face-to-face session. Thus, flipped learning is considered effective to create student-centered approach and famous movies are used as learning materials to be engaging for

students. Therefore, instead of lecture movies, this investigation focused on famous English movies to assign students to watch at home in order to update English language teaching.

III. Movies in English language teaching

The review of literature on the use of movies in ELT reveals that varieties of English, slices of culture and historical change can be demonstrated. Furthermore, using audio-visual elements aids learning and movies are great fun to watch (Lynch, 2008). Movies provide exposure to real language uttered in authentic settings and the culture in which the foreign language is spoken (TOGNOZZI, 2010) (Haghverdi, 2015). In addition, they assist the learners comprehension by enabling them to listen to exchanges and see such visual supports as facial expression and gesture simultaneously (Allan, 1985) which may boost their insights into the topic of the conversation. According (Seferoğlu, 2008), films provide authentic language input and a stimulating framework for classroom discussion. Movies can capture the students' attention toward the target language (TOGNOZZI, 2010); increase the students' motivation to learn the language (Ruusunen, 2011)and supply good material. Moreover, the integration of movies in the EFL/ESL classes can also improve the students' academic writing skills (Baratta & Jones, 2009).

A lot of studies on using movies in EFL classes have been conducted, but it is noted that there is time consuming to use movies in the classrooms and the research gap is that there is no investigation of using famous movies in flipped classroom. Therefore, the literature review came to the idea of doing research on the use of famous movies in flipped classroom to reduce time consuming in face-to-face class. The current investigation constructs the research questions:

1. Does the use of famous movies in flipped classroom improve students' language skills?
2. What are the students' perceptions towards famous English movies integrated with flipped teaching?
3. What are the teachers' perceptions towards famous English movies integrated with flipped teaching?

IV. PARTICIPANTS

40 students of the foundation year and four English teachers from university of medicine, Magway, participated in this investigation. The students including male and female have upper intermediate level of English. It took two months to do this investigation. The 40 students were divided into two classes: experimental setting and control setting. Each class contains 20 students combining male and female.

V. METHOD

Mixed-method (quantitative method and qualitative method) was used to collect data.

1. The scores of pre-test and post-test
2. Questionnaire for students and teachers
3. Interview with the participants: the students and the teachers

Data collection of the improvement of the students' language skills after using famous movies in flipped classroom is described with the table of pre-test scores and post-test scores. Data collection of the students' and the teachers' attitude towards using famous movies in flipped classroom were conducted through questionnaires. Questionnaires of a 5-points Likert scale –strongly disagree to strongly agree – were distributed to the participants – the 40 students and the 4 teachers.

At the end of the investigation period, the students from experimental setting and control setting were interviewed with some questions concerning with the use of famous movies in flipped classroom and the use of usual method in the class. The four teachers who facilitated the two classes: experimental and control class, were also interviewed with the questions concerning the difference between the two classes and the effect of using movies and flipped teaching.

VI. PRODUCRES

Before the investigation, both of the groups of experimental students and control students had to take pre-test of four skills. For the purpose of this investigation, two famous movies, "Interstellar" and "A rainy day in New York" were selected and used for the students of experimental setting. First of all, experimental students were asked to watch the movie "Interstellar" downloadable from the internet and were distributed some listening exercise: True/False question, multiple choice question and gap-fill question. Three days later, they had to discuss the characters, the language the characters used, the event of the movie, and the music in the movie in the face-to-face class. In the class, the teacher gave feedback of their answers to the listening questions. A face-to-face class period took 100 minutes and two periods were consumed for the discussion. After the face-to-face session, the students were assigned to write the summary of the movie and the movie review. For the other movie, "A rainy day in New York", the same procedure was used. For the students of control setting, the usual procedure and activities to practise listening and speaking, were used in the classroom. They had to practise listening with audio only in the class by doing exercise True/False question, multiple choice question and gap-fill question. For speaking activities, storytelling, role-play and discussion were performed. For writing activities, the students of control setting were assigned to write summary of passage. After the two months of investigation period, both the experimental students and the control students had to do post-test of four skills.

VII. Findings and Results

The findings and results of the investigation prove that the distinction between the students of experimental setting and the students of control setting is apparent because the scores of experimental students are better in the post-test of four skills than that of the students in control setting. It is concluded that movies factors associated with flipped teaching motivate students to learn enthusiastically and interactively, improve students' language skills and enhance the effectiveness of teaching and learning process.

A. The improvement of experimental students' language skills

In the post-test, the improvement of experimental students' language skills is apparent. Their results of post-test are much better than their results of pre-test. For the students of control setting, they have no improvement in the post-test because their results of post-test are almost the same as their results of pre-test.

TABLE I. THE SCORES OF PRE-TEST AND POST-TEST OF EXPERIMENTAL SETTING

Student of experimental setting	Pre-test	Post-test
1	77	81
2	76	81
3	71	78
4	69	79
5	65	75
6	64	75
7	63	72
8	63	72
9	60	71
10	60	70
11	59	71
12	58	70
13	57	69
14	55	69
15	54	68
16	53	67
17	51	65
18	51	65
19	50	62
20	50	61

TABLE II. THE SCORES OF PRE-TEST AND POST-TESTOF CONTROL SETTING

Student of control setting	Pre-test	Post-test
1	78	79
2	75	78
3	72	73
4	69	68
5	67	69
6	67	68
7	66	67
8	65	65
9	62	63
10	61	60
11	60	61
12	59	58
13	58	57
14	55	56
15	54	57
16	53	55
17	53	54
18	52	50
19	52	51
20	50	51

B. The result of questionnaire for students

According to the questionnaire for students, they agree that the use of famous movies in flipped classroom is effective to improve language skills and movies keep them interested. Most of the participants consider movies to be useful in learning English. Sixty-eight percent of the participants strongly agree that the use of movies in flipped teaching is interesting to learn English. The majority of the students accept that face-to-face class is more interactive after they have watched movies at home. More than half of the students strongly agree that their movie preference will affect their learning. Approximately 75percent of the participants strongly agree to the statement that English subtitles are good in learning English. Over ninety percent of the students believe that it is interesting to learn English if the teachers use famous movies in flipped classroom. Ninety-four percent of the students agree that they are motivated to write summary and movie review after watching. Ninety-two percent of the participants agree that dialogues in movies are useful for daily life. Eighty-six percent of the participants believe that teachers should use more movies to teach them English.

C. The students' interview

The interview of qualitative method strengthened the result of the questionnaire. Five participants were interviewed after using two movies in flipped classroom. All the students agree that the use of famous movies in flipped classroom motivate them to learn English language skills because of authentic and meaningful context in the movies and writing activities integrating with famous movies are also engaging.

Student 1: "Flipped classroom is really helpful to learn English and I can watch the movies comfortably at home and check the dialogs again and again until I understand."

Student 2: "I think movies are useful for learning English, especially listening and speaking. We can hear native speaking of English and learn how to speak in our daily life and learn more natural language expression."

Student 3: "I can learn more than ten sentences and new vocabularies while watching a movie."

Student 4: "Discussion in face-to-face classroom is more interactive and movies-based teaching attracts students to learn more than traditional teaching method."

Student 5: "Movies-based teaching method can integrate our listening skill and speaking skill with writing skill. That's why teachers should use more movies and flipped teaching method."

D. Teachers' perceptions towards famous movies integrating with flipped teaching

The general opinion of the four teachers is that famous movies combined with flipped teaching affect teaching and learning English beneficially. The following statements are the results of the teachers' questionnaires and some points are their answers to the interviews.

1. The teachers of participants have not received the training for flipped teaching and using famous movies.
2. All the four teachers agree that flipped classroom engages students to learn English enthusiastically and interactively.
3. They also strongly agree that famous movies should be used in flipped classroom.
4. They also strongly agree that famous movies in flipped teaching can improve students' language skills.
5. They believe that using movies in flipped classroom provides more time to discuss in face-to-face classroom.
6. Two of the teachers think that it is hard to find suitable movies for university students.

7. One of the teachers assumes that it is a little difficult to incorporate movies into the curriculum.
8. All the four teachers strongly agree that movies are a useful resource for oral English language teaching and writing activities.
9. The feedback they received from the students for the use of famous movies and flipped teaching has been positive.
10. Two of the teachers use flipped teaching method 1-2 times during an academic year but the other two have never used.
11. All the teachers discovered that the students of experimental setting learn more enthusiastically and interactively than the students of the control setting.
12. It is confirmed that the results of the experimental students are better than the results of the control students in the post-test of four skills.

VIII. DISCUSSION

The investigation shows that famous movies generally improve listening, speaking and writing skills. While the students are watching the movie at home, they can focus on listening practice. They can hear language expression in the authentic context. When they cannot clearly hear language expressions the actors use in the movie, they have the chance to watch and listen again. If the movie is shown in the classroom, it is not easy for individual to watch again and again whenever he or she does not catch up the expressions. They can also learn new vocabularies. It is interesting for students to do listening practice and to study new vocabularies and language expressions with the visuals. On the other hand, the students from control setting find practice on listening with audio in the class boring. While they are listening to the audio, they need to image the context in their minds and so they cannot fully concentrate on their listening.

For speaking, the students in flipped classroom have the resource to speak energetically. They can also prepare what they want to discuss before face-to-face class. In face-to-face class, they could discuss what they learn from the movie, the opinion of the characters and the movie, what they like best and what they like least about the movie and why. Therefore, movies-based discussion in the flipped classroom can enhance communicative skill more than usual speaking activities in the classroom such as storytelling, role-play and discussion on some topics.

Movie-based teaching really engages students to write summary and movie review. The resource of the movie they watch, what they learn and discuss in the face-to-face class are really helpful for them to write summary and movie review. It can also be discovered that movie-based writing activities are more engaging for students than usual writing activities used in the classroom.

There is no doubt that famous movies and flipped teaching is an effective way of language teaching and learning process. It not only provides a unique opportunity for students to expose language in authentic context but also improves students' productive skills. It is the communicative approach which is the most important way to learn English. Even though it is hard to incorporate movies to the curriculum for the university students, movies-based teaching in flipped classroom should be utilized at least five times in an academic year as a supplement to the curriculum. The choice of movies should be planned to suit the proficiency level of the students. It is also important for teachers to select suitable movies for their lessons. To conclude, the investigation indicates that famous movies can be used as pedagogical materials when used correctly.

IX. CONCLUSION

This paper aims to improve English language teaching and create more interactive teaching methods at universities of Myanmar. The results of the present investigation prove that famous movies and flipped teaching can enhance students' language skills. The participants: the students and the teachers in the investigation have positive perspectives towards the use of movies in flipped classroom. The investigation also shows that using movies in flipped teaching can arouse the students' motivation to learn English. The teachers in the study strongly recommend that famous movies develop participation and engagement of the students. The students believe that famous movies and flipped teaching help them to improve their listening skill, speaking skill and writing skill. In addition, teachers need to be wise to select the right movies and to facilitate the flipped classroom efficiently. It is also difficult to choose appropriate movies for the target language and students, and also hard to incorporate famous movies to the curriculum. It is hoped that further papers can discover the solution of such problems and aid teaching English through famous movies in flipped classroom.

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Investigating the Effects of Vocabulary Enhancement Exercises in *'English Result'* (Intermediate Students' Book) Prescribed for First Year Students at University of Computer Studies, Myanmar

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Abstract- **Vocabulary takes part in a vital aspect in English language learning because it is essential in every skill of language such as listening, speaking, reading and writing. For communication and acquiring knowledge, a useful and fundamental tool is vocabulary. So, vocabulary is central to language and of critical importance to the typical language learners. The aim of the research is to investigate what types of exercises enhancing vocabulary in 'English Result' prescribed for first year students at University of Computer Studies, Myanmar. In the present research, the data are collected using 'Vocabulary exercise types by Learn English Teens British Council'. The finding of the research shows that among eight types of vocabulary exercises, the most frequent exercise is 'Completing the gaps' and the exercise 'Odd one out' cannot be found in this coursebook. Vocabulary exercise types in 'English Result' are interesting, challenging, motivating and can support students to enhance their productive skills and also receptive skills.**

Keywords*: *Vocabulary, exercise types, language, learning, motivating

I. Introduction

In Learning English Language, vocabulary is considered to be of paramount importance to improve both receptive skills and productive skills. Thus, the keystone of English skills is vocabulary. One of the first steps in learning English language is learning vocabulary. A powerful vocabulary is directly linked to success in learning a new language. A sound knowledge of vocabulary can fulfill the learners' ultimate goals in learning such as being able to interpret others' ideas clearly, to express themselves fluently and to communicate with others successfully. The learners will face difficulties in receptive skills as well as in productive skills if they do not have sufficient amount of vocabulary in all four skills of English. So, it is very important for the teachers to decide what types of exercise should be used to promote the learners' vocabulary acquisition.

II. Aim and Objectives of the Research

The aim of the present research is to investigate what types of exercises are used to enhance vocabulary in 'English Result' prescribed for first year students at University of Computer Studies, Myanmar. The objectives of this research are:

(1) to identify the types of exercises used to teach vocabulary in each unit of 'English Result' and
(2) To observe the effect of vocabulary enhancement exercises in 'English Result'.

III. Literature Review

There are three parts in this research. First, the importance of Vocabulary in Language acquisition is presented. Then, various definitions of vocabulary are described. Finally, vocabulary exercise types suggested by "Learn English Teens British Council' are stated.

A. The Importance of Vocabulary in Language Acquisition

Nakata (2006) acknowledged that vocabulary acquisition requires continual repetition in order for effective vocabulary learning. Vocabulary acquisition has become an extremely important part of second language acquisition. Vocabulary, like other aspects of language learning, can be facilitated when done through cooperative learning.

Traditionally, vocabulary has been taught within the lessons of reading, writing, listening and speaking. During the lesson, learners apply their own vocabulary and are introduced to new words supplied by the teachers and classmate in classroom activities. Students need to be taught vocabulary in context so that they can retain the words and use them more frequently. English language learners need to possess enriching vocabulary. They can face difficulties in learning vocabulary even though the learners have been learning vocabulary through their studies. To find out why they are weak in learning vocabulary is necessary. So, teachers also need to discover effective vocabulary teaching methods, approaches, strategies and exercises and make them practice in the classroom.

B. Definitions of Vocabulary

According to Cambridge Advanced Learner's Dictionary, a noun "vocabulary" has two definitions: all the words known and used by a particular person and all the words which exist in a particular language or subject.

In Merriam Webster dictionary, vocabulary means a list or collection of words or phrases usually alphabetically arranged and explained or lexicon.

C. Exercise Types from 'Learn English Teens British Council'

There are eight types of effective teaching exercises in developing students' vocabulary skill in learning English. They are:

1. Completing the gaps
2. Matching the words and the pictures
3. Matching the words with the definitions
4. Choosing the correct word
5. Categories
6. Odd one out
7. Word building
8. Words that go together

Completing the gaps

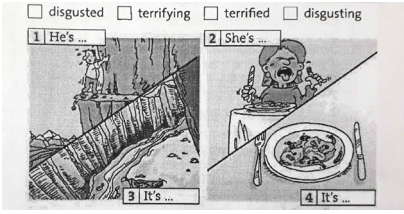
In this type of exercise, students have to put the correct word in the gaps. Students have to read the text carefully before and after the gap to be able to select the correct word. The words are often in a box and sometimes there are more words than gaps. Students require to read the whole text to see what it sounds like in order to obtain the right answer. For example: Complete the sentences with these words.

daydream	basketball	railroad

1. The ------ tracks cross the road here.
2. I had a ------ about flying in the air.
3. Can you throw the ------ through the hoop?

Match the words and the pictures

In this type of exercise, students have to match the words with the pictures. Students necessitate making sure the instructions. They have to draw clear lines and to copy the word suitably and check spelling carefully in order to acquire the right answer. For example: Match these words with pictures 1-4.



Match the words with the definitions

In this type of exercise, students have to match each word with a definition. Students have to read the definitions with awareness. Students have to establish with the words they know. If the words are similar, students will be able to match the words with the right definitions. For example: Match these words with the correct definitions.

1. The daughter of my sister	a. colleague
2. My uncle's daughter	b. niece
3. Someone I work with	c. cousin

Choosing the correct word

In this type of exercise, students have to choose the exact word from two or three probable answers. Students have to read the sentence carefully before and after the word. And then, students have to consider carefully about the meaning of the text and choose the words that are accurate. Some words have similar meaning but there is a difference. For example, the difference 'say' and 'tell'; 'make' and 'do'. Sometimes the options are wrong because the spelling is wrong. Students have to check the answer in order to obtain the correct answer. For example: Underline the correct word.

1. You can buy milk at a *grocer's* / *green grocer's.*
2. You pay at the checkout in a *market* / *supermarket*.
3. You don't pay to take books from a *bookshop* / *library*.

Categories

Sometimes students have to put words into different groups or categories. This is usually one of the easier types of vocabulary exercises. In this type of exercise, students have to read the words in the box and define the categories. And, they have to write the words they comprehend in the exact category. For example: Are these words '*cognates*, *false friends*, or *completely different*' in your language? Write 1, 2, or 3.

☐ apple ☐ large ☐ exit ☐ actually ☐ taxi

Odd one out

Students have to select the word that is different from three or four words. In this type of exercise, students have to read all the words carefully. And then, they have to find a connection before choosing the word which is different. If they do not realize a word in the group, it may be connected to the other words. So, they have to discover a connection first before choosing a word. Sometimes students have to explain why it is different. For example: Find out the word which is odd from the following.

1.	Mars	Jupiter	Singapore
2.	Tokyo	Liverpool	Paris
3.	Dallas	Italy	Frankfurt

Word building

Students have to read a sentence or text and have to vary the form of a word from a noun to an adjective or from a verb to a noun. Students have to look at the word they have to change. The beginning of the word is often the same and the end of the word changes. Moreover, they have to consider the most appropriate form of the given word; whether the best answer is a verb, a noun, an adjective or an adverb. For example: Look at 'Dictionary entries' opposite. Find these words.

1. The noun of *achieve* ----------
2. The adjective of *succeed* ----------
3. The verb of *manager* ----------

Words that go together

In this type of exercise, students have to match the two words that go together. When there are two groups of words, they have to put together one word from each group. Sometimes they have to make collections, e.g. verb + noun: make + friends. Sometimes they have to make compound nouns, e.g. snow + boarding. Sometimes they have to put a verb or adjective with a preposition, e.g. listen + to. Students have to check the answers in order to acquire the correct answer. For example: Match words in column A with words in column B to make meaningful sentences.

A	B
1. I went to restaurant	a. for the main course.
2. We looked	b. with my friends.
3. We had prawn	c. at the menu.

IV. Research Methodology

The present research is an investigation of exercises enhancing vocabulary in 'English Result' prescribed for first year students at University of Computer Studies, Myanmar. There are altogether twelve units in this coursebook. In this book, teaching grammar, vocabulary, interaction, pronunciation, reading, writing, listening, and speaking are incorporated. There are a lot of exercises relating to listening, speaking, reading, and writing in the materials. In this research, 'Vocabulary exercise types from Learn English British Council' are used to collect types of vocabulary exercises in 'English Result'.

D. Data Collection and Data Analysis

The data on types of exercises enhancing vocabulary in 'English Result' are shown in table 1.

Table I. Types of Vocabulary Exercises in *'English Result'*

Page	Unit	Exercise	Types of Exercise
7	1(A) How to talk about the people in your life	(1) Look at "The people in my life" opposite. Say if they are male, female or either.	-Categories
		(2) Read the text and name the people in the photos.	-Matching the words and the pictures
9	1(B) How to talk about greeting customs	(3) Look at "Greetings" opposite and match them with photos a-g.	-Matching the words and the pictures
11	1(C) How to explain who people are	(4) Look at the phrases in "Position" opposite. Match them with the numbers in the diagram	-Matching the words and the pictures
		(5) Underline the correct words.	-Choosing the correct word
13	1(D) How to correct a misunderstanding	(6) Match the definitions and examples.	-Matching the words with the definitions
		(7) Are these words cognates and false friends or completely different in your language? Write 1, 2, or 3.	-Categories
15	Unit 1 Review	(8) Match these words with the correct definition.	-Matching the words with the definitions
		(9) Complete the sentences with these words	- Completing the gaps
		(10) Where's the smiley? Write sentences for the picture.	-Words that go together
17	2 (A) How to talk about your background	(1) Match these names with the three categories	-Categories
		(2) Look at the information in "People and places" opposite. Which photo is it about?	-Matching the words and the picture
		(3) Complete the information.	-Completing the gaps
21	2(C) How to describe objects	(4) Match the sentences with photos a-l.	-Matching the words and the pictures
24	2(E) Writing An Intercultural experience	(5) Are these words and phrases used to talk about people, places, or things?	-Categories
25	Unit 2 Review	(6) Complete the sentences with these phrases.	-Completing the gaps
		(7) Complete the text with these words.	-Completing the gaps
29	3(B) How to talk about your achievements	(1) Look at "Dictionary entries" opposite. Find these words.	-Word Building
		(2) Write a second sentence with the same meaning, using the word in blue.	-Words that go together
31	3(C) How to offer hospitality	(3) Match the phrasal verbs with their meanings.	-Matching the words with the definitions
		(4) Complete the examples.	-Completing the gaps
		(5) Underline the correct words.	-Choosing the correct words
		(6) Tick the correct sentences.	-Choosing the correct words
		(7) Correct the wrong sentences.	-Words that go together
		(8) Find phrasal verbs in "Teen Dream" with these meanings	-Matching the words with the definitions
		(9) Complete the sentences with phrasal verbs from "Teen Dream"	-Completing the gaps
33	3(D) How to talk about your education and career	(10) Complete the sentences with these words.	-Completing the gaps
34	3(E) Writing a CV	(11) Put these words in the correct column	-Categories
35	3 Review	(12) Complete the text	-Word Building

		with the correct form of these words.	
		(13) Write the best word in each gap.	-Completing the gaps
		(14) Write the words for these definitions.	-Matching the words with the definitions
37	4(A) How to say how you feel about things	(1) Find –ed or –ing adjectives in "What's your idea of Fun?" to describe the following.	-Choosing the correct word
		(2) Match these words with pictures 1-4.	-Matching the words and the pictures
		(3) Finish the words in these sentences.	-Word Building
39	4(B) How to talk about music	(4) Find words in the quiz with these meanings.	-Matching the words with the definitions
		(5) Find words in "Are you into music?" to add to these lists.	-Categories
43	4(D) How to explain what a film is about	(6) Match the "Types of Film" opposite with film posters 1-7 in "His film or Her film?"	-Matching the words and the pictures
		(7) What types of film do men and women usually prefer? Put them in order from 1-7 for men and women.	-Categories
45	4 Review	(8) Complete the words in this conversation.	-Completing the gaps
		(9) Match the film types and the people.	-Matching the words with the definitions
47	5(A) How to talk about Countries & Government	(1) Complete the text with the words from "Politics".	-Completing the gaps
49	5(B) How to talk about rules and laws	(2) Write the verbs from the dictionary definitions in "Signs" in the box.	-Categories
51	5(C) How to talk about stories in the news	(3) Choose the best verbs to complete the sentences.	-Completing the gaps
55	5. Review	(4) Write the words for these definitions	-Matching the words with the definitions
		(5) Complete the sentence for each sign in the passive. Use the verb given.	-Completing the gaps
		(6) Complete the sentences with the correct form of these verbs.	-Word Building
57	6(A) How to express strong feelings	(1) Look at "Extreme adjectives" opposite and match one adjective with each of these meanings.	-Matching the words with the definitions
		(2) Find synonyms for terrible and wonderful in 'Extreme adjectives'. Write them in this diagram.	-Completing the gaps
		(3) Underline the best word to complete the sentences	-Choosing the correct word
61	6(C) How to talk about people in your neighbourhood	(4) Look at "Behaviour" opposite. Which do you think are positive and which are negative?	-Categories
		(5) Which of these complaints about neighbours are most	-Choosing the correct word

		common? Number them 1-7.	
63	6(D) How to report what people said	(6) Underline the correct words in these sentences.	-Choosing the correct word
		(7) Complete the text with 'said' or 'told'.	-Choosing the correct word
64	6(E) Writing Exchanging news in personal letter	(8) Match the news and the responses.	-Choosing the correct word
65	6. Review	(9) Complete the sentences with these adjectives.	-Completing the gaps
		(10) Complete the story with 'said' or 'told'.	-Choosing the correct word
67	7(A) How to say how people look	(1) Look at the example sentences and underline the correct word in the rules	-Choosing the correct word
		(2) Complete the sentences with the correct form of 'look' or 'look like'.	-Choosing the correct word
		(3) Look at 'Character, Looks and Age' opposite. Match the words and phrases with people in the photos.	-Matching the words and the pictures
69	7(B) How to talk about fashion	(4) Look at 'Compound adjectives' opposite. Which ones can you use to describe the people in the photos?	-Choosing the correct word
71	7(C) How to talk about plans and intentions	(5) Write these words in the correct box.	-Categories
		(6) Which words from exercise 1 could go in the gaps? Complete the questions.	-Completing the gaps
73	7(D) How to express guesses	(7) Underline the correct words in the rules.	-Choosing the correct word
		(8) Underline the best adverb.	-Choosing the correct word
75	7. Review	(9) Match the two parts of the compound adjectives	-Word Building
		(10) Label the pictures.	-Matching the words and the pictures
77	8(A) How to talk on the phone	(1) Look at 'Phrasal verbs in the dictionary' opposite. Find the phrasal verbs 'On the phone'. Match the phrasal verbs and the definitions.	-Matching the words with the definitions
		(2) Complete the text with verbs from exercise 7.	-Words that go together
83	8(D) How to report a conversation	(3) Look at reporting verbs opposite and underline examples of verbs in 'Vikram's Story'	-Choosing the correct words
		(4) Match the reporting verbs with the definitions	-Matching the words with the definitions
		(5) Underline the best options in these sentences	-Choosing the correct words
		(6) Report these sentences using all of the reporting verbs	-Words that go together
85	8.Review	(7) Match 1-8 with a-h.	-Words that go together
		(8) Complete the	-Completing

		phrases in this conversation	the gaps
		(9) Complete the stories with the verbs in the correct form.	-Completing the gaps
87	9(A) How to make small talk	(1) Look at the words in 'Weather' opposite. Decide if they are nouns, verbs or adjectives.	-Categories
		(2) Guess which words normally go together	-Words that go together
		(3) Complete the sentences with words from 'Weather'	-Completing the gaps
89	9(B) How to talk about your future	(4) Look in paragraph four of 'My Body in Five Years'. Find sentences with these adverbs.	-Choosing the correct words
		(5) Add adverbs to the sentences to give your attitude.	-Words that go together
91	9(C) How to give advice	(6) Look at 'Direction of movement' opposite. Match the words and pictures	-Matching the words and the pictures
93	9(D) How to talk about unreal situations	(7) Make compound nouns by putting the words below before or after phone.	-Word Building
		(8) Make compound nouns using the words in bold.	-Word Building
95	9. Review	(9) Order the words to make sentences.	-Words that go together
		(10) Match the words and the pictures.	-Matching the words and the pictures
		(11) Make compound nouns by matching one word from each line	-Word Building
97	10(A) How to exchange opinion	(1) Add more words to the lists of shops.	-Words that go together
		(2) Underline the correct word.	-Choosing the correct word
99	10(B) How to talk about your shopping habits	(3) Complete the phrases with some of the words from 'Packaging'	-Words that go together
		(4) Think of other products which could complete the phrases in exercise 2.	-Words that go together
101	10(C) How to talk about recent activities	(5) Underline these words and phrases in 'The Sale people'. Write them in the correct box.	-Categories
		(6) Which of them can complete sentences 1-3.	-Completing the gaps
		(7) Complete these sentences to give true information about yourself.	-Completing the gaps
103	10(D)How to ask about products in a shop	(8) Complete the questions with these words and phrases.	-Completing the gaps
105	10.Review	(9) Write the words for these definitions.	-Matching the words with the definitions
		(10) Find the words for these items of packaging.	-Matching the words with the pictures
		(11) Underline the correct time expression in these sentences.	-Choosing the correct words
		(12) Complete the text with these words.	-Completing the gaps
107	11(A) How to give and ask about directions	(1) Decide how to give these directions.	-Words that go together
		(2) Look at the map opposite and find these things.	-Matching the words and the pictures
109	11(B)How to talk about holiday accommodation	(3) Look at 'Accommodation adjectives' opposite. What things could these adjectives describe?	-Words that go together
111	11(C) How to give health advice	(4) Find the words for photos 1-8.	-Matching the words and the pictures
113	11(D) How to give extra information	(6) Describe the pictures in 'Travel problems' opposite. Use phrases from the box.	-Matching the words and the pictures
115	11.Review	(8) Look at the map and complete the missing words in the directions.	-Completing the gaps
		(9) Match 1-8 with a-h.	-Words that go together
		(10) Circle the words that go together to make compound nouns.	-Words that go together
		(11) Write the correct form of these verbs in the gaps.	-Completing the gaps
119	12(B) How to talk about hopes and wishes	(1)Read 'Three wishes' opposite. Match pictures a-c with texts 1-3.	-Matching the words with the pictures
		(2) Match the blue words with the definitions.	-Matching the words with the definitions
		(3) Make true sentences from the box.	-Words that go together
125	12.Review	(4) Complete the sentences with these phrases	-Completing the gaps

V. Findings and Discussion

The present research investigates types of vocabulary exercises found in *'English Result'* prescribed for first year students, using eight vocabulary exercise types suggested by Learn English Teens British Council. The vocabulary exercise types used in this research are 'Completing the gaps, Matching the words and the pictures, Matching the words with the definitions, Choosing the correct word, Categories, Odd one out, Word Building and words that go together'. There are altogether twelve units in *'English Result'*. Vocabulary exercise types from all units are investigated, identified, classified and analysed. The findings on vocabulary exercise types are described in percentage form in a tabular format. The data are counted and their percentage are calculated in order to get a holistic and accurate view for the finding. Percentages of types of vocabulary exercises found in the coursebook are shown in table 2.

According to the table, the most frequent exercise is 'Completing the gaps'. It is 25 out of 111 exercise types and its percentage is (22.52%) of all the exercises. The second frequent exercise is 'Choosing the correct word'. Its frequency is 20 out of 111 exercises and its percentage is (18.02%). The third frequent exercise is 'Words that go together'. It is 17 exercises and its percentage is (15.32%) of all the exercises. The exercise type 'Matching the words and the pictures' is the fourth frequent exercise. Its frequency is 16 out of 111 exercises and its percentage is (14.41%) of all the exercises. The fifth exercise is 'Matching the words with the definitions'. It is 13 out of

111 exercises and its percentage is (11.71%) of all the exercises. The sixth frequent exercise is 'Categories'. It is 12 exercises and its percentage is (10.81%). The least frequent exercise is 'Word Building' and its frequency is 8 out of 111 exercises. Its percentage is (7.21%) of all the exercises. The exercise 'Odd one out' is not found in this course book 'English Result'. According to findings, it is found out that all the vocabulary exercise types found in 'English Result' support students to improve their vocabulary skills. According to findings, it is found out that all the vocabulary exercise types found in this course book support students to enhance reading, writing, speaking and listening skills. Moreover, vocabulary exercises from this book promote not only productive skills for background vocabularies but also receptive skills for new vocabularies. So, 'English Result' prescribed at University of Computer Studies is very good for first year students at University of Computer Studies, Myanmar.

TABLE II. PERCENTAGES OF TYPES OF VOCABULARY EXERCISES IN 'ENGLISH RESULT'

Sr. No.	Types of vocabulary Exercises	Total	Percentage (%)
1	Completing the gaps	25	22.52
2	Matching the words and the pictures	16	14.41
3	Matching the words with the definitions	13	11.71
4	Choosing the correct word	20	18.02
5	Categories	12	10.81
6	Odd one out	-	-
7	Word Building	8	7.21
8	Words that go together	17	15.32
	Grand Total	111	100

VI. CONCLUSION

The present research is to investigate types of exercises enhancing vocabulary in the prescribed text, 'English Result' for first year students at University of Computer Studies, Myanmar. Vocabulary exercises from this coursebook are collected and categorized by using vocabulary exercises types suggested by 'Learn English Teens British Council'. There are eight types of vocabulary exercise types such as 'Completing the gaps, Matching the words and the pictures, Matching the words with the definitions, Choosing the correct word, Categories, Odd one out, Word building and Words that go together'. By practicing these exercises, students can enhance their vocabulary knowledge.

By practicing the exercise 'Completing the gaps', students can change the correct form of a given word to complete the sentence. Students can match the words with the correct pictures by doing the exercise 'Matching the words and the pictures'. To do the exercise 'Matching the words with the definitions', students have to read the definitions to match the given words. So, they can improve their reading skills. The exercise 'choosing the correct word' makes students be able to consider about the meaning of the text and to choose the exact word. The vocabulary exercise 'Categories' offers students to put the word in the correct groups or categories. By doing the exercise 'Odd one out', students can find out the different word among the given words. Moreover, students must cautiously read all the words. So, they can know a connection between words before choosing a word. By practicing the exercise 'Word Building', students can transform the correct form of the word to construct a sentence appropriately. Students can know how to match the two words that go together by learning the vocabulary exercise 'Words that go together'. Therefore, after learning vocabulary exercises in the coursebook 'English Result', students can get a good command of English Language.

To sum up, the vocabulary exercises in 'English Result' are up-to-date, effective, interesting, challenging, sophisticated and can attract students' attention and motivate them in acquiring new vocabularies. Therefore, 'English Result' is one of the fundamental and excellent coursebooks for every student to enhance their vocabulary skills.

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Implementing Cooperative Learning (Jigsaw) Method to Enhance Students' Reading Skill

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***Abstract*- This research paper aims to investigate whether applying cooperative learning (Jigsaw) method can enhance students' reading skill or not and also intends to find students' feedbacks towards this method. Most of the students in all universities are not good enough to be mastered in reading skill. They think that learning reading skill is a difficult and boring thing. This makes them low motivation and interests in teaching learning process. Moreover, Grammar Translation Method (GTM) is still used in teaching reading passages. This tends to have low concentration and students were not interested in the reading class. In order to solve these problems, cooperative learning (Jigsaw) method was implied in teaching reading skill. The participants are 50 first year students at the University of Computer Studies (Meiktila).The data were obtained from classroom observation, giving treatments and questionnaires. The duration is four months (First Semester). In former two months, Grammar Translation Method (GTM) was used in teaching reading passages. In latter two months, cooperative Learning (Jigsaw) method was implied. The data obtained from pre-test and post- test were analyzed and compared. According to the results, it is found that Cooperative Learning (Jigsaw) method can help students to improve their reading skill and make them motivate and more interested in learning reading skill because this method is a student- centred method and group work activity. Moreover, students enjoy learning reading comprehension through the jigsaw technique and they are skillful in reading skill by using it.**

Keywords—cooperative learning method, Jigsaw, enhance, reading skill, group work

I. INTRODUCTION

There are four skills in English: Reading, Writing, Speaking and Listening. Among them, reading is one of the important skills to be mastered. Enhancing students' English reading skill plays a vital role in English Language. Also, reading is the basic skill to make other skills to be improved. After the students had read a passage, they can get much knowledge such as recognizing more vocabularies, sentence structures and learning new information. If the students know more vocabularies' and sentence structures, other three skills will not be difficult for them. However, it can be seen that most students' reading abilities are not good enough to be mastered. Moreover, most of the classrooms are still applying Grammar Translation Method (GTM) in teaching reading. As GTM is a techer-centred method, the students don't develop the power of thinking in the target language (English). It doesn't help the students to learn correct pronunciation of English Language of the target language.

This method emphasizes on the Rules of Grammar. Students try to do everything by translating. As a result, they consider that reading skill is a difficult and boring thing. This can make them low concentration and motivation. Moreover, students think that learning English subject is boring and they do not eager to participate in teaching learning process. The first thing which needs to be done is the teacher's technique because teacher takes an important role in managing the class so that students will not feel bored and also feel excited on having a reading class. Next, the quality of the teaching learning process in the class should be changed into more cooperative atmosphere between teacher and students and avoided competitive atmosphere in order to create a beneficial teaching learning process during the class.

To solve the problems, many researchers have been interested in doing research to investigate the most effective reading strategies to help students to develop their reading skill. Many reading methods/ strategies are applied in classrooms alternatively. It is found that some methods are effective and some are not. It can be also seen that student- centred methods are more useful and effective than the traditional methods. Many efforts have been made in teaching reading skill in order to enhance students' skill. So, the researcher implied a cooperative learning method (Jigsaw) to help students to improve the reading skill. Cooperative learning is suitable for each student's need. It is different from the traditional grammar translation method. In cooperative learning, students need to work together rather than having competition to each other during the teaching learning process. In this process, students are given structured project in a small group.

Cooperative learning has several teachings techniques. According to Johnson &Johnson (1989), Slavin (1990) and Kagan el al (1995), jigsaw is one of them. Jigsaw is a cooperative learning strategy that enables each student to specialize in one aspect of a learning unit. Students meet each other members for other groups who are assigned the same aspect called "expert group". After mastering of

material, they return to the "home group" and teach or explain the material to their group members. As this method is a student- centred method and group work activity, it can help students to share their knowledge and solve the problems to their friends in a group. By using this technique, students are more actively participated and get more motivation and interest in teaching learning process. The purposes of the study are-

- to find whether Jigsaw technique can enhance students' reading skill or not
- to analyze the students' feedbacks to this technique

II. Literature Review

Reading is the complex cognitive process of decoding symbols to derive meaning. It is a variety of language processing. Reading comprehension is a measurement of success of this process. Reading is a way for language acquisition, communication, and sharing information and ideas. The symbols are typically visual (written or printed) but may be tangible. Like all languages, it is a complex interaction between text and reader, shaped by prior knowledge, experiences, attitude, and the language community—which is culturally and socially situated. Reading strategies to decode (to translate symbols into sounds or visual representations of speech) and comprehend are used. Context clues may be used to identify the meaning of unknown words. Readers integrate the words they have read into their existing framework of knowledge or schema. (Wikipedia)

A. The Importance of Reading Skill in Teaching Learning Process

Reading is the fundamental skill of the four basic language skills. It is basically associated with writing. Writing and reading are comparable to speaking and listening. However, writing and reading are the palpable skills of communication while speaking and listening are the impalpable skills of communication. Every student in all universities has to write and read at least in one language. Basically, reading is the ability of understanding and looking at the meaning of the written words, letters, or symbols. However, reading as a skill is wider than that. Reading is a tricky process of identifying/recognizing written signs, comprehending the signs, and constructing a meaning of the signs. There are many reasons to be improved in the reading skill. Firstly, reading is the first pace towards literacy in any language. It gives credibility to the written form of language and brings it into action. Secondly, reading is the first step of education. Students may get much knowledge and experiences of real- life situations through reading. Thirdly, reading provides students with many sources of knowledge, information, feelings, ideas, content, style and language in order to apply them in their writing skill. Lastly, a good reading skill helps them in many cases like tests and exams. If the students are skillful in reading skill, they will not face difficulties in exams and tests. If they read a text efficiently, half of the job will be done. Improving their reading skill will help them think and act faster in exams and in real life situations also. So, many students need to be improved their reading skill. However, most of the students in all universities consider that reading is a difficult and boring thing. Moreover, traditional methods are still used in teaching learning process.("Why Is Reading Important?," n.d.)

There are many methods and techniques in teaching reading skill. Some are effective and some are not. Moreover, it has become evident that the needs of modern students have outpaced teacher's best teaching strategies. In this paper, cooperative learning methods (such as jigsaw strategy) will be implemented to promote the students' reading skill and get more effectiveness for the students.

B. Cooperative Learning

Cooperative learning is defined by Johnson &Johnson (1989) as an instructional strategy which utilizes small groups so that learners work together to accomplish individual and shared learning goals. During cooperative learning activities, individual learners seek outcomes that are beneficial to themselves and beneficial to all other group members. Cooperative learning is in contrast with competitive learning where learners work against each other to achieve an academic goal that only one or few learners can achieve and individual learning where learners work by themselves to accomplish learning goals unrelated to those of other learners.

There are five basic principles of cooperative learning:

- Positive interdependence

In this process, every member of the group is essential for the success of the whole group and is assigned an equal share of work.

- Individual accountability

In this step, each student is responsible for performing his or her assigned tasks. All members notice that every individual has a role to play in carrying out the activity.

- Face- to- face interaction

In face to face interaction, students work in close physical existence, which makes them to communicate easily and gives chances for practicing speaking skill.

- Social skill

In this procedure, group work activities take a chance for communication and interaction, leadership, decision – making, and conflict management are an integral part of group work, and teachers should encourage students to use these skills in the classroom.

- Group processing

Throughout the procedure of an activity, group members are conscious of their learning on the knowledge and understanding of their thinking level. The process of group provides students an opportunity to give and receive feedback. This feedback enhances the students' skills in each group. (Johnson, 1991)

As well as the five original pillars of cooperative learning, Johnson &Johnson (1989), Slavin (1990) and Kagan el al (1995) discovered five broad cooperative learning techniques, each of which has been developed over the years by many scholars. The following

cooperative techniques utilize learners in pairs while others utilize small groups of four or five learners;

- Think- pair –share
- Student Team Learning
- Jigsaw
- Learning Together
- Three –Step _ Interview
- Roundtable
- Numbered Heads Together

Among these cooperative techniques, the researcher applied Jigsaw strategy because many previous researchers credited that the jigsaw approach is very suitable for reading comprehension. It is a cooperative learning strategy that helps students to become an expert on a certain topic. Students can communicate and discuss with others in reading the same text. And then they research the same topic or unit, and share their knowledge to their original "home group". One student from each group has got his/her own paragraph and then they meet with other students from other groups who have the same topic. And, they collaborate to decide the most important parts to share back with their original or home group. This helps them to develop the same understanding. It is stated that jigsaws allow them to increase their confidences and emphasize cooperative learning in the classroom. By providing students an opportunity to actively help each other, it can build comprehension, social skills as well as helps them look at the same information differently (Aronson, 2015).

C. Advantages of Using Jigsaw Method in Teaching Reading comprehension in Classroom

In jigsaw method, the teachers divide students into groups and give a piece of assignments. Students accomplished tasks collaborately. As students work together, the final image is done by gathering many separate pieces of assignments. So, reading passages are completed when members of the group give their best opinions and efforts to the group. In the Jigsaw Strategy in the classroom, every student's part is necessary, then every student is important. This fact precisely makes this strategy so effective. When the students worked independently, they are responsible strictly to themselves. The jigsaw method gives students a sense of responsibility and accountability and they feel that it is hard to experience when working alone.

In addition to having shared responsibility to the group setting, students gain many knowledge and experiences from each other. A group is rewarded when each individual contributes their skills and knowledge to the whole. The jigsaw method could be used to improve conversations related to what makes students different from one another. The jigsaw approach creates a cooperative classroom rather than a competitive one. "In the cooperative classroom, the students achieved success as a consequence of paying attention to their peers, asking good questions, helping each other, teaching each other, and helping each other teach." [Elliot Aronson] Students are not afraid against one another in competitions to earn the teacher's limited time and attention. Instead, they have a chance to grasp the knowledge from other members all around them.

The benefits of using Jigsaw for reading compression is it encourages students to share ideas and increased their learning through the communication and discussion with others. It teaches students cooperation, responsibility, teamwork, critical thinking and social skills, which are all skills that students need to be successful in the twenty-first century (Clarke, 2013).

III. Research Method

The data were collected from 50 first year students at the University of Computer Studies (Meiktila). All of them enrolled in the first semester of 2019-2020 Academic Year. There are four months in one semester. In former two months, Traditional method (Grammar Translation Method) was used in teaching reading comprehension. After that, pretest had been conducted before applying jigsaw method. In this period, reading comprehension tests (the total score of 50) were given to the students to measure their abilities of reading skill. Time frame is 60 minutes. The students were then placed in Grade A, Grade B, Grade C, Grade D and Grade E according to the score they got.

And then, the theory of jigsaw method was collected and applied it to help the students in conducting this study. During two months, Cooperative Learning (Jigsaw) method was applied in teaching reading comprehension. After that, the students were given the same reading comprehension tests used by the previous months. Then, the students were also placed in Grade A, Grade B, Grade C, Grade D and Grade E according to the score they got. The score of Grade A ranged from 40 to 50. The score of Grade B is from 30 to 40. Grade C is from 20 to 30. Grade D ranged from 10 to 20 and Grade E is from 0 to 10 respectively.

The writer used four steps to collect data;

- Reading comprehension Tests (pretest and posttest) were given to the students. Then, the data were analyzed.
- The grades were classified based on the students' score they got.
- And then, the rate percentage of students' score was calculated as a class in order to find whether Jigsaw strategy can enhance students' reading skill.
- The questionnaires were designed to analyze the students' feedbacks to this technique. When collecting their feedbacks, quantitative value from Likert Scaling method (Rensis Likert) was used.

The formula was used to compute the students' level ability as a class. The formula is as follows:

$$\bar{X} = \frac{\sum x}{n}$$

Where,

$\bar{X}$ = Mean/ the average of students' score
$\sum x$ = The sum of every data/ total score
n = The sum of data/ the number of students (Riduwan, 2012:84)

IV. Finding and Discussion

To get the information of the research , pre-test was carried out before the treatment and post-test was carried out after the treatment which intended to know there was a significant improvement of the students' reading skill before and after using jigsaw technique. It was found that applying jigsaw technique in teaching reading comprehension was more effective and the progress of students' reading skill was more dramatic than using Grammar Translation Method in the First semester. After calculating the result of the students' score, it can be seen the differences of students' reading skill between pre –test and post- test presented in table-1, table -2 and table -3.

Table 1. The Percentage of Students' Reading Score in Pre-test (While using GTM)

No	Grade	Score	No. of Ss	Percentage
1	Grade- A	40-50	0	0%
2	Grade- B	30-40	8	16%
3	Grade- C	20-30	10	20%
4	Grade- D	10-20	12	24%
5	Grade -E	0-10	20	40%
	total		50	100%

Table- 1 shows that the rate percentage of the 50 students' mean score in pretest. According to the university standard grade, if they get 20 or 30 marks, they are supposed to be qualified in the subjects they have learnt. In this table, none of the students have got Grade A .There are eight students (16%) got Grade B. Ten students (20%) got C, and twelve (24%) students are Grade D, and twenty students (40%) are Grade E.

After that, post-tests were conducted after applying jigsaw method in teaching reading passages. The percentage of students' reading skill in post- test is shown in table-2.

Table 2.The Percentage of Students' Reading Score in Post-test (After using CL (Jigsaw))

No	Grade	Score	No. of Ss	Percentage
1	Grade -A	40-50	18	36%
2	Grade- B	30-40	10	20%
3	Grade-C	20-30	9	18%
4	Grade -D	10-20	9	18%
5	Grade-E	0-10	4	8%
	total		50	100%

Table -2 describes the rate percentage of the 50 students' mean score on the post-test. According to the table, it can be seen that after applying jigsaw method, students' score reached a high percentage. Eighteen students (36%) got Grade-A. There are ten students (20 %) got Grade B and nine students (18%) got Grade C. Nine students (18 %) are Grade D. There are only four students (8%)got Grade E. It means that the rate of percentage of post-test is greater than the rate percentage in pre-test.

Table 3. The progress of students' Reading Skill in Pre-test and Post-test

Indicators	Student's Mean Score		
	Pre-test	Post-test	Improvement
	36%	74%	38%

According to the university grades, students who had got Grade C would pass the exam. As shown in table 1, eighteen students (36%) passed the reading comprehension tests before applying Jigsaw in teaching reading comprehension. After applying Jigsaw technique, students were asked to answer the same reading tests. At that time, thirty seven students (74%) passed these tests (as shown in table-2). In accordance with the data, the progress is 38% before and after using jigsaw technique. It was found that the mean score of post-test was higher than pre- test.

In order to find students' feedbacks towards jigsaw technique, data were collected through questionnaires. It can be seen in table -4.

Table 4. The Percentage of Students' Feedbacks towards Jigsaw technique

Survey Questions	SA (%)	SwA (%)	N (%)	SwD (%)	SD (%)
Do you agree jigsaw technique (group work activity) that is applied by your English teacher in teaching reading passages?	46%	44%	10%	0%	0%
This technique makes you happy in joining the English class and actively participated in teaching learning process?	44%	52%	4%	0%	0%
This technique makes you more understand the working process (when you read a passage in a group work form).	26%	50%	20%	4%	0%
This technique motivates you in reading a passage.	34%	34%	28%	4%	0%
This technique helps you to improve your English reading skill.	52%	24%	20%	4%	0%
The lessons become more interesting with this technique.	38%	30%	30%	2%	0%
This technique is	36%	32%	14%	14%	4%

better and more effective than traditional teaching methods (teacher-centred methods).					
This technique enables you to participate in sharing information, making decisions and solve the problems together.	54%	20%	20%	6%	0
This technique helps you to get cooperation, responsibility, teamwork, critical thinking and social skills.	52%	36%	6%	6%	0%

SA=Strongly Agree, SwA=Somewhat Agree, N= Neutral, SwD= Somewhat Disagree, SD= Strongly Disagree

From table-4, the percentage of students' feedbacks is shown in five rating scales. According to the data, most of the students (46%) enjoyed Jigsaw technique although few students (4%) enjoyed traditional methods in teaching reading comprehension. Some of the students (54%) rated the Jigsaw technique enables them to share information and increase making - decision and problem solving skill. Twenty six students (52%) strongly agreed that this technique enhances their reading skill and also help them to get cooperation, responsibility, teamwork, critical thinking and social skill. It can be seen that only one statement was checked strongly disagree (no.7).

Based on the tables above, it can be concluded that students mastered reading skill after the teachers had taught them by using Jigsaw Method in teaching learning process. It also means that implementation of Jigsaw method makes students skillful in reading . As a group work activity, students have team work spirit, cooperative learning skill and knowledge from other people. So they feel comfortable and relax in learning and answer reading comprehension tests because they study together and help to each other in mastering them. According to the questionnaires, students enjoy learning reading comprehension through this technique and they are competent in reading skill by using jigsaw.

V. Conclusion

Cooperative Learning (Jigsaw) method was used to enhance students' reading skill in this research. In this case, it is found that this method is very useful and effective because it makes the students increase their motivation and interests in teaching learning process. By doing group work activities, students are not shy and fearful to express and discuss their ideas. In this method, teachers are facilitators or instructors and give feedback and advice for the grammatical errors and spelling errors. As students get direct feedbacks from their teachers, they have more enthusiasm in reading class. As it is the student- centered method, the students get opportunities to exchange their knowledge and ideas to others. As they have chances to contribute meaningfully to a discussion and present their ideas freely, they are more eager to participate in classroom activities. This makes them active learners and improve their reading skill. According to the students' feedbacks to this technique, students enjoy learning reading comprehension through this technique. It is concluded that cooperative learning (Jigsaw) method can improve students' reading skill. Moreover, it is very useful and effective for students and teachers although it has a few needs and requirements such as classroom settings and time. Furthermore, the data collection should be wider than this and data from the language teachers should be corrected and used in other research by applying this method.

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Foreign Language Classroom Speaking Anxiety of Students at University of Computer Studies, Meiktila

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***Abstract*— The main aim of this research is to investigate the foreign language speaking anxiety of students who are studying English as a foreign language. This research tries to find out whether learners of English as a foreign language (EFL) have anxiety in speaking English, the sources of foreign language speaking anxiety, as well as the relationship between anxiety and language proficiency levels of English. The study was conducted with the participation of 110 students from University of Computer Studies, Meiktila. The data were collected by using the survey instrument named Foreign Language Classroom Anxiety Scale (FLCAS) which was adapted from** [1]**. Results showed that language anxiety actually differed across proficiency levels. In the present study, the findings indicated that majority of participants experience moderate level of speaking anxiety, and students with a higher level of language proficiency are less anxious than those with a lower level of language proficiency. Furthermore, the analysis of the quantitative data revealed that "lack of preparation" was the main source which caused anxiety among students. The findings of this research help foreign language teachers to understand the nature of students having anxiety in learning a foreign language and thus, they can support students to overcome their anxiety. Consequently, an enjoyable and effective language learning environment can be developed.**

***Keywords*— Language learning, English as a foreign language, speaking anxiety, Foreign Language Classroom Anxiety Scale (FLCAS)**

I. INTRODUCTION

Language learning is a perplexing procedure where the components of the full of feeling area that is related with the sentiments or feelings of people are as vital as the components of the cognitive domain [2]. According to [3], personality traits or qualities such as confidence, sympathy and introspection are included in the affective domain. One such quality is anxiety, which is an important feature of the affective domain. [1] identified the term "anxiety in the foreign language" according to the relationship between language learning and anxiety. Foreign Language Anxiety (FLA) is one such unique type of anxiety which can be observed at every stage of the learning process [4]. Foreign language learners often express sentiments of stress, apprehension or nervousness attempting to communicate in the objective language [5]. Foreign Language Anxiety (FLA) affects many people of all ages and levels. FLA is totally different from other types of anxieties.

These days, English is considered as the most predominant language and is otherwise called the most widely used language of the world. Besides, the significance of learning English is clearly expanding step by step. As anyone might expect, today individuals and students of Myanmar study English seriously for specific targets. Be that as it may, the greater part of them have uneasiness in contemplating English, particularly communicating in the objective language since they are not the local speaker but rather are required to learn or utilize the language. This tension is probably going to effect on EFL students' learning in the language classroom. Many factors can arouse students' foreign language anxiety. Thus, finding out the causes and sources of foreign language anxiety is significant in the language classroom.

A. Aim and Objectives

In response to the research gap mentioned in the introduction section, the present research aims to investigate the foreign language speaking anxiety of EFL students, who are studying English as a foreign language, at University of Computer Studies, Meiktila. It investigates how foreign language is experienced by foreign language learners from the perspective of Myanmar learners studying English as a foreign language. The specific objectives of the research are:

(i) to investigate the experience of EFL students in foreign language speaking anxiety

(ii) to examine the significant difference in terms of FLCA among the students according to their proficiency level, and

(iii) to explore sources of foreign language speaking anxiety of EFL students.

B. Research Questions

To achieve the objectives, the present study seeks answers for the following research questions.

(1) What is the level of speaking anxiety experienced by EFL students?

(2) What is the significant difference in terms of FLCA among the students according to their proficiency level?

(3) What are the sources of foreign language speaking anxiety of EFL students?

II. LITEERATURE REVIEW

Language anxiety has been defined as " the apprehension experienced when a situation requires the use of a second language with which the individual is not fully proficient" [6]. In fact, language anxiety has been identified through two different approaches. The first one indicates that language anxiety is considered as a fundamental affect, which occurs in any situation, such as social conditions in life, for example, interviewing for a job. This kind of anxiety shows that humans feel embarrassed, frightened and angry in any situation in their lives not only in learning situations. The second method shows that anxiety is limited to language learning conditions such as classrooms. This kind of anxiety, as [1] called, is "specific anxiety". In other words, this kind of anxiety is about the problem that students face in language learning, for instance, inability of students to understand what the teacher is saying. This disability is synonymous with anxiety in the classroom, which is considered as a major barrier to language learning.

As an illustration, [1] defined Foreign Language Anxiety (FLA) as "a distinct complex of self-perceptions, feelings, and behaviors related to classroom language learning arising from the uniqueness of the language learning process". The present research is based on Horwitz et al.'s notion of anxiety, since learning a foreign language could be perceived as a stressful experience that involves complicated feelings of apprehension and discomfort which could hinder the students' whole learning process.

A. Theoretical Background

[1] mentioned that language anxiety is "a distinctive complex of self-perceptions, beliefs, feelings and behaviors related to classroom language learning arising from the uniqueness of the language learning process". They stated that foreign language anxiety is a specific syndrome that may be related to three components of anxiety namely: communication apprehension, fear of negative evaluation, and test anxiety. They argued that these three forms of anxiety are fundamental to the concept of Foreign Language Anxiety (FLA) and that they are closely related to each other and together caused language learning to be a terrifying task for a learner. With the aim of measuring the students' anxiety level in the language classrooms, Horwitz and her colleagues developed an instrument called the Foreign Language Classroom Anxiety Scale (FLCAS). The finalized version of FLCAS included 33 statements which employs 5-point Likert scales, ranging from "strongly agree" to "strongly disagree". A higher score obtained by the instrument would indicate a higher level of FLA. To examine their theory, [1] conducted a research at the University of Texas with 75 college students who enrolled in introductory Spanish classes. The study revealed that significant anxiety was experienced by many students in foreign language learning which affected their performance in that language. Thus, Foreign Language Classroom Anxiety Scale (FLCAS) has been administered in a number of studies in order to show the anxiety score of a particular group of language learners and it has been shown to be very reliable [1], [7] [8].

In this study, 10 of the original FLCAS items are not applied, such as the ones asking about concern over grades, discomfort in a language classroom and anxiety over tests. Thus, the questionnaire applied in this research contains 23 items all related to the foreign language speaking anxiety as well as possible sources attributed to it. It can be said to be a modified version of the original FLCAS developed by [1]. The current study is to investigate the levels and sources of foreign language speaking anxiety exhibited by the EFL students at University of Computer Studies, Meiktila. As the whole FLCAS is meant to measure foreign language anxiety experienced by the learners in the language classroom, only 23 items which focus on speaking anxiety are adopted to assess the degree to which participants feel nervous during speaking practice in class [9].

B. Related Research

A number of studies have been carried out in relation to foreign language anxiety and sources of speaking anxiety in foreign language classrooms. [3] designed a study to investigate the effects of language anxiety on course achievement in three foreign language proficiency levels of Spanish. Results showed that language anxiety actually differed across proficiency levels. In their study, advanced learners showed higher levels of anxiety than beginners and intermediate learners. However, students with high levels of anxiety did not exhibit lower course achievement in comparison to students with low levels of language anxiety. Furthermore, there was a medium level of language anxiety among most participants, with no significant effect on course achievement.

[10] investigated the level and sources of the anxiety of Saudi EFL university students by using the Foreign Language Classroom Anxiety Scale (FLCAS) through a period of three years. A quantitative method was employed and the number of participants of his study was 1,389 Saudi students. The research findings showed that the main cause of anxiety among participants was their communication apprehension due to lack of preparation before the English class. In addition, students' limited participation in EFL classrooms was considered to be another cause for students' low proficiency in speaking, which then caused their anxiety.

[11] did a research with the title of "The Sources of Foreign Language Speaking Anxiety of Iranian English Language Learners". According to the researchers, foreign language learning anxiety is one of the affective factors which influence language learning negatively. Their study aimed at investigating the sources of foreign language speaking anxiety of Iranian EFL learners. The instrument used in this study was a revised version of the Foreign Language Classroom Anxiety Scale (FLCAS) by [1]. 23 items of questionnaire with possible causes of foreign language speaking anxiety were contributed to 154 students. The results of the study indicated that "fear of making mistakes", "fear of negative evaluation", and "lack of vocabulary knowledge" were the main factors which caused anxiety among students.

III. RESEARCH METHODOLOGY

The focus of this research is on investigating students' anxiety level in foreign language speaking and sources of foreign language anxiety of Myanmar students. This section is concerned with the research procedures, the collection of data and data interpretation. The data was analyzed quantitatively. The participants in the study were 110 undergraduate students (Third Year Computer Science and Technology Students) who are studying English as a foreign language at University of Computer Studies, Meiktila. Out of the 121 students who originally participated in the study, 11 had to be eliminated because they failed to complete either of the instruments. All names and results were kept confidential.

A. Participants

110 undergraduate third year students who are studying English as a foreign language at University of Computer Studies, Meiktila participated in the current study.

B. Data Collection

In this study, data were collected through a questionnaire designed by [1] to measure anxiety level and sources of foreign language speaking anxiety among the students in the classroom. It consists of 33 items measuring language anxiety related to foreign language learning. The questionnaire has two parts. In the first part, personal questions, such as name, gender, roll number and language proficiency, were asked. In the second part, 23 statements on a 5-point Likert Scale were used. Each item on the FLCAS is rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5(strongly agree). The items are divided into five sources of speaking anxiety under three components: Low self-esteem and lack of confidence (test anxiety), Lack of preparation (test anxiety), and fear of communication (communication apprehension), Language proficiency (communicative apprehension) and Fear of making mistakes (fear of negative evaluation).

C. Data Analysis

As aforementioned, the levels and sources of foreign language speaking anxiety were analyzed by applying the Foreign Language Classroom Anxiety Scale, proposed by [1]. The questionnaire (FLCAS) which includes 23 items was used to measure the students' level of speaking anxiety. The questionnaire was distributed to 110 students by using the google survey form. In the questionnaire, nineteen of the items are negatively worded, and four of the items (item no. 2, 10, 20, 22) are positively worded. When statements are positively worded, responses were reversed and recorded. The higher their total score, the more anxious they are in speaking English.

Table 1 below shows the detail responses of students on the speaking anxiety factors. For positive statements, the responses "strongly disagree" and "disagree" showed that the students have anxiety on the statements. For negative statements, the responses "strongly agree" and "agree" revealed that they have anxiety on these statements.

TABLE I. RESPONSES OF STUDENTS TO FOREIGN LANGUAGE CLASSROOM ANXIETY SCALE

Statements	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Low self-esteem and lack of confidence										
1. I never feel quite sure of myself when I am speaking in the oral class.	2	2%	29	26%	32	29%	40	36%	7	6%
2. I feel confident when I speak in the oral class.	4	4%	24	22%	50	45%	27	25%	5	5%
3. I always feel that the other students speak the English language better than I do.	2	2%	13	12%	44	40%	44	40%	7	6%
4. I am afraid the other students will laugh at me when I speak English.	11	10%	35	32%	23	21%	34	31%	7	6%
Lack of preparation										
5. Even if I am well prepared for my English class, I feel anxious about it.	6	5%	21	19%	25	23%	49	45%	9	8%
6. I start to panic when I have to speak without preparation in language class.	1	1%	9	8%	25	23%	49	45%	26	24%
7. I get nervous when I come to my English class with little preparation.	4	4%	19	17%	27	25%	45	41%	15	14%
8. I get nervous when the language teacher asks questions which I haven't prepared in advance.	1	1%	14	13%	22	20%	46	42%	27	25%
Fear of communication										
9. I tremble when I know that I am going to be called on in the oral class.	3	3%	14	13%	32	29%	49	45%	12	11%
10. I am usually at ease during the oral class.	4	4%	14	13%	57	52%	28	25%	7	6%
11. It embarrasses me to volunteer answers in my oral class.	10	9%	33	30%	38	35%	28	25%	1	1%
12. I can feel my heart pounding when I am going to be called on in the oral class.	3	3%	13	12%	25	23%	60	55%	9	8%
13. I feel very self-conscious about speaking English in front of other students.	0	0%	16	15%	54	49%	37	34%	3	3%
14. I feel nervous in the oral class when the English teacher asks me questions and I must reply in the oral class.	2	2%	31	28%	24	22%	51	46%	2	2%
Language proficiency										
15. It frightens me when I don't understand what the teacher is saying in the foreign language.										
16. I feel overwhelmed by the number of rules I have to learn to speak a foreign language.	8	7%	22	20%	57	52%	18	16%	5	5%
17. It worries me when I cannot speak English with a good accent in my language class.	3	3%	30	27%	22	20%	47	43%	8	7%
18. During the English class, I find myself thinking about things that have nothing to do with the course.	12	11%	27	25%	33	30%	30	27%	8	7%
19. In the oral class I can get so nervous I forget things I know.	1	1%	17	15%	28	25%	51	46%	13	12%
20. It would not be nervous speaking English with native speakers.	12	11%	32	29%	29	26%	33	30%	4	4%
21. I get nervous and confused when I am speaking English in my oral class.	8	7%	34	31%	29	26%	35	32%	4	4%
Fear of making mistakes										
22. I don't worry about making mistakes in the oral class.	8	7%	36	33%	24	22%	33	30%	9	8%
23. I am afraid that my language teacher is ready to correct every mistake I make while speaking.	17	15%	49	45%	26	24%	18	16%	0	0%

TABLE II: AVERAGE PROPORTION OF STUDENTS WHO EXPERIENCED FOREIGN LANGUAGE SPEAKING ANXIETY

Sources of Foreign Language Speaking Anxiety	SD/D	SA/A
Lack of confidence and low self-esteem	27%	39%
Lack of preparation	17%	60%
Fear of communication	22%	43%
Language proficiency	30%	40%
Fear of making mistakes	50%	27%

SD/D = strongly disagree and disagree, SA/A = strongly agree and agree

According to the participants' responses, Table 2 shows that the capacity of students (60%) attributes foreign language speaking anxiety to "Lack of Preparation". Therefore, among these five anxiety-provoking sources, lack of preparation was the most

significant cause of speaking anxiety. The second most important one was fear of communication. The third most important source of speaking anxiety was language proficiency; and the fourth, lack of confidence. The least anxious factor was fear of making mistakes.

D. Data Interpretation

In this section, results from data collection and data analysis were interpreted. The following pie-chart shows the data interpretation of students' anxiety levels in foreign language speaking.

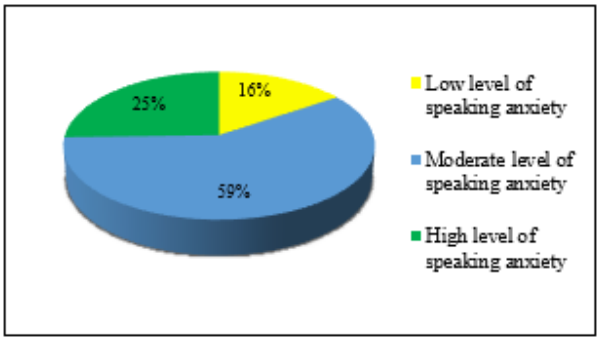

Fig.1. Students' Anxiety Levels in Foreign Language Speaking

Out of the 110 students surveyed in the study, 25% of the students have high anxiety in foreign language speaking; and 60% of them experience medium level of speaking anxiety. It is the largest percentage of all. Another 16% feel least anxious in speaking in English. Thus, Figure 1 reveals that students generally have moderate level of speaking anxiety among the participants in the study.

The sources of foreign language speaking anxiety from students' perspectives are interpreted as follow.

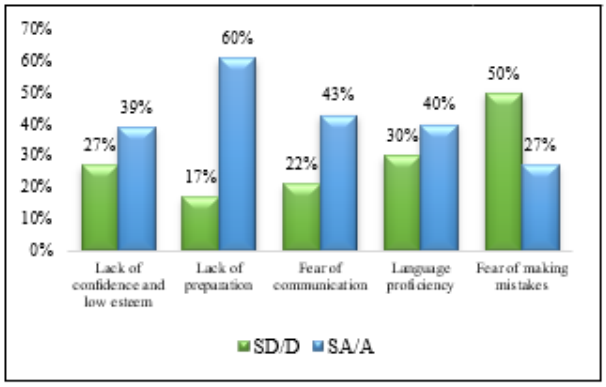

Fig. 2. Sources of Foreign Language Speaking Anxiety

Obviously, the students' responses show that they experienced FLA when they had to speak without preparation. From the chart, 60% of the participants agree about lack of preparation while only 17% of them disagree. The students feel most anxious in speaking when they do not prepare well. 43% of students agree that fear of communication disturbs them to speak in a foreign language in front of class whereas, 22% opposed the idea. About 40% of respondents agreed that their low level of language proficiency make anxious when speaking in English. On the other hand, 30% of them did not think that poor language proficiency develops speaking anxiety. According to the data, students had anxiety for their lack of confidence but the least anxiety was due to fear of making mistakes in speaking. A quarter of the respondents agree that lack of confidence and low self-esteem make them more nervous and tense while speaking in the target language. By contrast, another 27% of students revealed that lack of confidence is not one of the elements that trigger speaking anxiety in class. 27% of them feel uncomfortable when the instructor is ready to correct their errors in speaking. However, most of the students (50%) responded that they do not worry about making mistakes in an oral class and they want to be corrected by the instructor. It is clear that "fear of making mistakes" is not considered to be the major cause of speaking anxiety among EFL students in this research.

IV. FINDINGS AND DISCUSSION

The findings of the research indicate that speaking is a tension inciting factor in the foreign language learning process. As already mentioned, the responses of 110 participants to the foreign language classroom anxiety scale (FLCAS) revealed that the participants generally had a moderate level of foreign language speaking anxiety in this sample.

Secondly, when analyzing whether language proficiency level has an influence on their foreign language anxiety while speaking in the target language, the data showed that the students with the higher level of language proficiency students appeared less anxious than lower level of students. This could possibly happen because students at a higher proficiency level seem to be more confident when speaking in class whereas students with lower proficiency feel less confident when performing in English due to the fact that they are not fluent in English, and that they are afraid of making mistakes; thus perhaps they are more anxious. In this study, therefore, the students' proficiency and their speaking anxiety level in speaking in foreign language are positively correlated.

Several factors can bring about foreign language speaking anxiety in the classroom. The impact of these factors usually leads to the learners' avoidance of speaking the target language. Thus, teachers are expected to help their students to reduce such undesired feelings. The first step toward reducing students' anxiety is to identify the sources of their anxiety. According to data analysis and data interpretation, "lack of preparation" was the most significant cause of anxiety. A great number of participants feel highly anxious, tense, confused and nervous when they had to speak without preparation. The result may show how important it is for the students to be well-prepared to speak in the target language, especially for those who do not have sufficient language proficiency; they probably need to think what to say first before speaking up. The students also said that they felt less anxious if they prepared themselves in advance; probably this contributes to a feeling of pressure to prepare well. Fear of communication was the second sources of speaking anxiety; and language proficiency came as a third source of foreign language anxiety to EFL students. Students' lack of confidence also played as one of the

anxiety factors in foreign language speaking. Unexpectedly, only a few of students had anxiety making mistakes in speaking. This fear is somehow related to the students' fear of being negatively evaluated. The findings imply that students who took park in this study preferred to be corrected by the teacher when they made a mistake while speaking. The students believed that immediate corrective feedback would help them improve their oral proficiency.

According to the findings of this study, the correction of students' errors is necessary and positive. However, sometimes it may have a negative effect; the most typical way of correcting is by interrupting the student before he has finished speaking, which could have a negative effect, especially among anxious students as they normally loose the track, forget what they were talking about and their anxiety levels can increase. Before doing an activity, therefore, language instructors should bear in mind whether they are focusing on accuracy or fluency. For a class discussion, for example, fluency would be appropriate. Being corrected constantly by the teacher can be a really demotivation and hinder the flow of words and sentences when students are expressing themselves in the foreign language. Probably, correcting the student' mistakes after his performance may be a good way to avoid high anxiety levels.

It is extremely important for English teachers to recognize that anxiety can be a major cause of students not being successful in speaking English, and also to assist them to overcome their anxiety. When most students experience a certain degree of anxiety in foreign language learning, language teachers are, to a great extent, responsible to create a less threatening environment in teaching process. Moreover, teachers should support and encourage students to participate in in-class activities and to speak English either in or outside the classroom and interact with their peers. Finally, teachers must reassure students that mistakes are a part of a learning process and give positive feedback and rewards to enhance their self-confidence.

V. CONCLUSIONS

The present study examines foreign language classroom anxiety experienced by students from University of Computer Studies, Meiktila. The findings show that all students who participated in the survey feel anxious while speaking in front of the teacher as well as their peers. Generally, it indicated that most students experienced moderate level of speaking anxiety in English. Moreover, it can be seen that there is a significant difference between and speaking anxiety and students' level of language proficiency. As expected, anxiety decreased when proficiency increased; in the present study, advanced learners showed lower levels of anxiety than intermediate learners.

The responses to the items in the questionnaire reveal that the students attributed foreign language speaking anxiety to lack of confidence and low of self-esteem, lack of preparation, fear of communication, language proficiency and fear of making mistakes. Among these sources that make students anxious in speaking, lack of preparation was the most significant one. Indeed, investigating the major sources of students' foreign language anxiety plays as an important role in creating a better teaching-learning situation. The findings of the current study can be beneficial to language teachers to be aware of possible sources which make students anxious in speaking English. Hence, teachers are expected to help students overcome this feeling of uneasiness and nervousness in certain ways, as well as encourage them to develop their oral skill. However, the findings of this study may not be enough for both students and teachers to create a positive classroom environment. It is necessary to conduct follow-up studies, both qualitative and quantitative with a large number of participants. Future researches are recommended to explore how the students cope with their speaking anxiety in their foreign language classroom by producing some solutions for teachers and curriculum designers. It is suggested that investigating the causes of foreign language anxiety in using other language skills, such as writing skill, reading skill and listening skill are also worth-doing.

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ပြည်-နဝေး၏ မိုးတောရတုများမှ သရုပ်ဖော်အဖွဲ့များလေ့လာချက်

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စာတမ်းအကျဉ်း- ဤစာတမ်းသည် ပြည်-နဝေး၏ မိုးတောရတုများမှသရုပ်ဖော်အဖွဲ့များကို သိရှိစေလိုသော ရည်ရွယ်ချက်ဖြင့် လေ့လာတင်ပြထားသောစာတမ်းဖြစ်ပါသည်။ သရုပ်ဖော်အဖွဲ့များကို လေ့လာရာတွင် နဝေးရတု ပေါင်းချုပ် (စတုတ္ထအကြိမ်) စာအုပ်မှ မိုးတောရတု ကဗျာ (၁၁) ပုဒ်ကို အလေ့လာခံအဖြစ် သတ်မှတ်ပါသည်။ ဤစာတမ်းတွင် ပထမပိုင်းအဖြစ် စာဆိုး၏ အတ္ထုပ္ပတ္တိအကျဉ်း၊ ဒုတိယပိုင်းအဖြစ် ရတုကဗျာ၏ သဘောသဘာဝ၊ သရုပ်ဖော်အဖွဲ့ဟူသည်၊ တတိယပိုင်းအဖြစ် မိုးတောရတုများမှ သရုပ်ဖော်အဖွဲ့များ လေ့လာချက်များ ဟူ၍တင်ပြထားပါသည်။ သရုပ်ဖော်အဖွဲ့များကို လေ့လာဖော်ထုတ်တင်ပြရာတွင် သရုပ်ဖော်နည်းအပိုင်း(၃)ပိုင်းဖြင့်ဖော်ထုတ်တင်ပြထားပါသည်။သရုပ်ဖော်အဖွဲ့များအားလေ့လာမှုအပိုင်းတွင်စိတ်အာရုံ၌မြင်ယောင်၊ကြားယောင်၊ တွေးတောတတ်အောင်ရေးဖွဲ့နိုင်စွမ်းရှိကြောင်းတွေ့ရပါသည်။ဤစာတမ်းသည်မြန်မာစာပေ၊ရှေးဟောင်းကဗျာများကဏ္ဍမှ မိုးတောရတုကဗျာများကိုစိတ် ဝင်တစားလေ့လာသူများနှင့် မြန်မာစာလေ့လာလိုက်စားသူများ အတွက် အထောက်အကူပြုနိုင် မည်ဖြစ် ပါသည်။

သော့ချက်စကားလုံး_ မိုးတောရတု၊ မိုးရာသီသဘာဝ၊ သရုပ်ဖော် မိုးတော မောင်ဘွဲ့၊ မိုးတောမယ်ဘွဲ

၁။ နိဒါန်း

မြန်မာစာပေ သမိုင်းတလျှောက်၌ ဖြစ်ထွန်းပေါ်ပေါက်ခဲ့သော ရတုကဗျာများကို လေ့လာကြည့်သောအခါတွင် တောင်ငူခေတ် သည် ရတုခေတ်ဖြစ်သည်နှင့်အညီရတုအမျိုးအစားစုံလင်လာ ပြီး အရေအတွက်များပြားလာသည်ကိုလည်း တွေ့ရပါသည်။ ပြည်-နဝေး၏ ရတုများသည် ဘုရားတိုင်၊ စစ်ချီ၊ မိုးတော၊ မောင်ဘွဲ့၊ မယ်ဘွဲ့၊ကျေးစေ…စသည်ဖြင့် အမျိုးအစားကွဲပြားလျက်ရှိသည့် အပြင်ဖွဲ့နည်းအားဖြင့်လည်းအမျိုးအစားစုံလင်စွာတွေ့ရှိရပါသည်။ ရတုသည် လက်ဘမှပေါက်ဖွားလာသော ကဗျာအဖွဲ့အနွဲ့ ရတုတွင်ကား တစ်မျိုးပင်ဖြစ်သည်။ သို့သော် ရတုသည် လက်ဘကဲ့သို့မဟုတ် ဖွဲ့ဆိုရာ၌ နည်းစနစ်ဥပဒေရှိ၏။ လက်ဘ၌ ပိုဒ်ရေပေါင်း ဖွဲ့လို သမျှဖွဲ့ဆိုနိုင်သည်။ အဖျားချတွင်လည်း စာလုံးရေအကန့် အသတ်မရှိ။ တစ်ပိုဒ်တည်းဖွဲ့စပ်လျှင် ဧကပိုဒ်၊ နှစ်ပိုဒ်ဖွဲ့စပ်လျှင်အဖြည့်ခံ၊ သုံးပိုဒ်ဖွဲ့စပ်လျှင် ပိုဒ်စုံဟု ခေါ်ဆို သည်။ သုံးပိုဒ်ထက်ပို၍လည်း မဖွဲ့နွဲ့ကြချေ။ ဤစာတမ်းတွင် နဝေး ရတုပေါင်းချုပ်မှ မိုးတောရတုများဖြစ်သော- ထစ်ရင့် ဖြိုးဝှန်၊ ပြာသိုဟူသည်၊ ညိုညိုပြာပြာ၊ ထစ်အုံ့ပျသည်၊ ထစ်မြည် ရိုက်၍၊ ရတုညောင်ရေ၊ မည်းလေစွလေ၊ မစွေမရွာ၊ ထစ်ချုန်း ရင့် ၍၊ သွန်းမြူးစွေထန်၊ မွန်းယိမ်းကလျှင် စသည့် ရတု (၁၁) ပုဒ်မှ သရုပ်ဖော်အဖွဲ့များ ကိုသာ လေ့လာတင်ပြထားပါသည်။

ဤသို့လေ့လာတင်ပြရာတွင် အခန်း ၁။ စာဆိုး၏အတ္ထုပ္ပတ္တိ အကျဉ်း၊ အခန်း (၂) ရတုကဗျာ၏ သဘောသဘာဝ၊ ၂၊၁။ သရုပ်ဖော်အဖွဲ့ဟူသည်၊ အခန်း၃။ ပြည်-နဝေး၏ မိုးတောရတုများမှ သရုပ်ဖော် အဖွဲ့များ လေ့လာချက်၊ ၃၊၁။ အကြား သရုပ်ဖော်အဖွဲ့၊ ၃၊၂။ အမြင် သရုပ်ဖော် အဖွဲ့၊ ၃၊၃။ အတွေး သရုပ်ဖော်အဖွဲ့ဟူ၍အခန်းများခွဲကာလေ့လာတင်ပြထားပါသည်။

၁၊၁။ စာဆိုး၏အတ္ထုပ္ပတ္တိအကျဉ်း

''ပထမနဝေး'' ခေါ် ပြည်နဝေးသည် သက္ကရာဇ် (၈၄၉) ခုနှစ်၊ ပြည်မြို့တွင် မင်းပြုသော ဘုရင် နရပတိ၏ ယောက်ဖ (နှမတော် နရပတိမယ်တော် ၏ ကြင်ရာတော်) မင်းဘစောဘ၏ အထိန်းတော် သားဖြစ်သည်။ ဖွားသက္ကရာဇ်မှာ (၈၆၀) ခန့်ဖြစ်ပြီး စာဆိုး၏ ငယ်နာမည်မှာ 'မင်းသံနိုင်' ဖြစ်ပါသည်။ ဘုရင်နရပတိ သည် မင်းဘစော ကို 'ပွတ်လည်ရွာ' တွင် ကွပ်မျက်၍ နှမတော်နရပတိ မယ်ကို စလင်းစည်သူကျော်ထင်သို့ ပေးလိုက်သည်။ ထိုအခါ နဝေးကြီးလည်း စလင်းသို့ လိုက်ပါသွား ခဲ့ရပြီး စလင်းတွင်ပင် 'မင်းလကျာ်' ဟူသော ဘွဲ့ကို ရသည်။ ထို့နောက် စလင်းမြို့ပျက်၍စစ်ကိုင်းတွင်သက္ကရာဇ် (၉၀၇) ခုနှစ်၌ စလင်းစည်သူကျော်ထင် မင်းပြုရာ မင်းလကျာ်လိုက်ပါ ခစားရပြန်၍ ထောင်သင်းကို မှူးရသည်။ ထိုအခါ 'ထောင်သင်းမှူး' ဟုတွင်ပြန်သည်။ သက္ကရာဇ် (၉၂၈)ခုနှစ် ဟံသာဝတီဆင်ဖြူများရှင်လက်ထက် တာဝန်းသုံးထောင့် လေးရာရှိသော ဟံသာဝတီနေ ပြည်တော်ကြီး တည်ထောင်ပြီး နောက် 'ရာဇဋ္ဌာနီပြည်ကြီးပီ၍ တုသိတာမှ ဘုံလျှင်ကျသို့' အစချီသော ရတုပိုဒ်စုံကို စပ်ဆို၍ဆင်ဖြူရှင်မင်း တရားကြီးအား ဆက်သွင်းခဲ့၏။ မင်းတရားကြီးလည်းအားရတော် မူလွန်း၍ ထောင်သင်းမှူးအား 'နဝေး' ဟူသော ဘွဲ့ထူးဖြင့် ချီးကျူး

မြောက်စားတော် မူလေသည်။ ဤသို့အားဖြင့် 'ပြည် နဝေးကြီး' သည် ဘွဲ့မည်ရည်သုံးပါးဖြင့် ကျော်ကြားသော စာဆိုတော် ဖြစ်လေသည်။ စလင်းမြို့တွင်နေခိုက် 'မင်းလက်ျာ'၊ စစ်ကိုင်းမြို့တွင် ရှိခိုက် 'ထောင်သင်းမျှား'၊ ပြည်မြို့တွင် တာဝန် ထမ်းခိုက် 'နဝေး' ဟုတွင်လေသည်။ ထို့ကြောင့် လည်း 'စစ်ကိုင်းထောင်သင်း၊ စလင်းလက်ျာ၊ ပြည်မှာနဝေး' ဟု မြန်မာ စာပေတွင် ယနေ့တိုင် ဆိုကြခြင်း ဖြစ်ပါသည်။ စာဆို နဝေး သည် အသက် (၁၀)နှစ် ကတည်းကပင် ကဗျာ၊ လက်ာများကို လိုက်စား၍ရတုစပ်ဆိုသည်။ နဝေးကြီးစပ်ဆိုခဲ့သော ရတုပေါင်း (၃၀၀) ကျော် (၄၀၀) ခန့်ရှိသည်။ ဟံသာဝတီမူအရ (၂၃၆)ပုဒ် သာတွေ့ရှိရပါသည်။ 'နဝေး'၏ ရတုများ သည် ပုဒ်ရေများ သလောက် အမျိုးအစားလည်း ကွဲပြားခြားနား လှပါသည်။ 'ဘုရား တိုင်ရတု၊ သိကြားတိုင်ရတု၊ တောလားရတု၊ ရေလား ရတု၊ မိုးတောရတု၊ သဝေမပါရတု၊ သာလိကာ စေရတု' စသော သောင်းပြောင်းရတု အစုစုတို့ကို တစ်ခုနှင့် တစ်ခု မထပ်စေဘဲ အကန့်အကန့် သီးသန့် ရေးခဲ့ ပါသည်။ အဆန်းတွင်သော ရတုအဖြစ် ဥဒေါင်းဖိုမ အမေးအဖြေ၊ ဝမ်းဘဲဖိုမအမေးအဖြေ၊ အခံအလိုက် အပြိုင်ရတုများလည်း ပါဝင်သည်။ ထို့အပြင် 'ပြည် နဝေးကြီး' ရေးသားပြုစုခဲ့သော စာများမှာ 'မနော်ဟရီပျို့ မင်းတရားမယ်တော်ဧချင်း၊ ယိုးဒယား မိဖုရားဧချင်း၊ ရာဇဗျူဟာ ပျို့' နှင့် ရတုပုဒ်ရေ များစွာကို ရေးဖွဲ့ခဲ့ လေသည်။ စာဆိုနဝေး ၏ ဘဝကို ထင်ဟပ်ပြခဲ့သော စာပေရိပ်များသည် မြန်မာစာပေ သမိုင်းတွင် စာတင်လောက်ပါသည်။ ထို့ကြောင့် 'နဝေး' ၏ စာများက စာဆို၏ ဘဝကို ထင်ဟပ်သည့်အတွက် 'နဝေး' အား ဒေါက်တာ လှဖေက 'နယ်လှည့်စစ်သားစာဆိုတော်'၊ ဟံသာဝတီ ဦးဘရင်က 'စစ်ထွက်စာဆို'၊ မင်းသုဝဏ်က 'ခရီးသည် နဝေး'၊ မောင်နေလက'စာဆိုစစ်သည်'ဟူ၍အမျိုးမျိုးတင်စားကာဂုဏ်ပြု မှတ်တမ်းတင် ထားခဲ့ကြသည်ကို လေ့လာတွေ့ရှိရ ပေသည်။

၂။ ရတုကဗျာ၏ သဘောသဘာဝ

မြန်မာစာပေသမိုင်းစာအုပ်တွင် ရတုကဗျာကို "တစ်ပိုဒ်တည်း ဖွဲ့စပ်လျှင် ဧကပိုဒ်၊ နှစ်ပိုဒ်ဖွဲ့ စပ်လျှင်အဖြည့်ခံ၊ သုံးပိုဒ်ဖွဲ့စပ်လျှင် ပိုဒ်စုံဟူ၍ ခေါ်ဆိုသည်။ သုံးပိုဒ်ထက် ပိုမို၍မဖွဲ့နွဲ့ကြချေ။ တစ်ပိုဒ် တစ်ပိုဒ် တွင်လည်း ပဒအရေအတွက် အားဖြင့် (၁၀၈) ပဒထက် ပိုမို၍ မဖွဲ့နွဲ့ကြချေ။ အဖျားချများတွင် လည်းခိုင်ညွန့် ခက်ဖြာ (၇)လုံး၊ မဏိဆံကျင်(၉) လုံး အာသာဝတီ ဝတ်ဆံ (၁၁)လုံး၊ မဏိဦးပြည့် (၁၅)လုံး၊ ဇော် တစ်ခိုင်လုံး (၁၉) လုံး စသည်ဖြင့် အဖျားစာလုံး အရေအတွက် သီးသန့်ထားလျက် ရှိသည်။" (စာ-၄၈၊ ၄၉) ကာရန်ယူရာ တွင် သက်စေ့နှက်သုံးချက်ညီ၊ ဘီလူး ရယ်ဦးတိုက် စသည်ဖြင့် လက်ာစပ်နည်း (၆)မျိုး အတိုင်းဖွဲ့ ဆို လေ့ရှိကြသည်။ ရတုအချ တွင် အနည်းဆုံးအက္ခရာ (၇)လုံးမှ အများဆုံး (၃၅)လုံးအထိ ချနည်း ပေါင်း(၂၈)မျိုးရှိပါသည်။ ထို့ပြင်ရတုချီနည်းချနည်း နှင့်ပတ်သက် ၍ ပညာရှင်အသီးသီး တို့က ကဗျာစွယ်စုံကျမ်းတွင်(၂၅)မျိုး(စာ၂၄၁၊၂၄၂)၊ ကဝိဘာရတီ ကျမ်းတွင် (၂၈)မျိုး (စာ-၄၁၀၊ ၄၁၁) ကဗျာသာရတ္ထသင်္ဂြိုလ် (၄၁)မျိုး (စာ-၁၅၄)။ ကဝိလက္ခဏာသုံးကျမ်းတွဲတွင် (၆၀)မျိုး (စာ-၁၁၄) ရှိသည်ဟု ဖွင့်ဆိုထားပါသည်။ ရတုကဗျာ များကို ဘုရားတိုင်၊ မိုးတော၊ မိုးတိုင်၊ စစ်ချီ၊ကျေးစေ၊ သစ္စာတိုင်၊ မောင်ဘွဲ့၊ မယ်ဘွဲ့ စသည်ဖြင့်အကြောင်းအရာအလိုက် ခွဲခြား ထားပါသည်။ ထို့ကြောင့် အကြောင်းအရာပိုင်းတွင် လွတ်လပ် စွာဖွဲ့ဆိုနိုင်သော်လည်း အဖွဲ့အနွဲ့ပုံသဏာ□နိပိုင်းတွင် သတ်မှတ် ထားသော ရတုဖွဲ့နည်း စည်းကမ်းများနှင့်အညီ ဖွဲ့ဆိုရခြင်းသည် ပင် ရတုကဗျာ၏ သဘောသဘာဝဖြစ်သည်ဟု ဆိုနိုင်ပါသည်။

၂၁။ သရုပ်ဖော်အဖွဲ့ဟူသည်

အကြောင်းအရာတစ်ရပ်၊ အဖြစ်အပျက်တစ်ခု၊ ခံစားမှုအမျိုးမျိုး ကိုစာရှုသူ စိတ်မျက်စိဝယ် မြင်ယောင်၊ ကြားယောင်လာအောင် ရေးဖွဲ့မှုသည် "သရုပ်ဖော်အဖွဲ့" ဖြစ်ပါသည်။ သရုပ်ဖော်ရေးသား ခြင်းနှင့်ပတ်သက်၍ စာပေပညာရှင်အသီးသီးတို့က အနက် အဓိပ္ပာယ် အမျိုးမျိုးဖွင့်ဆိုကြပါသည်။ သရုပ်ဖော်ဟူသော ဝေါဟာရကို မြန်မာအဘိဓာန်တွင်-

"သရုပ်ဖော်-ကြို-စရိုက်၊ လက္ခဏာ၊ သဘာဝတို့ကို ပေါ်လွင်အောင်ပြုသည်" (စာ-၃၆၉)

ဟူ၍ ဖွင့်ဆိုထားပါသည်။ ထိုအဆိုအရ သရုပ်ဖော်အဖွဲ့ဟူသည် အကြောင်းအရာအဖြစ်အပျက်၊ လူ့သဘာဝတို့ကို ပေါ်လွင်အောင် ဖော်ပြထားသည့်အဖွဲ့ဖြစ်သည်ဟု ဆိုနိုင်ပါသည်။

သရုပ်ဖော်အရေးအဖွဲ့သည်စာဆိုများအသုံးပြုလေ့ရှိသော စာပေလက်နက်ကောင်းတစ်မျိုးဖြစ်ပါသည်။ စာဆိုများ စာဖွဲ့ လေ့ရှိသော စာပေအမျိုးမျိုးတွင် သရုပ်ဖော်အရေးအဖွဲ့သည် အနည်းနှင့်အများ ပါဝင်တတ်ပါသည်။ စာဖွဲ့သည်ဟူသော သဘောကပင်စာဆိုသည် မိမိခံစား၊ သိမြင်ကြားရသည်များကို စာဖတ်ပရိတ်သတ်ထံ ကူးစက်သွားအောင် ဆောင်ရွက်ခြင်းပင် ဖြစ်ပါသည်။ ထို့ကြောင့် စာဆိုများသည် မိမိတို့မြင်ခဲ့သည်များ ကို စာဖတ်ပရိတ်သတ် ထပ်တူမြင်လာအောင် သရုပ်ဖော် ရေးဖွဲ့ကြ၏။ မိမိကြားခဲ့သည်များကို စာဖတ်သူများထပ်တူ ကြားလာရအောင် အသံကိုသရုပ်ဖော်ရေးဖွဲ့ကြ၏။မိမိအဇ္ဈတ္တသဏ္ဌာန်ခံစားချက်အတွေး ကိုလည်း စာရှုသူများ ကူးစက်ခံစား လာရအောင် အတွေးစိတ်ကို သရုပ်ပေါ်အောင် ရေးဖွဲ့ကြ၏။ ထို့ကြောင့် သရုပ်ဖော်အရေးအဖွဲ့တွင် အမြင်ကို သရုပ်ဖော်ခြင်း၊ အကြားကိုသရုပ်ဖော်ခြင်းနှင့် အတွေးကို သရုပ်ဖော်ခြင်းဟူ၍ ယေဘုယျအားဖြင့် သုံးမျိုး တွေ့နိုင်ပါသည်။

၃။ ပြည်-နဝေး၏ မိုးတောရတုများမှ သရုပ်ဖော်အဖွဲ့များ လေ့လာချက်

မိုးတောရတုကဗျာများသည်သဘာဝအတိုင်းဖြစ်ပေါ်ပြောင်းလဲ နေသော မိုးရာသီတို့၏ အခြေအနေ၊ မိုးတိမ်တို့၏ အခြေအနေ၊ လျှပ်ပန်းလျှပ်နွယ်တို့၏ အခြေအနေ၊ မိုးရာသီ သဘာဝကို အခြေပြု၍ အချစ်၊ အလွမ်း၊ ခံစားချက်တို့ကို လေးလုံးစပ်လက်ာဖြင့်

ရေးစပ်သီကုံးတတ်ကြသော ကဗျာမျိုး ပင်ဖြစ်ပေသည်။ စာဆို "နဝေး"၏မိုးတောရတုများတွင်မိမိ
တွေ့မြင်ကြုံကြိုက်ရသည်များကို စာဖတ်သူတို့၏စိတ်အာရုံတွင် မြင်ယောင်၊ကြားယောင်တွေးတောလာအောင်သရုပ်ဖော် ရေးသား နိုင်စွမ်းရှိသည်ကို တွေ့ရှိရပါသည်။

၃၊၁။ 'အကြား' သရုပ်ဖော်အဖွဲ့

မောင်ခင်မင် (ဓနုဖြူ)က 'အကြားသရုပ်ဖော်အဖွဲ့' နှင့် ပတ်သက်၍ စကားပြေသဘောတရား၊ စကားပြေအတတ်ပညာ စာအုပ်တွင်-

"သရုပ်ဖော်အဖွဲ့တွင် ရုပ်ဆင်းသွင်ပြင်သာမက အသံ (၀၊) အကြား၊ အနံ့၊ အရသာအထိအတွေ့ဟူသည့် အာရုံကိုလည်း ထည့်သွင်းရေးဖွဲ့ခြင်းမျိုး ရှိတတ်ပါသည်" (စာ-၁၈၈)

ဟူ၍ ဖွင့်ဆိုထားပါသည်။

စာဆိုနဝေးသည် မိုးရွာမည့်သဘာဝ အခြေအနေများ တစ်နည်း အားဖြင့် မိုးမရွာခင်ဖြစ်ပေါ် နေသော မိုးသားတိမ်တိုက် တို့၏ သဘာဝအခြေအနေတို့ကို စာဖတ်သူတို့၏ စိတ်အာရုံ၊ စိတ်နားတို့၌ ကြားယောင်လာအောင် ဖွဲ့ဆိုထားကြောင်း တွေ့ရှိရ ပါသည်။ ထိုသို့ဖွဲ့ဆိုရာ၌ အာဒိကပ္ပကျမ်းတွင်-

"မြင်းမိုရ်တောင်ကိုဝန်းရံသော ယုဂန္ဓိရ်တောင်သည်ကား ရေမှ ပေါ်သောအမြင့် ယူဇနာ လေးသောင်း နှစ်ထောင်ရှိ၏။ အောက်သို့ အစောက်ယူဇနာလည်း လေးသောင်းနှစ်ထောင် ရှိ၏" (စာ-၃၁၊ ၃၂)

ထိုယုဂန္ဓိရ်တောင်ထိပ်ဆီမှ မိုးခြိမ်းသံများ ထစ်ချုန်းမြည်ဟီး သံများ ကြားနေရကြောင်းကို စာဆိုက 'မည်းလေစွလေ' မိုးတော ရတုကဗျာတွင်-

"တိမ်ဖြူမထင်၊ မှောင်တိပင်လျှင်၊ တပင်ပြေးသွား၊ ကြိမ်းဝါး သံပ၊ ယုဂန်ဝဟယ်" (စာ-၁၄၇)

ဟူ၍လည်းကောင်း မိုးကောင်းကင် ပတ်ဝန်းကျင်တစ်ခုလုံး မိုးခြိမ်းသံများ ကြားနေရပြီးမိုးသည်လည်းမစဲဘဲရွာနေကြောင်းကို 'ထစ်မြည် ရိုက်၍' မိုးတောရတုကဗျာတွင်-

"ထစ်မြည်ရိုက်၍၊ တိမ်တိုက်ဝန်းကျင်၊ ပတ်ကုံးဆင်လျှက်၊ ကောင်းကင်တရှည့်၊ စက်သွားပြည့်မူ၊ ခြိမ့်တည့်မည်၊ ပျံလည်းမစဲ" (စာ -၁၃၂) ဟူ၍လည်းကောင်း

'ရတုညောင်ရေ' မိုးတောရတုကဗျာတွင်စာဆိုက-

"လျှပ်ပန်းဆက်၍၊ သန်လျက်ကိုင်မိုး၊ အရွှေညိုးသို့၊ ဖြိုးဖြိုး ရေပေါက်၊ သွန်းကြမြောက်သော်" (စာ-၁၃၉)

ဟူ၍ လည်းကောင်း ရေးဖွဲ့ခဲ့ပါသည်။ ဤအကြောင်းခြင်း အရာ တို့ကို လေ့လာ ကြည့်ခြင်းအားဖြင့် မစဲဘဲ ရွာနေသော မိုး၊ မိုးရွာ သွန်းရာတွင် ကောင်းကင်မှ ကျလာသော မိုးစက်မိုးပေါက် ကလေးများ၏ အသံနှင့် မိုးခြိမ်းသံတို့သည် စိတ်အာရုံတွင် ကြားယောင် လာအောင် သရုပ်ဖော်ရေးဖွဲ့ထား နိုင်သည် ကိုလည်းလေ့လာတွေ့ရှိရပါသည်။ စာဆိုနဝေးသည် ထိထိမိမိ နှင့် မိုးရာသီသဘာဝအခြေအနေများကို သရုပ်ဖော်ဖွဲ့ဆိုထား သောကြောင့် ဖော်ပြလိုသော အကြောင်းအရာတို့မှာ ပိုမိုထင်ရှား ပီပြင် လာခဲ့ပါသည်။ ထိုကဲ့သို့ မိုးတောရတုသဘော သဘာဝ များနှင့် လိုက်လျောညီစွာ ဖွဲ့ဆိုထားသောကြောင့် နဝေး၏ မိုးဘွဲ့များသည် မိုးတောရတုပီသလှသည်ဟု ဆိုနိုင်ပါသည်။

၃၊၂။ 'အမြင်' သရုပ်ဖော်အဖွဲ့

မောင်ခင်မင် (ဓနုဖြူ)က 'အမြင်သရုပ်ဖော်အဖွဲ့' နှင့် ပတ်သက်၍ စကားပြေသဘောတရား၊ စကားပြေအတတ်ပညာ စာအုပ်တွင်-

"သရုပ်ဖော်အဖွဲ့သည် မျက်စိဖြင့် မြင်နိုင်သော ရုပ်ဆင်း သွင်ပြင်များကို အဓိကထား၍ ဖွဲ့သော အဖွဲ့မျိုးဖြစ်ပါသည်။ သက်ရှိသက်မဲ့ အကောင်အထည်တို့၏ ပုံသဏ္ဌာန်ကို စာဖတ်သူ၏ စိတ်ထဲတွင် မြင်ယောင်လာအောင် ဖော်ပြရ ခြင်းသည် သရုပ်ဖော်အဖွဲ့၏ အဓိကတာဝန် ဖြစ်သည်" (စာ-၂၁၄) ဟုဆိုထားပါသည်။

စာဆိုသည် သဘာဝအတိုင်းဖြစ်ပေါ်နေသော မိုးတိမ်တို့၏ သဘာဝကို စိတ်ကူးဉာဏ်ဆန်းကြယ်စွာဖြင့် ရေးဖွဲ့ပြခဲ့ပါသည်။ ထိုသို့ ရေးဖွဲ့ရာတွင် ကောင်းကင်ပြင်တွင် စိမ်းတလဲ့၊ ဖြူတခါ၊ ညိုတဖုံနီသလို အရောင်အဝါများသန်းပြီး ဟန်ရေးပြလျှက် အရပ်ကိုးမျက်နှာလုံးတွင် တိမ်တောင်တိမ်လိပ်တို့သည် လည်း ကောင်း၊ လျှပ်ပန်းလျှပ်နွယ်တို့သည် လည်းကောင်း၊ ခြူးပန်း ခြူးနွယ်များ ကဲ့သို့ လှပစွာ ယှက်သန်းနေပါသည်။ ထိုအကြောင်း ကို 'ထစ်ရင့်ဖြိုးဝှန်' မိုးတောရတုကဗျာတွင်-

"စိမ်းပြာဖြူညို၊ ဝါလိုနီကြန်၊ ကင်းဟန်ငုံပွင့်၊ နိမ့်မြင့်လိမ်ရှက်၊ ပန်းချီဖက်သို့၊ ကိုးမျက်နှာလုံး၊ ကုံးဘိရန်းရန်၊ တိမ်ပန်းခြူး ညွှန့်၊ ဖြုတ်ခြည်းဖြန့်က၊ လန့်စနည်းသာ၊ ပြက်လျှပ်ဝါနှင့်" (စာ-၁၃၄)

ဟူ၍ ပန်းချီကျော်တို့၏ စုတ်တံကစားဘိသကဲ့သို့ သရုပ်ဖော်ကာ ရေးဖွဲ့ထားပါသည်။ ထိုသို့ရေးဖွဲ့ထားခြင်းကြောင့် ကောင်းကင်ယံ ၌တစ်ပြောင်ပြောင်တလက်လက်နှင့် ရုတ်တရက်ဖြန့်ကာထင်နေ တော့သဖြင့် ပန်းချီကားချပ်ကြီးပမာ အသက်ဝင်နေတော့သည်။ လျှပ်ပန်းလျှပ်နွယ်နှင့် မိုးကောင်းကင်တွင် ဖြစ်ပေါ်နေသော မိုးတမ်တို့၏ အရောင်တို့ကိုလည်းမြင်ယောင်လာအောင် သရုပ် ဖော် ရေးဖွဲ့ထားကြောင်းတွေ့ရှိရပါသည်။

ထို့ပြင်မိုးမရွာမီ ဖြစ်ပေါ်နေသော မိုးကောင်းကင်၏အခြေအနေ ကိုလည်း ထည့်သွင်းဖွဲ့ဆို ခဲ့ပါသည်။ 'ပြာသို ဟူသည်' ရတု ကဗျာတွင် စာဆိုက-

"မင်းလွင်မထူး၊ တိမ်ဦးမိုက်မိုက်၊ ပြိုက်ပြိုက်ရော်ကျ၊ မမြ လွန်းသေး၊ရက်ကိုသွေး၍၊ နီးဝေးတောခြေ၊ မှိုင်းမှိုင်း ဝေသည်" (စာ-၁၃၅၊ ၁၃၆)

ဟူ၍တောတောင်တစ်ခွင်တွင် တိမ်များဖုံးလွှမ်းနေသောကြောင့် အလင်းရောင်ကင်းမဲ့ကာ အုံ့မှိုင်းနေသည်ဟု မိုးမရွာမီ အခြေ အနေကို မြင်ယောင်လာအောင် ရေးဖွဲ့ထားသည်ကိုလည်း တွေ့ရှိ ရပေသည်။ ၎င်းအပြင် စာဆိုက မိုးများရွာသွန်းပုံကိုလည်း 'ညိုညိုပြာပြာ' မိုးတော ရတုတွင်

"တိမ်ပြာကကွက်၊ တိမ်နက်မည်းမိုး၊ တိမ်ခြေညှို့နှင့်၊ ထပ်ဖို့ မစဲ၊ ရွာသွန်းကြက" (စာ-၁၄၄)

ဟူ၍လည်းကောင်း၊ တဖန် 'ထစ်အုံ့ပျသည်' မိုးတောရတုတွင်-

"စိမ်းဝါတန့်လျှက်၊ တိမ်ညွန့်သည်လည်း၊ မည်သို့ချည်းလျှင်၊ သာဖြည်းသေးဖွဲ၊ ပြိုးပြောက်ကြ၍" (စာ-၁၃၁)

ဟူ၍လည်းကောင်း မိုးတိမ်တို့၏ အရောင်နှင့်အတူ မိုးရွာသွန်းပုံကိုလည်း မြင်ယောင်လာအောင် ရေးဖွဲ့ထားခဲ့ပြန်ပါသည်။ ထို့နောက်စာဆို နဝေးသည် မိုးရွာပြီး အခြေအနေကိုလည်း ထည့်သွင်းရေးဖွဲ့ခဲ့ကြောင်း တွေ့ရပါသည်။ ထိုသို့ ရေးဖွဲ့ရာတွင် မိုးတိမ်တို့သည် နိမ့်ဆင်းလာကာ မိုးခြိမ်းသံတို့ဖြင့် မိုးများ တစ်ရစပ်ရွာသွန်းသောအခါ မြစ်ချောင်းအင်းအိုင်တို့သည် ရေများ ပြည့်နှက်လာပါသည်။ မိုးများလွန်း၍ လည်းဆည်မြောင်း၊ ကန်၊ ချောင်း၊ လယ်ယာကိုင်းကျွန်းများ ပျက်ဆီးကာ ရေအောက် နစ်မြုပ်ကုန်ကြသည်။ ထိုအကြောင်းကို စာဆိုက 'မဓွေမရွာ' မိုးတောရတုကဗျာတွင်-

"တိမ်သာလွှမ်းနိမ့်၊ ခြိမ့်ခြိမ့်ကြ၊ ဗေး၊ တလည်းပြေး၍၊ မြစ်ကွေး၊အင်း၊ချောင်း၊ ထုံးလောင်းရေဝင်၊ လယ်ပြင်၊ ကန်ထောင်း၊ ဆည်၊မြောင်း၊ကိုင်းကျွန်း၊ မျှောမွန်းနစ်မြုပ်" (စာ-၁၄၁)

ဟူ၍ မိုးရွာ ပြီးသောအခါ မိုးများလွန်း၍ လယ်ယာကိုင်းကျွန်းများ ပျက်စီးသွားတတ်ကြောင်းကိုလည်း သရုပ်ဖော် ရေးဖွဲ့ခဲ့ပါသည်။ လောကကြီးတွင် ပုထုဇဉ်မှန်သမျှ ချစ်ခြင်းမေတ္တာနှင့် မကင်းနိုင်ကြသည်မှာမမ္မတာပင်ဖြစ်ပါသည်။ စာဆိုနဝေးသည် 'အချစ်ဘွဲ့များ' ကို ရေးဖွဲ့ရာ၌ 'ရတုညောင်ရေ-ချီ' မိုးတောရတုတွင် ချစ်သူ မိန်းကလေးအား စတင်တွေ့ရှိချိန်ကို ထည့်သွင်းရေးဖွဲ့ခဲ့ပါသည်။ ထိုသို့ရေးဖွဲ့ရာတွင် နွေရာသီအခါသမယ ကဆုန်လပြည့်နေ့၊ ညနေခင်း ပြည်ရွှေဆံတော်ဘုရားတွင် ပြည်ရွာအဝှမ်းညောင်ရေ သွန်းရန် ရောက်ရှိလာကြပါသည်။ နံ့သာရည်အပြည့်နှင့် ပန်းပေါင်းစုံထည့်ထားသော မြူတာအိုးများ ခေါင်းတွင်ရွက်၍ လုံမပျိုလေးများသည် ညောင်ရေသွန်းလောင်းခြင်း၊ ဘုရားရှိခိုး ပူဇော်ခြင်းများ ပြုလုပ်ကြပါသည်။ ထိုအချိန်တွင် စာဆိုသည် ချစ်သူမယ်လေးကို စတင်တွေ့ရှိကြောင်းကို-

"ရတုညောင်ရေ၊ ခါလိုက်နွေဝယ်၊ ညနေချမ်းခါ၊ သင်းမြူတာ နှင့်၊ နံ့သာဖြိုးပြည့်၊ ပန်းစုံထည့်မှ၊ ပတ်လှည့်လက်ယာ၊ မြတ် စိန္ဒာဝယ်" (စာ-၁၃၉)

ဟူ၍ညောင်ရေသွန်းလောင်းနေကြပုံတို့ကို မြင်ယောင်လာအောင် ရေးဖွဲ့ထားသည်ကိုလည်း တွေ့ရှိရမည်ဖြစ်ပါသည်။

တဖန်စာဆိုနဝေးကြီးသည် 'မွန်းယိမ်းကလျင်-ချီ' မိုးတော ရတုတွင် မိုးနတ်သားဏ၏ အဆင်တန်ဆာနှင့် တုယင်ဝတ်ရုံလွှာကို လည်း စိတ်အာရုံတွင်မြင်ယောင်လာအောင် သရုပ်ဖော်ကာ ရေးဖွဲ့ထားပြန်ပါသည်။ ထိုသို့ သရုပ်ဖော်ရေးဖွဲ့ရာတွင် မိုးနတ် သားသည် စည်မောင်းစလွယ်၊ လက်ကောက်တို့ဖြင့် မင်းတို့၏ ဝတ်စားတန်ဆာအတိုင်း ဝတ်ဆင်ထားကြောင်းကို-

"ဦးစိုက်ပန်ပန်း၊ နရန်းနားသန်၊ ရည်မွန်သွယ်ပျောင်း၊ စည်ဗောင်းလည်ဝယ်၊ စလွယ်လက်ကောက်၊ စံပယ်ထောက် ၍" (စာ-၁၃၆)

ဟုမြင်ယောင်လာအောင် သရုပ်ဖော်၍ ရေးဖွဲ့ခဲ့ပါသည်။ ထို့ပြင် မိုးနတ်သား၏ တုယင်အင်္ကျီကိုလည်း အလျှဉ်းသင့်သည့် အလျောက် သရုပ်ဖော်၍ ရေးဖွဲ့ခဲ့ပြန်ပါသည်။ မိုးနတ်သား၏ အင်္ကျီမှာ ရှပ်စုံဖြင့် ဖော်ပြထားသော ခိုင်ခံ့စွာယက်လုပ်ထားသည့် တုယင်ဖြစ်ပါသည်။ အောက်ကစာမရီရှပ်၊ ဇာနီရှပ်၊ တိုးရှပ်၊ ဆင်ရှပ်၊ နဂါးရှပ်၊ ဂဠုန်နှင့် အသူရာနတ်မင်းတို့ ရင်ဆိုင်စစ်ခင်း ထားသော အရှပ်တို့ကို အမျက်ရတနာကိုးပါးနှင့်စီခြယ်ထားပါ သည်။ ထိုတုယင်ကို ဖြန့်၍ မိုးနတ်သားသည် တန်ခိုးလွတ်ကာ မိုးတို့သည်းထန်စွာရွာသွန်းစေခဲ့ပါသည်။ ထိုအကြောင်းကိုစာဆိုက 'စက်ဝန်းရံခွေ-ချီ' ရတုတွင်-

"အောက်ကစာမရီ၊ ဇာနီနှင့်ထိုး၊ ဆင်မျိုးဆယ်ပါး၊ နဂါးခွေရှက်၊ အတက်ရောင်လျှံ၊ ဂဠုန်ပျံနှင့်၊ သုရံနတ်သား၊ ရင်ဆိုင်တားမှ၊ကိုးပါးမျက်ရှင်၊စီးမွမ်းဆင်၍၊ တုယင်နှင့်ချည်း၊ ဝှန်သည်းလှည့်ပတ်၊ တန်ခိုးလွတ်လျက်" (စာ-၁၄၉)

ဟူ၍ ရေးဖွဲ့ခဲ့ပါသည်။ မိုးနတ်သား၏ တုယင် (အင်္ကျီ) ဝတ်ရုံကို သရုပ်ဖော်ရင်း မိုးနတ်သားသည် တန်ခိုးလွတ်ကာ မိုးရွာစေသည် ကိုလည်း စိတ်အာရုံတွင် မြင်ယောင်လာအောင် သရုပ်ဖော်ရေးဖွဲ့ ခဲ့ပါသည်။

ဤသို့ဖြင့်စာဆိုနဝေးသည် မိုးကောင်းကင်၌ ဖြစ်ပေါ် နေသော မိုးတိမ်တို့၏ သဘာဝ၊ မိုးမရွာသွန်းမီ အခြေအနေများ၊ လျှပ်ပန်းလျှပ်ရောင် မိုးခြိမ်းသံများနှင့် မိုးရွာသွန်းမှုအခြေအနေ များ၊ မိုးရွာသွန်းပြီးသော အခြေအနေများ၊ မိုးနတ်သား၏ အဆင် တန်ဆာများအပြင် အချစ်ဘွဲ့များကိုလည်း စာဖတ်သူတို့၏ စိတ်အာရုံတွင် မြင်ယောင်လာအောင် သရုပ်ဖော်ရေးဖွဲ့ထား ကြောင်းကိုလည်း လေ့လာတွေ့ရှိရပေသည်။ အချစ်ဘွဲ့များကို ရေးဖွဲ့ရာတွင် နဝေးကြီးသည် ချစ်သူမယ်ကလေးအား ကဆုန် ညောင်ရေသွန်းပွဲတော်တွင် စတင်တွေ့ရှိပုံ၊ မြန်မာတို့၏ ရိုးရာဓလေ့ညောင်ရေသွန်းလောင်းပုံတို့ကိုလည်း မမေ့လျော့စွာ ရေးဖွဲ့ထားသည့်အပြင် မိုးများလွန်းသောကြောင့် လယ်ယာ ကိုင်းကျွန်းများပျက်စီးတတ်ပုံကို ပြည်သူ့ရှုထောင့်မှ ခံစားကာ သရုပ်ဖော်ရေးဖွဲ့ထားသည်ကိုလည်း ထူးခြားစွာတွေ့ရှိရပါသည်။

၃.၃။ 'အတွေး' သရုပ်ဖော်အဖွဲ့

ဆရာမောင်ထင်က 'အတွေးသရုပ်ဖော်အဖွဲ့' နှင့်ပတ်သက်၍ ဝတ္ထုရှည်စာတမ်းများ ဒုတိယတွဲတွင်-

"သဘာဝကိုသရုပ်ဖော်ကောင်းခြင်း၊ ရုပ်ဆင်းသဏ္ဌာန်တို့ကို သရုပ်ဖော်ကောင်းခြင်း၊ လူစရိုက်ကိုသရုပ်ဖော်ကောင်းခြင်း၊ အတွေးအခေါ် သရုပ်ဖော်ကောင်းခြင်း၊ ဝေဒနာခံစားမှုကို သရုပ်ဖော်ကောင်းခြင်း၊ လူမှုရေး သရုပ်ဖော်ကောင်းခြင်း စသည့် အင်္ဂါရပ်ခြောက်ပါး အနက်တစ်ပါးပါးနှင့် ပြည့်စုံလျှင် ပင် သရုပ်ဖော်အဖွဲ့ကောင်းသည်ဟု ဆိုနိုင်ပါသည်။" (စာ-၂၁၀။ ၂၁၁)ဟူ၍ဖွဲ့ဆိုထားပါသည်။

မိုးတောရတုတ်၏ သဘာဝအတိုင်း မိုးရာသီသဘာဝအခြေအနေများကို နောက်ခံထားကာ မောင်နှင့်မယ်တို့၏ အချစ်၊ အလွမ်း၊ ခံစားချက်များကိုလည်း သရုပ်ဖော်ကာ ရေးဖွဲ့ခဲ့ကြောင်း တွေ့ရှိရပါသည်။ ထိုသို့ သရုပ်ဖော်ရေးဖွဲ့ရာတွင် စာဆိုသည် မိမိချစ်သူ မိန်းကလေး၏ အလှကို ဖော်ကျူးကာထည့်သွင်းရေးဖွဲ့ခဲ့ပါသည်။ ချစ်သူမိန်းကလေး၏ အလှကို သရုပ်ဖော်ရေးဖွဲ့ရာတွင် ချစ်သူ မိန်းကလေး၏ 'အသားအရေ' ကောင်းခြင်းကိုလည်း ကြွင်းမကျန် ရအောင်ရေးဖွဲ့တင်ပြထားပါသည်။ချစ်သူမယ်လေးသည်ရံရွှေတော် သုံးပါးအလယ်တွင် လနယ်ဝင်းပြောင်ပြီး ညိုညက်ကာ ရှုံ့ဝင်းနွဲ့ လှပသော လှမှန်ကင်းလေးဖြစ်ကြောင်းကို 'သွန်းမြူစွေထန်' မိုးတောရတုတွင်-

"သုံးဘောင်ရွှေလယ်၊ လနယ်ဝင်းပြောင်၊ ညိုရောင်နွဲ့ရှင်း၊ လှမှန်ကင်း" (စာ-၁၅၁)

ဟူ၍လည်းကောင်း၊ မယ်လေး၏ အသားရေမှာ ရွှေရောင်ကဲ့သို့ ဝင်းဝါလတ်ဆတ်နေပြီး ရုပ်အဆင်းမှာ နွဲ့နွဲ့နှောင်းနှောင်းလေး နှင့်အပြစ်ပြော စရာမရှိအောင် လှရက်သူလေးဖြစ်ကြောင်းကို 'သွန်မြူးစွေထန်' ရတုတွင်-

"မုရင်းရွှေရောင်၊ ဝင်းပြောင်ပြာလဲ့

နွဲ့နွဲ့ရုပ်သွင်၊ လေးပင်ငြိမ်သက်

ပြစ်စက်မစွန်း၊ ရွှေနန်းဘုံလယ်

ဖြိုးကြွယ်ဘုန်းအင်၊ လှများရှင်" (စာ ၁၅၁)

ဟူ၍လည်းကောင်း၊

"ရွှေစင်အသား၊ လှထွတ်ထား" (စာ ၁၅၁)

ဟူ၍လည်းကောင်း၊ တဖန်'ထစ်ချုန်းရင့်၍' ရတုတွင် စာဆိုက-

"စံပွင့်ရွှေနှစ်၊ ဇမ္ဘူရစ်သို့

ပျိုမျစ်ပြာဝင်း၊ သွယ်နွဲ့ရှင်းမှ

တင်းတင်းမစက်၊ မွတ်မွတ်ညက်သား" (စာ ၁၃၀)

ဟူ၍လည်းကောင်း ဖွဲ့ဆိုထားသည်ကို တွေ့ရပါသည်။ ချစ်သူ မိန်းကလေး၏အသားအရေမှာရွှေကဲ့သို့ဝင်းဝါကြောင်း၊ရွှေရောင် အသားနှင့်ပင် လှပနေကြောင်း ရွှေနှင့်နှိုင်းကာ သရုပ်ဖော်၍ ပင်ကိုယ်အလှကိုပေါ်လွင်အောင်ရေးဖွဲ့ခဲ့ပါသည်။

ထိုသို့အသားအရေ၏ လှပမှုကိုဖွဲ့ဆိုရုံသာမက "ဆံကေသာ အလှ" ကိုလည်း ထည့်သွင်းရေးဖွဲ့ထားပြန်ပါသည်။ ဆံကေသာ လေးထုံးကာစ၊ လက်သင်ဆံထုံးလေးထုံးကာစဖြစ်ကြောင်းကို 'သွန်းမြူးစွေထန်' ရတုတွင်-

"ရွက်သွယ်ကေသာ၊ ထုံးကာစစ

ရွှရ လက်သင်" (စာ ၁၅၁)

ဟူ၍လည်းကောင်း၊ 'ထစ်အုံ့ပျသည်' ရတုကဗျာတွင်-

"မြိတ်လွတ်ရွက်သွင်၊ ကေသျှင်ရစ်ဆင့်

ဆင်တိုင်းသင့်သား" (စာ ၁၃၁)

ဟူ၍လည်းကောင်း ချစ်သူမိန်းကလေး၏ ဆံပင်ဆံထုံးအလှကို သရုပ်ဖော်ကာ ရေးဖွဲ့ခဲ့ပါသည်။ အမြိတ်လွတ်ရုံကလေး နက် မှောင် ရှင်သန်နေသည့် ဆံပင် ကလေးကို အဆင့်ဆင့်ရစ်ကာ ပတ်ကာ ဆင်ပြင်ထားသည်မှာ ကြည့်ရှု၍ လှပတင့်တယ် နေကြောင်းချစ်သူမိန်းကလေး၏ အလှကို အတွေးဖြင့် သရုပ် ဖော်ကာရေးဖွဲ့ပြခဲ့ပါသည်။

ထို့ပြင် စာဆို 'နဝေး' သည် ချစ်သူမယ်လေး၏ အသက် ရွယ်ကိုလည်း ပေါ်လွင်အောင် ဖွဲ့ဆိုထားကြောင်းတွေ့ရှိရပါ သည်။ ချစ်သူမယ်လေးမှာအသက်အရွယ်အားဖြင့် ဆယ်နှစ်သာ ရှိကြောင်းကို ' ညိုညိုပြာပြာ ' ရတုကဗျာတွင်-

"ဆင်းပြင်လျာမှ၊ ပြစ်မှာမစက်

ဆယ်နှစ်သက်" (စာ ၁၃၅)

ဟူ၍ ချစ်သူမိန်းကလေး၏ ငယ်ရွယ်နုပျိုပုံကို သရုပ်ဖော်ကာ ရေးဖွဲ့ခဲ့ပါသည်။

စာဆို"နဝေးကြီး"သည် ချစ်သူမယ်လေး၏ အသား အရေအလှ၊ ဆံပင်အလှ အသက်အရွယ်နုပျိုမှုအလှတို့ကို ဖွဲ့ဆို ပြီးနောက် ချစ်သူမယ်လေးသည် နတ်သမီးတမျှလှပကြောင်း ကိုလည်းဖွဲ့ဆိုခဲ့ပြန်ပါသည်။ ထိုသို့ဖွဲ့ဆိုရာတွင် ကြန်အင်ငါးဖြာ နှင့် ပြည့်စုံသော မယ်လေး၏ သရုပ်သဏ္ဌာန်သည် နတ်သမီး တို့၏အဆင်းအသွင်သဖွယ်ဖြစ်ကြောင်းကိုလည်း 'ထစ်ရင့်ဖြိုးဝှန်' ရတုတွင်-

"ထုံးပုံထို့ဟန်၊ နှိုင်းသင့်ရန်သား

ငါးကြန်ဆင်းပြင်၊ မိသခင်မှ

အဆင်တန်ဆာ၊ အတိုင်းသာနှင့်

ဖြာဖြာငြိမ့်ကြည်ထင်ဘိသည်။" (စာ-၁၃၅)

ဟူ၍ ဖွဲ့ဆိုထားသည်ကို တွေ့ရှိရပါသည်။

စာဆို'နဝေး'သည် စစ်သည်တော်တစ်ဦးဖြစ်သည်နှင့် အညီ အရှင်သခင်နှင့်အတူ စစ်ချီရာသို့ လိုက်ပါရမြဲဖြစ်ပါသည်။ မကြာခဏစစ်ချီသွားရသော ချစ်သူမောင်အားလွမ်းဆွတ်တမ်း နေမည့် မယ်လေး၏ အလွမ်းသရုပ်ကိုလည်း မြင်ယောင် လာအောင် ရေးဖွဲ့ထားပါသည်။ မယ်လေး၏ အလွမ်းကို ဖော်ပြရာတွင် တစ်နယ်တစ်ကျေးခရီးဝေးသို့ သွား၍ တာဝန် ထမ်းဆောင်နေရသော ချစ်သူမောင်အားလွမ်းဆွတ်တသ သတိ ရခြင်းကြောင့် သနားဖွယ်ဖြစ်နေပုံကို ' ထစ်အုံ့ပျသည် ' ရတုကဗျာတွင် -

'နွဲ့နွဲ့ယိမ်းယိမ်း၊ လည်တိမ်းအုံးဝယ်

သနားဘွယ်လျှင်' (စာ ၁၃၁)

ဟူ၍လည်းကောင်း၊ ' ထစ်မြည်ရိုက်၍' ရတုကဗျာတွင်-

"အုံးဖြင့်မှီမြဲ၊ နွဲလည်းမတတ်

ပျောင်းညွှတ်ခွေခွေ၊ ဖြေ၍မရှင်

လက်ငင်းညိုးငယ်၊ နွဲ့နွဲ့သွယ်" (စာ ၁၃၂)

ဟူ၍လည်းကောင်း မယ်လေး၏အလွမ်းကို သဘာဝကျကျ ဖော်ပြထားပါသည်။ စာဆိုစစ်သည်မောင်သည် နိုင်ငံ၏ တာဝန် ထမ်းဆောင်ရန်အတွက် တစ်နယ်တစ်ကျေး ရပ်ဝေးသို့ ခွဲခွါ သွားရခြင်းကြောင့်ပူပင်သောက ဖြစ်နေရသည့် ချစ်သူမယ်လေး ၏ ခံစားချက်ကို အတွေးဖြင့် ရေးဖွဲ့ပြခဲ့ပါသည်။

စစ်သည်တော်တို့သည် စစ်မြေပြင်တွင်အနေကြာလာသည် နှင့်အမျှ ချစ်ခင်သူများနှင့် တကွအိမ်ကိုတမ်းတလာကြ၏။ ဤသို့ အိမ်ကို တမ်းတနေချိန်တွင် ပတ်ဝန်းကျင်ဌက်မောင်နှံ တို့၏ တူစုံပျော်ရွှင်နေကြ ပုံကိုမြင်ရသောအခါ မိမိတို့၏ မလွတ်လပ် သော ဘဝကို အားမလိုအားမရဖြစ်လာရသကဲ့သို့ ဌက်ကလေး များ၏ လွတ်လပ်သောဘဝကို အားကျလာမိ၏။ ထိုအခါ ဌက် ကလေးများသာ ဖြစ်လိုက်ပါက ယခုချက်ချင်းပင် ချစ်သူထံ ပျံသန်း၍ သွားရောက်ချင်လှသည် ဟု စိတ်ခံစားချက် နှင့် ဆန္ဒ များကို ' မည်းလေစွလေ' ရတုကဗျာတွင်-

"သဘောဌက်တူ၊ ပျံတက်မူကား

တွေးယူမခွ၊ ရောက်ချင်လှ၏" (စာ ၁၄၈)

ဟူ၍ ဖွဲ့ဆိုထားပါသည်။ ထိုသို့ဖွဲ့ဆိုထားသောကြောင့် မိမိဇာတိ ဌာနသို့ ပြန်ရောက်လို လှသောစိတ်၏ ပြင်းထန်စွာလှုပ်ရှား ခံစားမှုအသွင်မှာ သရုပ်ပေါ်လွင်လာရပါသည်။

ဤသို့အားဖြင့် စာဆိုနဝေးကြီး၏ မိုးတောရတုများတွင် မိုးအပေါ်ထားရှိသည့်သဘောထားအမြင်တို့ကိုသရုပ်ဖော်ဖွဲ့ဆိုရာ တွင် မိုးရာသီသဘာဝနှင့်အတူ မောင်မယ်တို့၏ အချစ်၊ အလွမ်း ခံစားချက်များကို စာဖတ်သူတို့၏ စိတ်အာရုံ၊ စိတ်မျက်စေ့၊ စိတ်နားတို့တွင် မြင်ယောင်၊ ကြားယောင်၊တွေးတောလာအောင် ဝေဝေဆာဆာဖြင့် ရေးဖွဲ့ထားနိုင်ကြောင်း ရှိသည်ကိုလည်း တွေ့ရှိရပါသည်။ ထိုသို့ မိုးရာသီ သဘာဝအခြေအနေ အမျိုးမျိုး တို့ကို ရေးဖွဲ့ထားရာ သာမာန်လူတို့အတွက်ပင် လွမ်းဆွေးသလို ဖြစ်ကာ ခံစားချက်ကို ပိုစေပါသည်။ ထို့ကြောင့် ဇာတိဌာနေနှင့် ချစ်သူကိုခွဲခွာကြရသော စာဆိုနှင့်စစ်သည်များအတွက် မိုးသည် အချမ်းဒဏ်နှင့်အတူ အလွမ်းဒဏ်ကိုပါ ပူးတွဲခံစားရကြောင်း ပေါ်လွင်ကာ စာနာစိတ်အတွေးများကိုလည်း ဖြစ်ပေါ်စေကြောင်း လေ့လာတွေ့ရှိရပါသည်။

၄။ ခြုံငုံသုံးသပ်ချက်

စာဆို 'နဝေး' ၏ မိုးတောရတုများတွင် တွေ့ရှိရသော သရုပ်ဖော်အဖွဲ့များကိုလေ့လာကြည့်သောအခါ အမြင်ကို သရုပ် ဖော်ခြင်း၊ အကြားကိုသရုပ်ဖော်ခြင်း၊အတွေးကို သရုပ်ဖော်ခြင်း ဟူ၍ လေ့လာတွေ့ရှိရပါသည်။ ဤသို့သရုပ်ဖော် ရေးဖွဲ့ရာတွင် လည်း သဘာဝအတိုင်းဖြစ်ပေါ်နေသော မိုးတိမ်တို့၏သဘာဝ၊ ရာသီ အလိုက်ပြောင်းလဲနေသော ကောင်းကင်တို့၏ သဘာဝ တို့ကို ထည့်သွင်းဖော်ပြထား၍ ကောင်းကင်၏သဘာဝမှာပို၍ ရှုပ်လုံးကြွလှပလာရပါသည်။ မိုးရွာသွန်းမှုကို သရုပ်ဖော်ရေးဖွဲ့ ရာတွင် လည်းမိုးမရွာမီအခြေအနေ၊ မိုးရွာသွန်းပုံအမျိုးမျိုး၊ မိုးရွာသွန်းပြီး အခြေအနေတို့ကိုလည်း မြင်ယောင်ကြားယောင် လာအောင်ထည့်သွင်းရေးဖွဲ့ကာသရုပ်ဖော်ထားကြောင်း တွေ့ရှိရ ပါသည်။ ထို့အပြင် မိုးနတ်သား၏ တုယင် (အင်္ဂျီ) ဝတ်ရုံလွှာနှင့် မိုးနတ်သားကြောင့်မိုးရွာသွန်းစေတတ်ပုံတို့ကိုလည်း စိတ်ကူးနှင့် ဖော်ကျူးကာ သရုပ်ဖော်ရေးဖွဲ့ခဲ့ပြန်ပါသည်။ ထိုသို့ မိုးရာသီ သဘာဝ၏ အခြေအနေ အမျိုးမျိုးတို့ကို ရေးဖွဲ့ထားရာ သာမာန် လူတို့အတွက်ပင် လွမ်းဆွေးသလိုဖြစ်ကာ ခံစားချက်ကိုပိုစေပါ သည်။ တဖန် မိုးသည် ခွဲခွာနေရသော ချစ်သူ မောင်မယ်တို့ အတွက် အလွမ်းကို ပိုမိုပံ့ပိုးပေးနိုင် သည်ဖြစ်ရာ စာဆိုက မိုးအပေါ်ထားရှိသော သဘောထားကို ချစ်သူနှစ်ဦး၏ ခံစားချက် အမြင်ဖြင့် ဖွဲ့ဆိုထား သည်ကိုလည်း လေ့လာတွေ့ရှိ ရမည် ဖြစ်ပါသည်။ စစ်သည် စာဆိုနှင့်ချစ်သူ မယ်လေးတို့၏ အပြန်အလှန် အချစ်၊ အလွမ်း၊ ခံစားချက်များကိုလည်း အထင် အရှားတွေ့မြင် ရသကဲ့သို့ အတွေးဖြင့် သရုပ်ပေါ်လွင်အောင် ရေးဖွဲ့ထားကြောင်းကိုလည်း တွေ့ရှိရပါသည်။ ပြင်ဆင်မှု ကင်းမဲ့ သော ချစ်သူမိန်းကလေး၏ ပင်ကိုယ် အလှကိုလည်း ကွက်ကွက် ကွင်းကွင်း မြင်ယောင် လာအောင် သရုပ်ဖော် ရေးဖွဲ့ခဲ့ပါသည်။ မည်သို့ပင်ဆိုစေကာမူ စာဆို 'နဝေး'၏ မိုးတောရတုတွင် ပါဝင်သော 'သရုပ်ဖော်အဖွဲ့များ' ကြောင့် စာဆိုဖော်ပြလိုသော အကြောင်းအရာကို ဝိပြင် စေသည့်အပြင် သဘာဝပတ်ဝန်းကျင်ကို ချစ်ခင်မြတ်နိုးစိတ်၊ စာနာစိတ်များဖြစ်ပေါ် လာစေပါသည်။

၅။ နိဂုံး

ဤစာတမ်းသည် ပြည်နဝေး၏ မိုးတောရတုကဗျာ (၁၁) ပုဒ်မှ စာဆို၏ သရုပ်ဖော် အဖွဲ့ပိုင်နိုင်ကျွမ်းကျင်ပုံများကို လေ့လာ ဖော်ထုတ်တင်ပြခဲ့ခြင်း ဖြစ်ပါသည်။ သုတေသီများ အနေဖြင့် ပြည်-

နဝေးဇာ၊ ရတုများမှ ဘုရားတိုင်၊ စစ်ချီ၊ မယ်ဘွဲ့၊ မောင်ဘွဲ့၊ မြို့ဘွဲ့၊ ရေလား၊ တောလား၊ ဥဒေါင်းဖို, မ အမေးအဖြေ၊ ဝမ်းဘဲ ဖို, မ အမေးအဖြေ၊ ပန်းဘွဲ့အဖြည့်ခံ...ရတုများကိုလည်း ဆက်လက် သုတေသနပြုနိုင်ပါသည်။

ကျမ်းကိုးစာရင်း

၁။ ကျော်ရင်၊ ဦး။ (၁၉၄၁) ။ ကဝိဘာရတီကျမ်း (ပထမဘွဲ့) မန္တလေး၊ သုခဝတီပုံနှိပ်တိုက်။

၂။ ခင်မင်၊ မောင်။ (ဓနုဖြူ)။ (၁၉၉၄) ။ စကားပြေသဘောတရား စကားပြေ အတတ်ပညာ၊ ရန်ကုန်၊ စာပေလောကပုံနှိပ်တိုက်။

၃။ ထင်၊မောင်။ (၁၉၈၁) ။ ဝတ္ထုရှည်စာတမ်းများ (ဒုတိယတွဲ)။ ရန်ကုန်၊ စာပေဗိမာန် ပုံနှိပ်တိုက်။

၄။ ထွန်းရွှေ၊ ဦး။ ဓမ္မစရိယ။ (၁၉၆၇) ။ ကဗျာစွယ်စုံကျမ်းကြီး။ ရန်ကုန်၊ အောင်မိတ်ဆက်ပုံနှိပ်တိုက်။

၅။ နဝေး၊ ပြည်။ (၁၉၆၆) ။ နဝေးရတုပေါင်းချုပ် (စတုတ္ထအကြိမ်)။ ရန်ကုန်၊ ဟံသာဝတီပုံနှိပ်တိုက်။

၆။ ဖေမောင်တင်၊ ဦး။ (၁၉၈၇) ။ မြန်မာစာပေသမိုင်း (ပထမအကြိမ်)။ ရန်ကုန်၊ ခေတ္တရာပုံနှိပ်တိုက်။

၇။ ရွှေနော်၊ မောင်။ (၁၉၅၈) ။ အာဒိကပ္ပကျမ်း၊ ရန်ကုန်၊ (စစ်ကဲတော်ကြီးမင်း) ၊ ဟံသာဝတီပုံနှိပ်တိုက်။

၈။ လွမ်း၊ ဆရာ။ (၁၉၅၅) ။ ကဗျာသာရတ္ထသင်္ဂြိုလ်။ ရန်ကုန်၊ ရန်အောင် မင်္ဂလာပုံနှိပ်တိုက်။

၉။ သြ၊ ဦး။ (၁၉၆၀) ။ ကဝိလက္ခဏာသုံးကျမ်းတွဲ။ ရန်ကုန်၊ မြဇော်ပုံနှိပ် တိုက်

Article ID – JRA6004920

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သော့ချက်ဝေါဟာရ- အတွေးနှင့်အရေး၊ ကဗျာ၊ စိတ်ကူး၊ ခေတ်ကဗျာ၊ သရုပ်ဖော်။

၁။ နိဒါန်း

မြန်မာစာပေလောကတွင် အခြေခံအားဖြင့် ကဗျာ နှင့် စကားပြေဟူ၍ ပုံသဏ္ဌာန်နှစ်မျိုး ရှိပါသည်။ ထိုပုံသဏ္ဌာန်နှစ်မျိုးသည် လောကလူသားတို့ကို ခံစားမှုရသ ပေးစွမ်းနိုင် သည့် အနုပညာပစ္စည်းများ ဖြစ်ကြပါသည်။

ကဗျာဆရာတို့သည် မိမိ ကြုံတွေ့ခဲ့ရသော အတွေ့အကြုံတို့ကို မိမိတို့၏ခံစားချက်နှင့် ပေါင်းစပ်ကာ ကဗျာများ ဖွဲ့သီခဲ့ကြသည်။ ထိုအထဲတွင် ဆရာ ဒေါင်းနွယ်ဆွေလည်း ပါဝင်ခဲ့သည်။ ဆရာဒေါင်းနွယ်ဆွေ သည် ၁၉၄၈-ခုနှစ် လွတ်လပ်ရေးခေတ်၌ ထွက်ပေါ် ထွန်းကားလာသော ကဗျာဆရာထဲတွင် ထင်ရှားကျော်ကြားသူဖြစ်ပြီး ကဗျာပုဒ်ရေ ပေါင်း “၁၀၀၀” ကျော်ကို ရေးဖွဲ့ခဲ့သူလည်း ဖြစ်သည်။ ဆရာဒေါင်းနွယ်ဆွေ၏ ကဗျာများကို သုတေသနစာတမ်းပြုစုထားသည့် စာတမ်း များ များစွာ မတွေ့ရပေ။ ‘မာန်’ ဝတ္ထုဟု ထင်ရှားသည့် ကဗျာရှည်ကြီးကို ပါရဂူဘွဲ့ကြို စာတမ်းငယ်အဖြစ် ဒေါ်စပယ်ဖတ်ခဲ့ဖူးသည်ကိုသာ တွေ့ခဲ့ရပါသည်။ ထို့ကြောင့် ဆရာဒေါင်းနွယ်ဆွေ၏ကဗျာများကို သုတေသနပြုစုရခြင်း ဖြစ်ပါသည်။ ထိုကဗျာများထဲမှ မုန်တိုင်းနှင့် အိပ်ပျော် နေသောပန်း(၁၉၅၉)၊ မုန်တိုင်းကို ရင်ဆိုင်လေ့ (၁၉၆၆)၊ မာနလွန်ပြီးကာလ၏ မေတ္တာစောင်းချင်းသစ် (၁၉၈၅) ဟူသော ကဗျာ(၃)ပုဒ်ကို ထုတ်နုတ်၍ ကဗျာဆရာ၏ အတွေးနှင့် အရေးကို လေ့လာဖော်ထုတ် တင်ပြသွားပါမည်။

ထိုသို့တင်ပြရာတွင် ဒေါင်းနွယ်ဆွေ၏ အတ္ထုပ္ပတ္တိ အကျဉ်း၊ကဗျာဝေါဟာရအဖွင့် နှင့် ခေတ်ကဗျာ သဘောသဘာဝ၊ ဒေါင်းနွယ်ဆွေ၏ ကဗျာ (၃) ပုဒ်မှ အတွေးနှင့်အရေး လေ့လာချက် ဟူ၍ အပိုင်း (၃) ပိုင်း ခွဲကာ ဖော်ထုတ်တင်ပြထားပါသည်။

၂။ ဒေါင်းနွယ်ဆွေ၏အတ္ထုပ္ပတ္တိအကျဉ်း

ကဗျာဆရာဒေါင်းနွယ်ဆွေကို ၁၉၃၁-ခုနှစ်၊ ဧနှင်ဝါရီလ ၁၆ရက် သောကြာနေ့တွင် ပုသိမ်ခရိုင်၊ သာပေါင်းမြို့တွင် အဖ ရာဇဝတ်ဝန်ထောက် ဦးဘထိန်၊ အမိ ဒေါ်ဖုန်ရိန် တို့မှ ဖွားမြင်ခဲ့သည်။ မွေးချင်းသုံးယောက်တွင် အကြီးဆုံးဖြစ် သည်။ ဗဟိုအစိုးရအထက်တန်းကျောင်းတွင် နေစဉ်ကပင် လက်ရေးစာစောင် များမှာ “ဒေါင်းဒင်” ဟူသော ကလောင်အမည်ဖြင့် ကဗျာများ စရေးခဲ့သည်။ ၁၉၄၈-ခုနှစ်တွင် ဟံသာဝတီ သတင်းစာ၌ “ဒေါင်းနွယ်ဆွေ” အမည်ဖြင့် ကဗျာ များရေးခဲ့သည်။ ၁၉၅၃-ခုနှစ်တွင် ကမ္ဘာ့ငြိမ်းချမ်းရေး ညီလာခံကဗျာပြိုင်ပွဲ၌ ‘စစ်နှင့်ပြည်သူ’ ကဗျာဖြင့် ဆရာကြီး သခင်ကိုယ်တော်မှိုင်း ချီးမြှင့်သည့်ဆုကို ရရှိခဲ့သည်။

စာရေးသူ ရေးသားပြုစုခဲ့သော စာအုပ်များမှာ ကဗျာ့ပုလဲကုံး၊ ပုလဲနိဒါန်း၊ လောကမျက်ကန်း၊ မိုးသောက် လက်ဝပန်း၊ မာန်ကဗျာရှည်ကြီး၊ ချစ်သူမျက်နှာ ကဗျာ စက်ဝိုင်း၊ လောကသစ္စာကို ရှာဖွေခြင်းနှင့် ကဗျာဝတ္ထု လေးပုဒ်၊ ကလျာမိမိမုန်း၊ မိုးဆန်သောမိုး၊ အသည်းနှင့် ထပ်တူ၊ ကဗျာလွတ်အနမ်း၊ မလွမ်းသာ ကြမ္မာနှောင်းစသော စာအုပ်ပေါင်း (၅၅) အုပ် ရေးသားထုတ်ဝေခဲ့ပါ သည်။

ထို့ပြင် စာရေးသူသည် ရှင်ရှင်လောကသို့လည်း ဝင်ရောက်ခဲ့သူ ဖြစ်သည်။ ‘ရွှေရင်သိမ်းသစ်’ ၊ ‘လုလင် ငယ်သွေး’ ၊ ‘အပယ်ရတနာ’ ၊ ‘ချွေးကလေးစိုစို’ ဇာတ် ကားများတွင် ဇာတ်ဆောင်တစ်ဦးအဖြစ် ပါဝင်ခဲ့သည်။ ‘ပြည်ဟိန်းကျော်’ အမည်ဖြင့် ဗေဒင်လည်း ဟောခဲ့သူ ဖြစ်သည်။ ဆရာဒေါင်းနွယ်ဆွေသည် ၁၉၅၈-ခုနှစ် မတ်လ ၂၂ ရက်၊ နံနက် ၂

နာရီ အချိန် တွင် ကင်ဆာရောဂါဖြင့် ဘဝတစ်ပါးသို့ ပြောင်းသွားကွယ်လွန်ခဲ့သည်။

၃။ ကဗျာဝေါဟာရအဖွင့်နှင့် ခေတ်ကဗျာသဘောသဘာဝ

ကဗျာဟူသော ဝေါဟာရနှင့်စပ်လျဉ်း၍ ပညာရှင် အသီးသီး က အဓိပ္ပာယ် အမျိုးမျိုး ဖွင့်ဆိုခဲ့ကြပါသည်။ ပုဂံဝန်ထောက်မင်းဦးတင်က ကဗျာဗန္ဓသာရကျမ်းတွင် -

“ကဗျာဆိုသည်မှာ သက္ကဋ္ဌဘာသာကဗျ, ကးဗျ များ ကိုသော်ငင်း၊ မာဂဓဘာသာ ကာဝေယျ, ကဗျ, ကဗ္ဗများ ကိုသော်ငင်း မြန်မာဘာသာ ကဗျာဟူ၍ ပြန်ဆိုခေါ်ဝေါ် ကြသည်။ ဖွဲ့သည်… ပညာရှိတို့စီကုံး သောစာ” [၂] (စာ-၅)

ဟူ၍ ဖွင့်ဆိုပါသည်။ မြန်မာစာအဖွဲ့က ထုတ်ဝေသော မြန်မာအဘိဓာန်တွင်-

“ကဗျာ /ဂဗျာ/ နာ- စည်း မျဉ်းများနှင့်အညီ စာလုံး၊ စာပိုဒ်အရေအတွက်၊ ကာရန်အချိတ်အဆက်၊ အသံအနေ အထား စသည်ဖြင့် စီကုံးထားသောအဖွဲ့အနွဲ့” [၈] (စာ-၄)

ဟူ၍ ရှင်းလင်းဖွင့်ဆိုထားသည်ကို တွေ့ရပါသည်။

ကဗျာဟူသည် လူတို့၏ လှုပ်ရှားမှု၊ ခံစားမှု၊ စိတ်ကူး အတွေးတို့နှင့် တူညီသော စကားနယ်မှ အဖွဲ့အစည်း တစ်ခုဖြစ်သည်။ မြန်မာစာဆိုတို့သည် လှုပ်ရှား၊ ခံစား၊ စိတ်ကူး၊ တွေးတောမှုတို့ကို ဖွဲ့စည်းတင်ပြရာ၌ ရသ မြောက်သောကဗျာများကို ဖန်တီးနိုင်ကြောင်း တွေ့ရသည်။

ထို့ကြောင့် ကဗျာသည် မိမိဆိုလိုသည့် အဓိပ္ပာယ် ကို ကျစ်လျစ်ထိမိသော စကားလုံးများဖြင့် ဖွဲ့နွဲ့ရသော စာပေအမျိုးအစားဖြစ်သည်။ ကဗျာသမိုင်းကြောင်းကို လေ့လာ ကြည့်လျှင် ကဗျာကို ပုဂံခေတ်မှစ၍ မျက်မှောက် ခေတ်အထိ ခေတ်အဆက်ဆက် စာဆိုအသီးသီးတို့က ပုံစံအမျိုးမျိုးဖြင့် ဖွဲ့နွဲ့ခဲ့သည်ကို လေ့လာအကဲခတ် နိုင်ပါသည်။ ကိုလိုနီခေတ် နှောင်းပိုင်းတွင် ကဗျာ လမ်းကြောင်း ပြောင်းလဲသွားကာ ခေတ်စမ်းကဗျာဟူသည့် ခေတ်ကဗျာများပေါ်ထွက်လာခဲ့သည်။ ခေတ်ကဗျာများ သည် လူသားတို့၏သတ္တိ၊ အားမာန်၊ ခံစားမှုတို့ကို ပေါ်လွင်အောင်ဖွဲ့လာကြသည်။ လူအများ နားလည်လွယ်သည့် အဖွဲ့ပုံစံများကို ရိုးရိုးရှင်းရှင်း ဖွဲ့ဆိုလာကြသည်ကို တွေ့နိုင်ပါသည်။

၄။ ဒေါင်းနွယ်ဆွေ၏ကဗျာ(၃)ပုဒ်မှ အတွေးနှင့်အရေး

အတွေးနှင့်အရေးဟူသော ဝေါဟာရတို့ကို မြန်မာအဘိဓာန် အကျဉ်းချုပ်တွင်-

အတွေး- စဉ်းစားဆင်ခြင်မှု၊ တွေးတောကြံစည်မှု [ဂ] (စာ-၆၂)

အရေး- အက္ခရာစာလုံးကိုရေးသားခြင်း၊ အကြောင်းအရာ တစုံတရာကို စီကုံးဖွဲ့နွဲ့မှု [ဂ] (စာ-၁၁၆)

ဟူ၍လည်းကောင်း၊

မြန်မာအင်္ဂလိပ်အဘိဓာန်တွင်-

အတွေးကို thought, idea [၉] (စာ-၅၆၃) အရေးကို writing [၉] (စာ-၅၈၆)

ဟူ၍လည်းကောင်း၊

ဆရာဇော်ဂျီ၏ ‘ရသစာပေ အဖွင့်’ တွင်-

ဖွဲ့နွဲ့ပုံနှင့် စိတ်ကူးညာဏ်တို့သည် ခွဲ၍မရစကောင်းသော အရာနှစ်ခုဖြစ်သည် [၁] (စာ-၉၃)

ဟူ၍လည်းကောင်း၊

ဆရာမြင်ငက ‘ကဗျာ့နရီနှင့်နမိတ်ပုံ’ တွင်-

ကဗျာတစ်ပုဒ်သည် တွေးခေါ်ခံစားမှုတရပ်ဖြစ်သည်။ ထို တွေးခေါ်ခံစားမှုကို ဖြစ်ပေါ်စေသည့် ‘အဆာ’ ကို ကဗျာ့ ပရိယာယ်ဖြင့်ဖော်ကျူးရင်း ‘ပုံ’ ပေါ်လာသည်။ ကဗျာတွင် အသံ၊ နရီ၊ နမိတ်ပုံ၊ ဖွဲ့ထုံး၊ အနက်တို့၏ဓာတ်ပေါင်းသည့် ‘ပုံ’ ဖြစ်သည် [၆] (စာ-၄၀)

ဟူ၍လည်းကောင်း အတွေးနှင့်အရေး၏ အနက် အဓိပ္ပာယ်ကိုယူဆချက် အမျိုးမျိုးဖြင့် ဖွင့်ဆိုထားကြသည် ကို လေ့လာတွေ့ရှိရပါသည်။ ထို့ကြောင့် အတွေး နှင့် အရေး ဟူသည် စိတ်ကူးစဉ်းစားမိသည်များကို လူအများသိရှိ ခံစားနိုင်စေရန် ပုံဖော်ရေးသားစီကုံးခြင်းပင် ဖြစ်ပါသည်။

ကဗျာဆရာတို့သည် လောကသုံးပါးမှ မကုန် နိုင်သော အကြောင်းအရာများကို စိတ်ဝင်စားစွာ ကြည့်ရှု၍ မိမိအမြင်၊ မိမိအသိ၊ မိမိအကြားတို့ကို စိတ်ကူးအတွေးနှင့် ပုံဖော်ကာ စာဖတ်သူတို့ကို ရသခံစားမှု ဖြစ်ပေါ်လာစေရန် ရေးဖွဲ့လေ့ရှိကြပါသည်။ ဆရာဒေါင်းနွယ်ဆွေသည် မိမိ တွေ့ခဲ့၊ ကြုံခဲ့၊ ခံစားခဲ့ရသော တွေ့ကြုံခံစားမှုအသိတို့ကို ကဗျာဖွဲ့သီ၍ စာဖတ်သူတို့ကို အတွေးအခေါ် ခံစားမှု ရသ ပေးစွမ်းထားသည်။

၄.၁။ မုန်တိုင်းနှင့်အိပ်ပျော်နေသောပန်း

ဆရာဒေါင်းနွယ်ဆွေသည် “မုန်တိုင်းနှင့် အိပ်ပျော်နေသော ပန်း” ကဗျာတွင် ကံကြမ္မာမုန်တိုင်းက တိုက်မြဲတိုင်း တိုက် သော်လည်း လူသားတို့၏အားမာန် ပန်းဖူးက ရှင်သန် နေကြောင်း မြင်ယောင်လာအောင် သရုပ်ဖော်ရေးဖွဲ့ထား သည်။

ဤကဗျာတွင် ညကမုန်တိုင်းတိုက်သောကြောင့် ပန်းပွင့်များ အိပ်ပျော်ကြရပုံ၊ ကဗျာဆရာမှာ အိပ်ပျော်နေ သောပန်းပွင့်များကို ကြည့်၍ ဝမ်းနည်းကြေကွဲရပုံ၊ ထိုသို့ ဝမ်းနည်းနေစဉ်တွင် ပြာလဲ့သော ကောင်းကင်မှ နီရဲသော နေလုံးကြီးဖြင့် အရုဏ်တက်လာပုံ၊ ထိုအခါ ပန်းဖူးများ အိပ်ပျော်ရာမှ လူးလဲထလာပုံ၊ အားသစ်မာန်သစ်ဖြင့် ပန်းများ ပွင့်လန်းလာကြပုံကို -

“ညကမုန်တိုင်း၊ သူအိပ်ခိုင်း၍

ပန်းတိုင်းငုံကာ၊ မပွင့်ရှာဟု” [၃] (စာ-၁၄၀)

ဟူ၍ လည်းကောင်း၊

“ငါ့မှာကြေကွဲ၊ ဝမ်းပမ်းနည်းစဉ်

ရဲရဲနီဖြာ၊ အရုဏ်လာ၍၊

တိမ်ပြာကိုဖောက်၊ တမိုးသောက်မှ၊

နှင်းသောက်ဆွတ်လူး၊ ပန်းဖူးဖူးလျှင်၊

လူးလဲ၍ထ၊ ပွင့်လှာကြသည်၊

ရွှန်းမြင့်လှစ်… သစ်သစ်တကား" [၃] (စာ-၁၄၀)

ဟူ၍လည်းကောင်း ပုံဖော်ဖွဲ့ဆိုထားသည်။ အဆိုး လောကဓံကို 'မုန်တိုင်း' ၊ လူသားကို 'ပန်း' နှင့် တင်စား ဖွဲ့ဆိုထားပါသည်။ မုန်တိုင်းနှင့်ပန်းကို "အိပ်ခိုင်း" ဟူသော သက်ရှိလူသားများကဲ့သို့ သုံးနှုန်းလိုက်သောအခါ ပိုမို ပေါ်လွင်လာပါသည်။ အဆိုးလောကဓံ ကြောင့် ကြိုးစားမှု အားမာန်မှာ စိတ်ရှိတိုင်း မပွင့်လန်းနိုင်ဘဲ အိပ်ပျော်နေရပုံ ကို 'မပွင့်ရှာ' ဟု 'ရှာ' ဟူသော သနားကရုဏာသက်ဖွယ် စကားလုံးလေးဖြင့်သရုပ်ဖော်ထားပါသည်။ အရုဏ်တက် လာသောနေလုံးကြီး၏ အနေအထားကို "ရဲရဲနီဖြာ၊ အရုဏ် လာ" ဟူသော အရောင်သင်္ကေတဖြင့် ညွှန်းဆိုထားသည်။ ပန်းဖူးပန်းပွင့်တို့၏ လှုပ်ရှားမှု အမူအရာကိုလည်း "လူးလဲ၍ထ" ဟူသည့် သက်ရှိတွင် သုံးသော စကားသုံး ကောင်းဖြင့် ဖော်ကျူးထားသည်မှာ ပန်းဖူး၊ ပန်းပွင့်တို့၏ အားမာန်ကို ပေါ်လွင်စေသည်။ စာရေးသူ၏အတွေး နှင့်အရေးကြောင့် မုန်တိုင်း၏ဒဏ်ကို မည်မျှ ခံရစေကာမူ ပြန်လည်ရှင်သန်မြဲဖြစ်သော ပန်းပွင့်တို့၏အားမာန်ကို လူသားအားမာန်အဖြစ် ပေါ်လွင် ထင်ရှားလာစေပါသည်။

ကဗျာ၏ဂယက်အနက်တို့သည် စာဖတ်သူတို့အား ရိုက်ခတ်မြဲပင် ဖြစ်သည်။ ဤကဗျာသည် ဆရာဇော်ဂျီ၏ "ပန်းပန်လျက်ပဲ" ကဗျာကဲ့သို့ လောကဓံကို ကြံ့ကြံ့ခံနိုင် သည့် လူသားတို့၏ အားမာန်ကို ပေါ်လွင်စေပါသည်။ လူသားအားမာန် ပန်းဖူးကလည်း ထာဝရ ရှင်သန်ဆဲပင် ဖြစ်ကြောင်း ပေါ်လွင်လာရသည့် ကဗျာကောင်း တစ်ပုဒ် ဟု ဆိုရမည်ဖြစ်သည်။

၄၂။ မုန်တိုင်းကိုရင်ဆိုင်လော့

ဆရာဒေါင်းနွယ်ဆွေသည် "မုန်တိုင်းကိုရင်ဆိုင်လော့" ကဗျာတွင် မည်သို့သော အခက်အခဲမျိုးနှင့်ကြုံတွေ့ရပါစေ ရည်မှန်းချက်ပန်းတိုင် ရောက်အောင် ရင်ဆိုင်သွားမည် ဖြစ် ကြောင်း မောင်မယ်နှစ်ဦး၏ ဇာတ်လမ်းဖြင့် ဖန်တီးဖွဲ့ဆို ထားသည်။

ဤကဗျာတွင် ညဉ့်နက်နက် မှောင်ကြီး မဲကြီး ထဲတွင် မယ်နှင့်မောင် တူစုံလျှောက်လှမ်းကြပုံ၊ လမ်းခရီး တွင် အဆင်း၊ အတက်၊ အချိုး၊ အကွေ့များဖြင့် ပြေပြစ် ချောမွေ့ခြင်း မရှိပုံ၊ တစ်ယောက်ကို တစ်ယောက် အဖော်ပြု ၍ ကြောက်ရွံ့စိတ်ကို ဖြေဖျောက်ကြပုံ၊ ညဉ့်နက်ခရီးတွင် (ဝိညာဉ်) စိတ်အားမာန်ကိုအဖော်ပြု၍ ခရီးဆက်ကြပုံတို့ကို သရုပ်ဖော်ဖွဲ့ဆိုထားသည်။

မယ်နှင့်မောင်တို့ ခရီးလမ်းတွင် မမောတမ်း လျှောက်လှမ်းကြသည့် မြင်ကွင်းကို-

"လက်ချင်းတွဲ၍၊ မှောင်ထဲညဉ့်လမ်း၊

တွားတွားစမ်းကာ၊ လှမ်းကြမည်မောင်၊

လွင်ခေါင်တီးတီး၊ ခရီးခြေကုန်၊

ရင်တုန်ပြီလော၊ မမောပြီရှင်" [၄] (စာ-၁၀၃)

ဟူ၍ ဇာတ်လမ်းဖန်တီး ဖွဲ့ဆိုထားသည်။ မယ်နှင့် မောင် သည် ကြမ်းတမ်းသော ခရောင်းလမ်းကို လျှောက်လှမ်း တော့မည် ဖြစ်သောကြောင့် ညဉ့်နက်ချိန်ကို ရွေးချယ် သုံးနှုန်းထားသည်။ စာရေးသူ၏ အတွေး နှင့် အရေး သည် ချီးကျူးဖွယ်ပင်တည်း။ "တွားတွားစမ်းကာ" ဟူသော စကားသုံးသည် ညဉ့်နက်ချိန် ဖြစ်သောကြောင့် ဖြည်းဖြည်း ချင်း စမ်းကာ သွားနေရသည်ကို ပေါ်လွင်စေပါသည်။ "မမောပြီရှင်" ဟူသောအသုံးမှာ မယ်ကလေး၏ အမူအရာကို ထင်းကနဲ မြင်ယောင်စေသည်။ ဤအသုံး၏ နောက်ကွယ်တွင် မိမိရည်မှန်းထားသည့် ပန်းတိုင်ကို အရောက်လှမ်းမည့် မယ်ကလေးအား ကြိုးစားစေလိုသော၊ မမောပမ်းစေလိုသော စာရေးသူ၏ စေတနာဆန္ဒကို တွေ့မြင်နိုင်သည်။

ဆက်လက်၍ မယ်နှင့်မောင် လျှောက်လှမ်းရသော ခရီးလမ်းမှာ ပြေပြစ်ချောမွေ့ခြင်းမရှိပုံကို-

"လမ်းဆစ်ကွေ့ချိုး၊ မြူဝိုးဝိုးမှ၊

ပမ်းရိစ္စလည်း၊ ဖွဖွဖော့နင်း၊

အဆင်းလျှော့လျှော့၊ အထက်မော့ပြီး၊

ခရီးသော့လျှောက်၊ တွင်တွင်ပေါက်မှ၊

မိုးသောက်မှန်းခြေရောက်ပေမည်" [၄] (စာ-၁၀၃)

ဟူ၍ ဖွဲ့ဆိုထားသည်။ လမ်းခရီး၏ကြမ်းတမ်းပုံ၊ ပြေပြစ် ချောမွေ့ခြင်းမရှိပုံကို သံပြင်းတစ်လှည့်၊ သံတင်းတစ်လှည့် ၄-၃-၂ ကာရန်များဖြင့် ချိတ်ဆက်ထားသည်မှာ နှစ်သက် ဖွယ်ပင် ဖြစ်သည်။ ဘဝအမောကို အသံကာရန်ဖြင့် သရုပ်ဖော်ဖွဲ့ဆိုထားပါသည်။ မယ်နှင့် မောင်တို့၏ ခရောင်း လမ်းကို လျှောက်လှမ်းရခြင်းမှာလည်း ပေါ်လွင်ထင်ရှား စေ ပါသည်။

ထို့နောက် ကဗျာပါ မယ်နှင့်မောင်တို့ သည် တစ်ယောက်ကို တစ်ယောက် အားပေးရင်း မဲမှောင်နေသော အမှောင်ထုကို ရင်ဆိုင်နေကြရပုံမြင်ကွင်းကို-

"အို….တွယ်ရာမဲ့ကင်း၊

နှစ်ယောက်ချင်းမို့၊ အားတင်းရသည်၊

မှောင်ခြည်ညစ်သမ်း၊

လခြမ်းမမြင်၊ တိမ်ပြင်မည်းမည်း" [၄] (စာ-၁၀၃)

ဟူ၍ သရုပ်ဖော်ရေးဖွဲ့ထားသည်။ "မှောင်ခြည် ညစ်ညမ်း၊ လခြမ်းမမြင်၊ တိမ်ပြင်မည်းမည်း" ဟူသော အဖွဲ့အနွဲ့သည် အမှောင်ထုကြီးစိုးနေကြောင်း ပေါ်လွင်လှသည်။ လူသား နှစ်ဦးအား အခက်အခဲကို ရင်ဆိုင်နေရသော အချိန်အခါ အဖြစ် မှောင်မိုက်ည ကို နောက်ခံယူ၍ ရေးဖွဲ့ခြင်းဖြစ်သည်။

ထို့ပြင် မှောင်မိုက်သောညနှင့် (ဝိညာဉ်) စိတ်အားမာန်ကို မိတ်ဆွေကဲ့သို့ သဘောထားကာ ဘဝမုန်တိုင်းကို ရင်ဆိုင်နေကြရသော မယ်နှင့်မောင်တို့၏ ဖြစ်ထွေကို-

"မေကတန္ဓဲ့၊ မောင်တလှည့်လျှင်၊

ရှေ့တွင်မုန်တိုင်း၊ ပြင်းပြင်းခိုင်း၍၊

သစ်ကိုင်းကျိုးကြေ၊ ပင်ခြေလွင့်ဆဲ၊

လှမ်းမြဲမောင်နှင့်၊ ခရီးဆင့်မည်၊

ညနှင့်ဝိညာဉ် မိတ်ဆွေတကား" [၄] (စာ-၁၀၃)

ဟူ၍ ရေးဖွဲ့ထားသည်။ ထိုအဖွဲ့၏ နောက်ကွယ်တွင် မယ်နှင့်မောင်တို့ကို အားမလျှော့ဘဲ ခရီးဆက်စေလိုသော စာရေးသူ၏ စေတနာအတွေးကို တွေ့မြင်ရသည်။ လူသား တို့သည် ဘဝမုန်တိုင်းကို ကြုံတွေ့ရမြဲဖြစ်သည်။ ထိုသို့ ကြုံတွေ့ရာတွင် စိတ်ပျက်အားလျော့၍ အရှုံးပေးသွား ကြသည်လည်းရှိ၏။ ဤကဗျာသည် ဘဝမုန်တိုင်းကို အရှုံး မပေးဘဲ ရင်ဆိုင်ဖြေရှင်းသွားရမည်ဟူသော ဘဝအားမာန် သတ္တိအတွေးကို ပေးစွမ်းနိုင်သည့် ကဗျာကောင်းတစ်ပုဒ် ပင် ဖြစ်ပါသည်။

၄၃။ မာနလွန်ပြီးကာလ၏မေတ္တာစောင်းချင်းသစ်

ဆရာဒေါင်းနွယ်ဆွေသည် "မာနလွန်ပြီးကာလ၏ မေတ္တာ စောင်းချင်းသစ်" ကဗျာတွင် မိမိငယ်ရွယ် နုနယ်စဉ်က ဒေါသအမျက်ကြီးခဲ့ပုံ၊ မာန်မာနထားခဲ့ပုံတို့ကို ပြန်လည် ဆင်ခြင်မိကာ မာနတရားကို ခဝါချခဲ့ကြောင်း သံဝေဂယူရန် အတွေးဖြင့် ရေးဖွဲ့ထားပါသည်။

ကဗျာဆရာသည် ငယ်နုစဉ်က အမျက်ဒေါသ ပြင်းထန်သည့် နဂါးနှင့် ဂဠုန်ထက်ပင် ဒေါသပိုကြောင်း၊ ရဲရဲတောက်နေသည့် မီးတောင်ထက်ပင် မာနပိုကြီးကြောင်း ကို-

"ငယ်နုစဉ်က

ဒေါသမာန်ဟုန်၊ သိမ့်သိမ့်တုန်လျက်၊

ဂဠုန်ခေါင်းဖြတ်၊ နဂါးသတ်ကာ၊

မာနမီးတောင်၊ ရဲရဲလောင်၍၊

အခေါင်မြင့်ကျူး၊ တောင်ထွတ်ဦးကို" [၅] (စာ-၃)

ဟူ၍ ဖွဲ့ဆို ဝန်ခံထားသည်။ ကဗျာဆရာ၏ စိတ်ကူး အတွေး၌ အမျက်ဒေါသကို နဂါးနှင့် ဂဠုန်၊ မာနကို မီးတောင်တို့နှင့် နိမိတ်ပုံယူလိုက်သည်။ ထိုအမျက်ဒေါသ၊ မာနတရားတို့မှာ တောင်ကို ဒူးနှင့်တိုက်၊ နဖူး နှင့်ရိုက် သကဲ့သို့ မိမိသာနစ်နာရကြောင်း၊ အချည်းနှီးဖြစ်ကြောင်း ကို-

"နဖူးနှင့်ရိုက်၊ ဒူးနှင့်တိုက်လျက်၊

ရူးမိုက်သော့သွမ်းခဲ့ဖူးသည်" [၅] (စာ-၃)

ဟူသောအဖွဲ့ဖြင့် ပုံဖော်ခဲ့ပါသည်။

တစ်ဖန် အသက်အရွယ်ရလာသောအချိန်၊ ဘဝ ရေယဉ်ကြောတွင် ကူးခတ်ရာမှ လက်ပန်းကျသောအချိန်၊ ဘဝသစ်သီးမှည့်၍ ကြွေကြွေခါနီးအချိန်တို့တွင် မိမိ၌ အဆိုပါ ဒေါသမာနတရား တို့သည် ရှာဖွေ၍ မတွေ့နိုင် ကြောင်းကို-

"ယခုအခါ၊ ဇရာလမ်းခွ၊

လက်ပန်းကျ၍၊ ဘဝသစ်သီး၊

မှည့်ချိန်နီးကာ၊ ကြွေလုပါသော်၊

မာနဖွေရှာ၊ မတွေ့ပါပြီ" [၅] (စာ-၃)

ဟူ၍ ဖွဲ့ဆိုထားသည်။ ဤကဗျာသည် ဆရာဒေါင်းနွယ်ဆွေ ကွယ်လွန်ခါနီးအချိန်တွင် ရေးဖွဲ့ခဲ့ခြင်းဖြစ်သည်။ ကွယ်လွန် ခါနီးအချိန်ကို 'ဘဝသစ်သီး၊ မှည့်ခါနီးကာ၊ ကြွေလုပါသော်' ဟုဖွဲ့ဆိုထားသည်။ စာဆိုး၏အတွေး၌ ကွယ်လွန်ခါနီးကို ကြွေလုသစ်သီးမှည့်အဖြစ် ပုံရိပ်ထင်လာပေမည်။ သူ အတွေးကို စိတ်ကူးဖြင့် ရေးဖွဲ့လိုက်သောအခါ သံဝေဂ ယူဖွယ် ကောင်းလှသည်။ ကဗျာဆရာ၏ အတွေးနှင့် အရေး မှာ ပြောင်မြောက်လှသည်ဟု ဆိုရပေတော့မည်။

၅။ ခြုံငုံသုံးသပ်ချက်

ကဗျာဆရာဒေါင်းနွယ်ဆွေ၏ ကဗျာများမှ အတွေး နှင့်အရေးကို လေ့လာကြည့်သောအခါ အတွေးစိတ်ကူးများ နှင့်အတူ စေတနာဆန္ဒများကို ပေါ်လွင်အောင် ရေးဖွဲ့ထား သည်ကို တွေ့ရသည်။ ကဗျာပုံသဏ္ဌာန်မှာ လေးလုံးစပ် လင်္ကာကို အများဆုံးသုံး၍ ဖွဲ့ဆိုထားသည်။ ကာရန်ယူ ပုံမှာလည်း ၄-၃-၂ ကာရန်ကို ချိတ်ဆက်၍ အများဆုံး သုံးနှုန်းဖွဲ့ဆိုထားကြောင်း တွေ့ရသည်။

မုန်တိုင်းနှင့် အိပ်ပျော်နေသောပန်းကဗျာ သည် တိုက်မြဲတိုင်း တိုက်နေသော ကံကြမ္မာမုန်တိုင်း ကို လူသား တို့၏ မလျော့သောအားမာန်ဖြင့် အနိုင်ယူရှင်သန်နေရ မည်ဟူသော ကဗျာဆရာ၏ စေတနာအတွေး ပေါ်လွင်စေ ပါသည်။

မုန်တိုင်းကိုရင်ဆိုင်လော့ ကဗျာသည် လူတိုင်း ကြုံတွေ့နေရသည့် ဘဝအခက်အခဲများကို စိတ်ဓာတ် ခိုင်မာစွာဖြင့် လက်တွဲဖြေရှင်းကြရမည့်အကြောင်း၊ ဇွဲသတ္တိ ရှိရမည့်အကြောင်းများကို မောင်မယ်နှစ်ဦး၏ ဇာတ်လမ်း ဖြင့် ဖန်တီးရေးဖွဲ့ထားသည်။ စေတနာအတွေး ပေါ်လွင် သော ကဗျာကောင်းတစ်ပုဒ်ဖြစ်ပါသည်။

မာနလွန်ပြီးကာလ၏ မေတ္တာစောင်းချင်းသစ် ကဗျာသည် ငယ်ရွယ်စဉ်အခါက ဒေါသ၊ မာနများ ပြင်းထန် ခဲ့သည်ဟူသော ကဗျာဆရာ၏ အတွေးစိတ်ကူး နှင့် ထိုဒေါသ၊ မာနတို့သည် အသက်အရွယ်ကြီးရင့် လာသော အခါ နောင်တ တရားများကို ဖြစ်ပေါ်စေသည် ဟူသော သံဝေဂယူစရာ ကဗျာတစ်ပုဒ် ဖြစ်လာပါသည်။ 'မာန လွန်ပြီးကာလ၏ မေတ္တာစောင်းချင်းသစ်' ကဗျာ ခေါင်းစဉ်ကပင် စာဆို၏ စေတနာအတွေးနှင့် စိတ်ကူးဉာဏ်

ကို ပေါ်လွင်စေပါသည်။ ကဗျာ (၃) ပုဒ်လုံး သည် လူ့သဘာဝ ပတ်ဝန်းကျင်၌ စိတ်ဓာတ်အားမာန်များကို ဖော်ညွှန်းနေပါသည်။

ဆရာဒေါင်းနွယ်ဆွေ၏ ကဗျာများသည် အဆင် တန်ဆာ လက်ဝတ်များစွာ မပါဘဲ စိတ်ကူး အတွေး ခံစားချက် တို့ကို စာဖတ်သူတို့၏ရင်ထဲသို့ အတိုဆုံး၊ အရှင်းဆုံး နားလည်ခံစားသိရှိနိုင်စေရန် ရေးဖွဲ့ထားကြောင်းတွေ့ရပါ သည်။

ဆရာဒေါင်းနွယ်ဆွေသည် နိမိတ်ပုံဖြင့် တင်စား ဖွဲ့ဆိုလေ့ရှိသော ခေတ်သစ်ကဗျာဆရာတစ်ဦး ဖြစ်သည့် အားလျော်စွာ စကားလုံးများကို လှပအောင် တင်စား၍ ပြောင်မြောက်စွာ ဖွဲ့ဆိုသွားနိုင်သည်ကို သူ၏ကဗျာများ တွင် တွေ့နိုင်ပါသည်။ ထိုကဗျာများသည် စာဖတ်ရှုသူတို့၏ စိတ်အစဉ်တွင် တက်ကြွခြင်း အရှိန်အဟုန်နှင့် အင်အားသစ် များ ဖြစ်ပေါ်စေပါသည်။ ခံယူချက် ကွဲလွဲစေကာမူ ဆရာ ဒေါင်းနွယ်ဆွေသည် အတွေးသစ်၊ အမြင်သစ်များကို ဖတ်သူ ထံ ရောက်အောင် ထင်ဟပ်ရေးဖွဲ့နိုင်သည်ဟု ကောက်ချက် ချရမည် ဖြစ်ပါသည်။

၆။ နိဂုံး

ဤစာတမ်းသည် မြန်မာစာပေနယ်ပယ်ရှိ ခေတ်သစ် ကဗျာကဏ္ဍလာ ဒေါင်းနွယ်ဆွေ၏ ကဗျာများစွာထဲမှ (၃) ပုဒ်၏ အတွေးနှင့် အရေးကိုသာ လေ့လာတင်ပြထားပါ သည်။ ဒေါင်းနွယ်ဆွေ၏ ကဗျာများမှ နိမိတ်ပုံအဖွဲ့များ၊ အလင်္ကာအဖွဲ့များ၊ သရုပ်ဖော်အဖွဲ့များ စသည်ဖြင့် ကဏ္ဍများစွာ ပိုင်းခြား၍ သုတေသနပြုနိုင်ပါသေးသည်။ ဤစာတမ်းကို ဖတ်ရှုလေ့လာခြင်းဖြင့် လောကအမြင်သစ် တစ်ခု ရရှိနိုင်မည်ဟု မျှော်လင့်မိပါသည်။

ကျမ်းကိုးစာရင်း

၁။ ဇော်ဂျီ။ (၁၉၆၆)။ ရသစာပေအဖွင့်။ ရန်ကုန်၊ အောင်မိတ်ဆက်စာပုံနှိပ်တိုက်။

၂။ တင်၊ ဦး၊ ပုဂံဝန်ထောက်မင်း။ (၁၉၆၉)။ ကဗျာ ဗန္ဓသာရကျမ်း။ ရန်ကုန်၊ လယ်တီမဏ္ဍိုင်ပုံနှိပ်တိုက်။

၃။ ဒေါင်းနွယ်ဆွေ။ (၁၉၅၉)။ ကဗျာပုလဲကုံး။ ရန်ကုန်၊ ရှုမဝတိုက်။

၄။ ဒေါင်းနွယ်ဆွေ။ (၁၉၆၆)။မိုးသောက်လက်ဝပန်း။ ရန်ကုန်၊ ပြည်တော်ကျက်သရေပုံနှိပ်တိုက်။

၅။ ဒေါင်းနွယ်ဆွေ။ (၁၉၉၆)။ ကမ်းသစ်သို့ နှင့် အခြားကဗျာများ။ ရန်ကုန်၊ သီရိဝဋ္ဌစာပေတိုက်။

၆။ မြဇင်။ (၁၉၇၃)။ ကဗျာနရီနှင့်နိမိတ်ပုံ။ ရန်ကုန်၊ မိုးကျော်အောင်ပုံနှိပ်တိုက်။

၇။ မြန်မာစာအဖွဲ့။ (၁၉၈၀)။ မြန်မာအဘိဓာန် အကျဉ်းချုပ်။ ရန်ကုန်၊ စာပေဗိမာန်ပုံနှိပ်တိုက်။

၈။ မြန်မာစာအဖွဲ့။ (၁၉၉၁)။ မြန်မာအဘိဓာန်။ ရန်ကုန်၊ ဖိုတိုလစ်သိုပုံနှိပ်တိုက်။

၉။ မြန်မာစာအဖွဲ့။ (၂၀၁၉)။ မြန်မာ-အင်္ဂလိပ် အဘိဓာန်။ ရန်ကုန်၊ စရဏာပုံနှိပ်တိုက်။

Article ID – JRA6006720

မင်းသုဝဏ်၏ဇာတ်လမ်းပါကဗျာ (၂) ပုဒ်လေ့လာချက်

မြင့်မြင့်လှိုင်	ခင်မျိုးထွန်း	သန္တာအေး
ဘာသာစကားဌာန(မြန်မာစာ)	မြန်မာစာဌာန၊	မြန်မာစာဌာန၊
ကွန်ပျူတာတက္ကသိုလ်(မိတ္ထီလာ)	နည်းပညာတက္ကသိုလ်(မိတ္ထီလာ)	နည်းပညာတက္ကသိုလ်(ကလေး)
myint2hlaing.mmh@gmail.com	khinmyotun.370@gmail.com	thandarayepku555@gmail.com

စာတမ်းအကျဉ်း– ဤစာတမ်းသည် မြန်မာစာပေနယ်ပယ်၊ ခေတ်ကဗျာကဏ္ဍလာ မင်းသုဝဏ်၏ ဇာတ်လမ်းပါကဗျာ(၂)ပုဒ်ကို လေ့လာတင်ပြ ထားသော စာတမ်းဖြစ်ပါသည်။ ထိုကဗျာ(၂)ပုဒ်တွင် ပါဝင်သော ဇာတ်လမ်းနှင့် စာဆို၏စေတနာ၊ ဇာတ်ဆောင်စရိုက်သရုပ်ဖော်မှု အရေး အဖွဲ့များကို သိစေလိုခြင်းဖြစ်ပါသည်။ ထိုသို့လေ့လာရာတွင် မင်းသုဝဏ် ၏ကဗျာပေါင်းချုပ်မှ ဇာတ်လမ်းပါသောကဗျာ(၂)ပုဒ်ကို အလေ့လာခံ အဖြစ် သတ်မှတ်ပါသည်။ ထိုသို့လေ့လာရာတွင် ဇာတ်လမ်းအင်္ဂါရပ်များ၊ ဇာတ်ဆောင်သရုပ်ဖော်အဖွဲ့များ ဖွဲ့နည်းများဖြင့် လေ့လာတင်ပြထားပါ သည်။ ထိုသို့လေ့လာခြင်းဖြင့် ဆရာကြီး၏ထူးခြားသော ဇာတ်လမ်း ပါဝင်သည့် ကဗျာအကြောင်းအရာနှင့် စာဆို၏စိတ်ကူးဉာဏ်စေတနာ၊ အရေးအဖွဲ့တို့ကို လေ့လာသိရှိနိုင်ပါသည်။ ဇာတ်လမ်းပါကဗျာများကို လေ့လာလိုသူများအတွက် အထောက်အကူ ပြုနိုင်ပါသည်။

သော့ချက်စကားလုံး–ဇာတ်လမ်း၊ ခေတ်ကဗျာ၊ ဘဲလက်ကဗျာ၊ သရုပ်ဖော်၊ ဇာတ်ပျိုး၊ ဇာတ်နှိုး၊ ဇာတ်တက်၊ ဇာတ်ထွတ်၊ ဇာတ်ဆင်း၊ ဇာတ်သိမ်း။

၁။ နိဒါန်း

ဆရာကြီးမင်းသုဝဏ်သည် အမိမြန်မာနိုင်ငံကို ချစ်မြတ်နိုးသည့် အပြင် ပတ်ဝန်းကျင်ကိုလည်း အလေးထားခံစားပြီး စာနာတတ်သူ ဖြစ်ပါသည်။ ထို့ကြောင့် မြန်မာတို့၏ ဇာတိချစ်စိတ်၊ နိုင်ငံချစ်စိတ်များကို ဇာတ်လမ်းဖန်တီးကာ ခံစားရေးဖွဲ့ထားသော ကဗျာများစွာ ကိုတွေ့ရှိရပါသည်။ ဆရာကြီး၏ ကဗျာများမှ ဇာတိမာန်အဖွဲ့များ၊ နိမိတ်ပုံအဖွဲ့ များဟူ၍ လေ့လာထားသော စာတမ်းများ ရှိပါသည်။ သို့သော် တစ်ခုနှင့်တစ်ခု ရှုထောင့် တူညီမှုမရှိပေ။ စာတမ်းတွင် လေ့လာထားသော ဇာတ်လမ်းပါကဗျာ (၂)ပုဒ်မှာ ဖိုးမောင်လာပြီနှင့် သူ့မှာတမ်းကဗျာတို့ ဖြစ်ပါသည်။ ထိုကဗျာများမှ မြန်မာ့ဓလေ့၊ မြန်မာ့ယဉ်ကျေးမှု၊ မြန်မာ့ကျေးလက်သဘာဝများ၊ ဇာတ်လမ်း၊ ဇာတ်ဆောင်နှင့် စာဆို၏ စိတ်ကူးဉာဏ်စေတနာ၊ အရေးအဖွဲ့တို့ကို လေ့လာတင်ပြမည် ဖြစ်ပါသည်။ ဤသို့ တင်ပြရာတွင် မင်းသုဝဏ် ၏အတ္ထုပ္ပတ္တိအကျဉ်း၊ ကဗျာဝေါဟာရအဖွင့်နှင့်ခေတ် ကဗျာသဘော သဘာဝ၊ မင်းသုဝဏ်၏ ဇာတ်လမ်းပါ ကဗျာ(၂)ပုဒ် လေ့လာချက် ဟူ၍ အခန်း(၃)ခန်းခွဲ၍ တင်ပြထားပါ သည်။

၂။ စာဆို၏အတ္ထုပ္ပတ္တိအကျဉ်း

ဆရာကြီးကို ၁၉၀၉ခုနှစ် ဖေဖော်ဝါရီလ (၁၀)ရက်နေ့တွင် ဟံသာဝတီခရိုင်၊ ကွမ်းခြံကုန်းမြို့၌ ကုန်သည်များဖြစ်သော အဖ ဦးလွန်းပင်နှင့် မိခင်ဒေါ်မိတို့မှ မွေးဖွားသည်။ မွေးချင်း (၇)ယောက်တွင်ဒုတိယမြောက်သားဖြစ်သည်။ အထွေးဆုံးနှမမှာ ကဗျာဆရာမ နုယဉ် (ဒေါ်နုယဉ်) ဖြစ်သည်။ ငယ်မည် မောင်လှမောင်ဖြစ်ပြီး အမည်တူရှိသဖြင့် "မောင်လှဝံ" ဟု အမည်ပြောင်းသည်။ နောင်တွင် မောင်လှဝံဟုသာ တွင်၍ မိမိစိတ်ကြိုက် 'ဝ' ကို နသတ်ပြီး "မောင်လှဝန်" ဟုပြင်သည်။ ၁၉၂၉ ဒီဇင်ဘာတွင် ဆယ်တန်းစာမေးပွဲကို စိန်ဂျွန်းကျောင်းမှ ပထဝီဘာသာဂုဏ်ထူးဖြင့် အောင်သည်။ ၁၉၂၉ ဒီဇင်ဘာလထုတ် တက္ကသိုလ်နှစ်လည်မဂ္ဂဇင်းတွင် ကဗျာ (၅)ပုဒ် စတင်ဖော်ပြခံရသည်။ မင်းသုဝဏ် ကလောင်အမည်ကို စတင်သုံးစွဲသည်။ ၁၉၃၃တွင် ဝိဇ္ဇာဂုဏ်ထူး(မြန်မာစာ)ကို ပထမအဆင့် ဖြင့် အောင်မြင်သည်။ ထို့နောက် အရှေ့တိုင်းပညာရပ်များ ဌာနခ၌ အချိန်ပိုင်းနည်းပြ လုပ်သည်။ ၁၉၄၂ တွင် ညောင်တုန်းမြို့ တရားဘက် တာဝန်ခံအရာရှိ ဦးဌေး၊ ဒေါ်စံယုတို့၏သမီး ဒေါ်ကြည်ကြည်နှင့် လက်ထပ်သည်။ ၁၉၆၂တွင် သီရိပျံချီဘွဲ့ ချီးမြှင့်ခြင်းခံရသည်။ မေ (၁၃)တွင် မြန်မာစာပါမောက္ခရာထူးကို စွန့်လွှတ်ပြီး ဘာသာပြန်နှင့် စာအုပ်ထုတ်ဝေရေးဌာနတွင် စာတည်းမှူးတာဝန်ကို ပြန်လည်ထမ်းဆောင်သည်။ ၁၉၆၆တွင် မြန်မာနိုင်ငံစာမတတ်သူများ ပပျောက်ရေးအတွက် သက်ကြီးစာသင်နည်း "ဝ၊ထ၊က၊လ၊သ" ကိုတီထွင်ခဲ့ သည်။ ၁၉၈၄ တွင် ရှိတ်စပီးယား၏ လီယာမင်းကြီး(King Lear)ပြဇာတ် စာအုပ်အတွက် အမျိုးသားဘာသာပြန်စာအုပ် (ရသ)ဆု ရရှိခဲ့သည်။ ဆရာကြီးသည် ကွယ်လွန်ချိန်ထိ ကလောင်အမည်ကွဲ (၃၀) ခန့်တွင် ကဗျာ၊ ဆောင်းပါး၊ ပုံပြင်၊ ဝတ္ထု၊ စာတမ်းများ ရေးသားခဲ့သည်။

၃။ ကဗျာဝေါဟာရအဖွင့်နှင့် ခေတ်ကဗျာသဘောသဘာဝ

ရသစာပေဖြစ်သော ကဗျာဝေါဟာရနှင့် ပတ်သက်၍ မြန်မာ အဘိဓာန်တွင်–

ကဗျာ/ဂဗျာ/နေ-စည်းမျဉ်းများနှင့်အညီ စာလုံး၊ စာပိုဒ် အရေအတွက်၊ ကာရန်အချိတ်အဆက်၊ အသံအနေအထား စသည်ဖြင့် စီကုံးထားသော အဖွဲ့အနွဲ့။ [၄] (စာ-၄)

ဟူ၍လည်းကောင်း၊ ဆရာဇော်ဂျီ၏ ရသစာပေ နှင့် အဖွင့်နိဒါန်း စာအုပ် တွင်-

ကဗျာသဘောတွင် အပိုင်းနှစ်ပိုင်း ရှိပါသည်။ တစ်ပိုင်းသည် အကြောင်းအရာပိုင်းဖြစ်၍ ကျန်တစ်ပိုင်းသည် ပုံသဏ္ဌာန်ပိုင်း ဖြစ်ပါသည်။ အကြောင်းအရာဟုဆိုရာ၌ ကဗျာဆရာ၏ စေတနာ အလျောက်၊ ကဗျာဆရာ၏ စိတ်ကူးညာဏ် (ပဋိဘာန်ညာဏ်) အစွမ်းဖြင့် သိမြင်ခြင်းရှိလာသော ပတ်ဝန်းကျင် လောကအမှုအရာ များကို ဆိုလိုပါသည်။ ပုံသဏ္ဌာန်ဟုဆိုရာ၌ ကဗျာဆရာ၏ စေတနာ အလျောက်၊ ကဗျာဆရာ၏ စိတ်ကူးညာဏ်စွမ်းဖြင့် သိမြင်လာသော အကြောင်းအရာကို ထိုစေတနာအလျောက် ထိုစိတ်ကူး ညာဏ်စွမ်း ဖြင့်ပင် ဖွဲ့စည်းရေးသားနိုင်သော ဖွဲ့ပုံရေးပုံကို ဆိုလိုပါသည်။ [၁] (စာ-၂၁၈)

ဟူ၍လည်းကောင်း ဖွင့်ဆိုထားသည်။ ထို့ကြောင့် ကဗျာဟူသည် စာဆို၏ စိတ်ကူးညာဏ်စွမ်းရည်ဖြင့် သိမြင်လာသော အကြောင်း အရာများကို ကာရန်အချိတ်အဆက်ဖြင့် စီကုံးရေးဖွဲ့ထားသော အဖွဲ့ အနွဲ့များဖြစ်ပါသည်။ ခေတ်ကာလအလျောက် ကဗျာ ပုံသဏ္ဌာန်များ သည် အမျိုးမျိုးပေါ်ပေါက်လာကြသည်။ မြန်မာ ကဗျာသမိုင်းတွင် ဆန်းသစ်သော ကဗျာလောကသစ်သည် ၁၉၂၈ ဝန်းကျင်တွင် အစ ပြုခဲ့ကြသည်။ ဆန်းသစ်သော ကဗျာလောကသစ် သည် ခေတ်စမ်း ကဗျာ လောကသစ် သို့မဟုတ် ခေတ်ကဗျာ လောကသစ် ဖြစ်ပါသည်။ ခေတ်စမ်းကဗျာနှင့် ပတ်သက်၍ ခေတ်စမ်းကဗျာ ပထမတွဲနိဒါန်း တွင် ဆရာကြီး ဦးဖေမောင်တင်က-

"ဆန်းသစ်သည်ဆိုရာ၌ အဖွဲ့အနွဲ့ အမျိုးအစား ဆန်းသစ် သည်ကို မဆိုလို၊ စိတ်ကူးဆန်းသစ်သည်ကို ဆိုလိုပါသည်"

[၅] (စာ-နိဒါန်း)

ဟူ၍ဖော်ပြထားပါသည်။ ထို့ကြောင့် ဆန်းသစ်သော ခေတ်ကဗျာ များတွင် အရာခပ်သိမ်းတို့အပေါ်၌ ထားရှိသော မေတ္တာစေတနာ၊ ကရုဏာစေတနာတို့ကို တွေ့ရှိရပါသည်။

၄။ မင်းသုဝဏ်၏ ဇာတ်လမ်းပါကဗျာ (၂) ပုဒ်လေ့လာချက်

ခေတ်ကဗျာများတွင် ဘဲလက်ခေါ် ဇာတ်လမ်းပါကဗျာများ ပါဝင် သည်။ ဘဲလက်ကဗျာကို Longman Dictionary တွင်-

Bal-lad/b æ l ∂ d/ noun

1) a slow song

2) a short story in the form of a poem or song [၆]

ဟူ၍ ဖော်ပြထားသည်။ ဇာတ်လမ်းနှင့် ပတ်သက်၍ မြန်မာ အဘိဓာန် တွင်-

ဇာတ်လမ်း၊ နေ- ရုပ်ရှင်၊ ပြဇာတ်၊ ဝတ္ထု စသည်တို့တွင် ပါဝင်သော အဖြစ်အပျက်၊ အကြောင်းအရာ အစအဆုံး။ [၄] (စာ-၁၃၁)

ဟူ၍ ဖော်ပြထားပါသည်။ ထို့ကြောင့် ဇာတ်လမ်းဆိုသည်မှာ ဇာတ်ဆောင်တို့၏အဖြစ်အပျက်၊ အချိတ်အဆက်၊ ဆက်စပ်မှုကို တင်ပြထားခြင်းပင်ဖြစ်ပါသည်။ ဇာတ်လမ်းတွင် ကာလဒေသ နောက်ခံဝန်းကျင်များ ပါဝင်သကဲ့သို့ အဓိကဇာတ်ဆောင်နှင့် အရန် ဇာတ်ဆောင်များလည်း ပါဝင်ပါသည်။ ဇာတ်ဆောင်နှင့် ပတ်သက်၍ ဝတ္ထုရှည်စာတမ်းများ ပထမတွဲပါ "ဝတ္ထုရှည်ဟူသည်မှာ" စာတမ်း တွင် ဆရာကြီး တက္ကသိုလ်ဘုန်းနိုင်က-

"ဇာတ်ဆောင်ဆိုသည်မှာ ဇာတ်ကြောင်းဖြစ်လာရန် လုပ်ပြ၊ တွေးပြ၊ ခံစားပြသော ဝတ္ထုရှည်အတွင်းမှ လူများကို ဇာတ်ဆောင်ဟု ခေါ်သည်" [၂] (စာ-၂၈)

ဟူ၍ ဖွင့်ဆိုထားပါသည်။ ထို့ကြောင့် ဇာတ်လမ်းပါကဗျာ ဟူသည်မှာ ဇာတ်ဆောင်ပါဝင်သော ဇာတ်လမ်း၊ အဖြစ်အပျက် အစမှ အဆုံးထိပါဝင်သော ကဗျာမျိုးကို ခေါ်ဆိုခြင်းပင်ဖြစ်ပါသည်။ ဇာတ် လမ်းတစ်ပုဒ်တွင် ဇာတ်လမ်းကို အစပျိုးသည့် ဇာတ်ပျိုးပိုင်း၊ စာဖတ်သူ ၏သိလိုစိတ်ကို နိုးကြားစေသည့် ဇာတ်နိုးပိုင်း၊ ဇာတ်ရှိန် မြင့်တက်စေသည့် ဇာတ်တက်ပိုင်း၊ သိလိုစိတ် အမြင့်ဆုံးသို့ ရောက်ရှိ စေသည့် ဇာတ်ထွတ်ပိုင်း၊ ဇာတ်ရှိန် လျော့ကျသွားသည့် ဇာတ်ဆင်း ပိုင်းနှင့် ဇာတ်လမ်းအဆုံးဖြစ်သည့် ဇာတ်သိမ်းပိုင်းတို့ ပါဝင် ပါသည်။

၄.၁။ ဖိုးမောင်လာပြီ

ဆရာကြီးမင်းသုဝဏ်သည် ဖိုးမောင်လာပြီကဗျာတွင် အရေးကြုံ လာသောအခါ မိမိအသက်ကို ပဓာနမထားဘဲ ရပ်ရွာအကျိုးအတွက် အသက်စွန့်ရဲသော ကျေးလက်ရွာသားတံငါသည်တစ်ဦး၏ စိတ်ဓာတ် ကိုဖော်ကျူးထားပါသည်။ ကဗျာအစဇာတ်ပျိုးပိုင်း၌ မှိုင်းညိုညှိုနေသော ညဉ့်ကာလလူခြေတိတ်ချိန်တွင် ရေဆိပ်အနီးရွာတံခါးမှ ကျယ်ကျယ် လောင်လောင်နှင့် ခွေးဟောင်သံ ကြားရတိုင်း ဖိုးမောင်အကြောင်း ပြောကြပုံနှင့် ဇာတ်လမ်းကို အစပျိုးထားသည်။ ဤသည်ကို ကဗျာ၌-

"မှိုင်းညိုညှိုရိပ်၊ လူခြေတိတ်၍

ရေဆိပ်အနား၊ ရွာတံခါးမှ

ဂုတ်ကျားကျယ်လောင်၊ ဆီးကြိုဟောင်သော်

ဖိုးမောင်လာပြီ၊ ဆိုကြသည်" [၃] (စာ-၉၇)

ဟူ၍ ဇာတ်ပျိုးပိုင်းကို ရေးဖွဲ့ထားပါသည်။ တိတ်ဆိတ်သော သဘော ကိုပေါ်လွင်စေရန် 'မှိုင်းညိုညှိုရိပ်၊ လူခြေတိတ်' ဟူသော စကား လုံးဖြင့်ပုံဖော်ထားသည်မှာ ကာလဒေသ နောက်ခံသရုပ်ပေါ်လွင်လှ သည်။ 'ရေဆိပ်အနား၊ ရွာတံခါးမှ' ဟူသောအဖွဲ့ဖြင့် ဒေသ နောက်ခံကို ပေါ်လွင်စေပါသည်။ 'ဂုတ်ကျားကျယ်လောင်၊ ဆီးကြို ဟောင်သော်' ဟူသောအဖွဲ့သည်လည်း ရပ်ရွာထဲရှိခွေးက လူတစ် ယောက်ကို ဆီးကြိုဟောင်လိုက်သည်မှာ ရန်သူကိုတွေ့၍ ဟောင် ခြင်းမျိုးမဟုတ်ဘဲ ရင်းနှီးပြီးသော လူတစ်ယောက်ကို ဟောင်ခြင်း

မျိုးကို ပေါ်လွင်စေပါသည်။ ကဗျာ၏နိဒါန်း ဇာတ်ပျိုးပိုင်းတွင် ခွေးဟောင်သံနှင့်ဖိုးမောင် မည်သို့ဆက်စပ်မည်ကို သိလိုသည့် စာဖတ်သူ၏ သိလိုစိတ်ကို ဆွဲဆောင်၍ ရေးဖွဲ့ထားကြောင်း တွေ့ရပါသည်။

ဖိုးမောင်သည် ရွာသားတစ်ဦးဖြစ်၍ မည်သည့်လုပ်ငန်း လုပ်ကိုင်ကြောင်းကို ကဗျာတွင်-

"ညခါငါးထောင်၊ မောင်ဖိုးမောင်သည်

ရွာတောင်ချောင်းက ပြန်ခဲ့ပြီ" [၃] (စာ-၉၇)

ဟူ၍ ဖော်ပြထားပါသည်။ ကာရံနှောရ်ပြောသော အပြောအဖွဲ့သည် ဇာတ်လမ်းပါ ကဗျာများ၏ သဘောသဘာဝပင်ဖြစ်ပါသည်။ ဖိုးမောင်သည် ရွာတံခါးမှကင်းစောင့်သမားကို ပြောလိုက်သော ဇာတ်ဆောင်၏အပြောသည် ဇာတ်ဝင်ခန်းဇာတ်တက်ပိုင်းပင် ဖြစ်ပါသည်။ ကင်းစောင့်သမား ဖွင့်ပေးသောတံခါးမှ ဖိုးမောင် ဝင်လာပုံကို-

"ယာတွင်အုပ်ဆောင်း၊ ဝဲတက်ချောင်းနှင့်

ခါးစောင်းကိုယ်ကိုင်း၊ ငါးပလိုင်းကို

လွယ်သိုင်းပြီးလျှင်၊ ရွာကိုဝင်သည်

လူပင်လေလား၊ တစ္ဆေလား" [၃] (စာ-၉၇)

ဟူ၍ သရုပ်ဖော်ဖွဲ့ဆိုထားပါသည်။ လက်ယာလက်တွင် မီးအုပ်ဆောင်းကိုကိုင်၍ လက်ဝဲလက်တွင် လှော်တက်ကိုင်ကာ ငါးပလိုင်းကို ကျောတွင် ပိုးထားသည့် ဖိုးမောင်၏ ဟန်ပန်အမူအရာ၊ လှုပ်ရှားပုံတို့ကို ပေါ်လွင်စေသော အရေးအဖွဲ့ပင် ဖြစ်ပါသည်။ "လူပင်လေလား၊ တစ္ဆေလား" ဟူသော အပြောသည် မြန်မာတို့ ပြောလေ့ပြောထရှိသော အပြောစကားပင်ဖြစ်ပါသည်။ ဖိုးမောင်ပြန်လာသည့် အချိန်နှင့် ဟန်ပန်အမူအရာများသည် ဖိုးမောင်၏သရုပ်ကို ပိုမိုပေါ်လွင်စေသည့်အပြင် ဇာတ်ရှိန်ကိုပိုမိုမြင့်တက်စေသည့် ဇာတ်တက်ပိုင်းပင်ဖြစ်ပါသည်။

ထို့ပြင် ဇာတ်ရှိန် မြင့်တက်စေသည့် ဇာတ်တက်ပိုင်း တွင်-

"တစ္ဆေမကြောက်၊ မြွေမကြောက်ဘဲ

တစ်ယောက်တည်းပင်၊ ညည့်မှောင်တွင်း၌

သူလျှင်ငါးရှာ၊ မကျွေးပါက

ထိုရွာသူသား၊ လူအများတို့

ငါးစိုငါးစိမ်း၊ ငတ်ပေလိမ့်" [၃] (စာ-၉၇)

ဟူ၍ ညအခါ ငါးရှာထွက်သော ဖိုးမောင်ကို တစ်ရွာလုံးက အားထားကြကြောင်း၊ ဖိုးမောင်ရှာမကျွေးပါက ရွာသူရွာသားများ ငါးစို၊ ငါးစိမ်းစားရမည်မဟုတ်ကြောင်း ရေးဖွဲ့ထားရာ ရွာသူရွာသားများ၏ အလေးထားခြင်းခံရသည့် ဖိုးမောင်၏တန်ဖိုးသရုပ်မှာ ပိုမိုပေါ်လွင်လာလေသည်။ ဆောင်းရာသီ ညတစ်ည၏ ဖိုးမောင်ပြန်လာချိန်တွင် ရွာနံဘေး စပါးကျီပျက်အနီး၌ ထူးခြားသော ဇီးကွက်အော်သံ၊ တောက်တဲ့အော်သံများ ကြားရသည်။ ထို့ပြင် ဆီးကြို ဟောင်နေကျ ဂုတ်ကျား၏ဟောင်သံမှာလည်း တစ်မူထူးခြား နေသည်။ ထို့နောက် ဆက်လက်ဖြစ်ပွားသော အဖြစ်အပျက်ကို-

"မောင်းကိုထုပါ၊ လူစုပါဟေ့

ရွာကိုဘေးမှ၊ ကာကွယ်ကြလေ့

ဓားပြငါ့အား၊ ဖမ်း၍ထားဟု

စကားမဆုံး၊ ဟစ်အော်တုန်းတွင်

ဒိုင်ဒုန်းဒိန်းသံ၊ ရွာလုံးညံသည်" [၃] (စာ-၉၇)

ဟူ၍ ရေးဖွဲ့ထားပါသည်။ ဖိုးမောင်သည် ရွာတံခါးအနီးသို့ ရောက်သောအခါ ရွာတံခါးကိုမဖွင့်ခိုင်းဘဲ ရပ်ရွာကိုကာကွယ် သောအနေဖြင့် မိမိအသက်ကို ပဓာနမထားဘဲ အော်ဟစ် သတိပေးလိုက်သည်။ ထိုသို့ ဖိုးမောင်၏သတိပေးသံကြောင့် ရွာသူရွာသားများနှင့် ဓားပြများ အချင်းချင်း ပြန်လှန်ပစ်ခတ် တိုက်ခိုက်ကြသံများ ဆူညံသွားပုံကို စာဖတ်သူများ စိတ်မျက်စိ၊ စိတ်နားထဲတွင် ကြားယောင် မြင်ယောင်လာအောင် "မောင်းကိုထုပါ၊ လူစုပါဟေ့၊ ရွာကိုဘေးမှ၊ ကာကွယ်ကြလေ့၊ ဓားပြငါ့အား၊ ဖမ်း၍ထား" ဟူသော ဖိုးမောင်၏ အပြောစကားများဖြင့် ရေးဖွဲ့ထားပါသည်။ စာဖတ်သူ၏ သိလိုစိတ်ကို အမြင့်ဆုံးဆွဲဆောင်ရေးဖွဲ့ထားသော ဇာတ်ရှိန်အမြင့်ဆုံးဖြစ်သည့် ဇာတ်ထွတ်ပိုင်းပင် ဖြစ်ပါသည်။

ကဗျာ၏နိဂုံး ဇာတ်သိမ်းပိုင်းတွင် ဖိုးမောင်၏ ကြေကွဲဖွယ် အဖြစ်ဆိုးနှင့် ရွာသူရွာသားများ၏ စိတ်ခံစားမှုများကို-

"ဖိုးမောင်နိဂုံး၊ ဤတွင်ဆုံးလည်း

ရွာလုံးစိတ်တွင်၊ ဖိုးမောင်ဝင်၍

ပဲ့တင်ထပ်ကာ၊ ဟည်းလျက်ပါတည့်

ဘယ်ခါမဆို၊ ဆီးလင့်ကြိုသို့

မှိုင်းညိုညည့်ရိပ်၊ လူခြေတိတ်၌

ရေဆိပ်အနား၊ ရွာတံခါးမှ

ဂုတ်ကျားကျယ်လောင်၊ ဆီးကြိုဟောင်သော

ဖိုးမောင်လာပြီ၊ ဆိုဆဲပင်" [၃] (စာ-၉၇)

ဟူ၍ရေးဖွဲ့ထားပါသည်။ ဖိုးမောင်၏အကြောင်းကို တသသ ဖြစ်အောင် ဖွဲ့ဆိုထားသော အဖွဲ့ပင်ဖြစ်ပါသည်။ မိမိအသက်ကို ပဓာနမထားဘဲ ရပ်ရွာအကျိုးအတွက် အသက်စွန့်ရဲသော စိတ်ဓာတ်ပိုင်ရှင် ဖိုးမောင်ကို ရွာသူရွာသားများသည် အမြဲသတိရဆီးကြိုနေကြောင်းကို "ဆီးလင့်ကြို" "ဆီးကြိုဟောင်" ဟူသော အသုံးဖြင့်ထင်ရှားစေပါသည်။ မည်သည့် အချိန်အခါမှ မမှေ့နိုင်ကြမည်မဟုတ်ပေ။ ညအခါ ခွေးဟောင်သံ ကြားရတိုင်း ဖိုးမောင်ပြန်လာပြီဟု ပြောစမှတ်ပြုကြမြဲ ဖြစ်ပါသည်။ ဖိုးမောင်၏ ဘဝနိဂုံးသည် ကဗျာနိဂုံးပင် ဖြစ်ပါသည်။ ဇာတ်လမ်းကို ကြေကွဲဖွယ်အကြောင်းအရာနှင့် နိဂုံးချုပ်ထားသည်။ ဖိုးမောင်ကဲ့သို့သော မိမိရပ်ရွာကို ချစ်ခင်သည့်၊

အသက်ပေးကာကွယ် စောင့်ရှောက်သည့် လူများသည် လူသာ သေသော်လည်း မည်သည့်အခါမျှ နာမည်သေမည် မဟုတ်ပေ။ လူတိုင်း၏ရင်ထဲတွင် အစဉ်သတိရနေမည် တမ်းတ နေမည်မှာ မလွဲဧကန်ပင် ဖြစ်ပါသည်။ ဆရာကြီး မင်းသုဝဏ်သည် ဖိုးမောင်ကိုယ်စားပြု တိုင်းချစ်ပြည်ချစ် မြန်မာလူငယ်များ ပေါ်ထွန်း လာစေလိုသော အတွေးစိတ်ကူးဖြင့် ရေးဖွဲ့ထားခြင်းပင် ဖြစ်ပေမည်။ စာဆို၏စေတနာ အတွေးပုံရိပ်ကို စာဖတ်သူများ၏ စိတ်မျက်စိ၊ စိတ်နား ထဲတွင် မြင်ယောင် ကြားယောင်လာအောင် ဇာတ်လမ်းဆင်ကာ ရေးဖွဲ့ထားသော ဇာတ်လမ်းပါ ကဗျာကောင်းတစ်ပုဒ် ဖြစ်ပါသည်။

၄၂။ 'အမြင်' သရုပ်ဖော်အဖွဲ့

သူမှာတမ်းကဗျာသည် ဖက်ဆစ်တော်လှန်ရေး ကာလကို နောက်ခံထားကာ ပြောက်ကျားစစ်သည်လေး၏ မျိုးချစ် စိတ်ဓာတ်ကို ဖော်ပြလို၍ ရေးဖွဲ့ထားသောကဗျာ ဖြစ်ပါသည်။ ကဗျာ နိဒါန်းတွင် ပြောက်ကျားစစ်သည်လေးသည် ဖက်ဆစ်ဂျပန်တို့ ဆုတ်ခွာရင်းမြှုပ်ခဲ့သော ဗုံးငုတ်ကို တိုက်မိသောကြောင့် ယမ်းငွေ့တလူလူ ကြားတွင် သေအံ့မူးမူးဝေဒနာခံစားနေရပုံဖြင့် ဇာတ်လမ်းကို အစပျိုး ထားသည်။ ပေါက်ကွဲသံကြောင့် အနီးအနားမှ ရွာသူရွာသားများသည် ပြောက်ကျား စစ်သည်လေးကို မေးမြန်းကြပုံကို-

"သူတို့အဆုတ်၊ ထားခဲ့မြှုပ်သည့်

ဗုံးငုတ်တိုက်မှား၊ မောင်ပြောက်ကျားကို

ရွာသားရွာသူ၊ မေးကြမြူသည်

အူအူယမ်းငွေ့၊ ထတုန်းတည်း" [၃ (စာ-၂၃၇)

ဟူ၍ ရေးဖွဲ့ထားပါသည်။ စစ်၏ အနိဋ္ဌာရုံမြင်ကွင်းဖြင့် ဇာတ်လမ်းကို အစပျိုး ရေးဖွဲ့ထားသည်မှာ စာဖတ်သူများ၏ စိတ်မျက်စိထဲတွင် မြင်ယောင်လာစေပါသည်။ ထို့နောက် ယမ်းငွေ့များကြားတွင် သေလုမျောပါး ခံစားနေရသော ပြောက်ကျားစစ်သည်လေးကို ရွာသူရွာသားများက ကိုယ်ချင်းစာစိတ်ဖြင့် ပြောက်ကျားစစ်သည်လေး၏ ချစ်သူ၊ မိဘနှင့် တိုင်းပြည်အတွက်မှာကြားလိုသည်များကိုမှာကြား ရန်မေးမြူကြပုံဖြင့် ဇာတ်ရှိန်ကို မြှင့်တင်ကာ စာဖတ်သူကို စိတ်ဝင်စားဖွယ်ဆွဲဆောင် ရေးဖွဲ့ထားပါသည်။ "ရွာသား ရွာသူ၊ မေးကြမြူသည်" ဟူသော ဒေသနောက်ခံနှင့် အရံဇာတ်ဆောင်များ၏ အဖွဲ့ဖြင့် ပြောက်ကျား စစ်သည်လေးနှင့် ရွာပတ်ဝန်းကျင်ကို မြင်ယောင်လာ စေပါသည်။

ပထမဦးစွာ ရွာသူရွာသားများက ချစ်သူနှင့်ပတ်သက်၍ မေးမြန်းသည့်အခါ ပြောက်ကျားစစ်သည်လေး ဖြေကြားပုံကို-

"ငယ်ကကြင်မြတ်၊ မိသက်မှတ်ကို

ခွင့်လွှတ်ခဲ့ကြောင်း၊ ပြောပါလေ"" [၃] (စာ-၂၃၇)

ဟူ၍ ရေးဖွဲ့ထားပါသည်။ "ခွင့်လွှတ်ခဲ့ကြောင်း" ဟူသော အသုံးသည် ရိုးရှင်းလှသည်။ သို့ရာတွင် အနက်အဓိပ္ပာယ် နက်ရှိုင်းသည်နှင့်အမျှ သိမ်မွေ့ နူးညံ့သည်။ ငယ်စဉ်မှယခုတိုင် အသက်တမျှ ချစ်မြတ်နိုးရသည့် မိမိချစ်သူအား ချစ်ကြိုးအနှောင်အဖွဲ့မှ ဖြေလွှတ်ပေးလိုက်ပါကြောင်း၊ နောင်သောအခါ အချစ်ရေးရာဟူသမျှ ချစ်သူကစိတ်တိုင်းကျ ဆောင်ရွက်ခဲ့ပါလျှင်လည်း မိမိအနေနှင့် ခွင့်လွှတ်ပါကြောင်း စသည့် အနက်များစွာဆောင်သည့် "ခွင့်လွှတ်" ဟူသည့် ရိုးရှင်းသော စကားလုံးများဖြင့် ပြောက်ကျားစစ်သည်လေး၏ နူးညံ့သည့်စိတ်ဓာတ်ကို ဖော်ဆောင်ထားပါသည်။ သေအံ့ဆဲဆဲ မျိုးချစ်ပြောက်ကျား စစ်သည်လေး၏အဖြစ်နှင့် နူတ်ဖျားမှ ထွက်လာသော စကားသံတို့ကို ကြားယောင် မြင်ယောင်လာအောင် ဖွဲ့ဆိုနိုင်သည်မှာ ကဗျာစာဆို၏ အရေးအဖွဲ့ကောင်းတစ်ရပ်ပင် ဖြစ်ပါသည်။

ဆက်လက်၍ ဒုတိယမေးခွန်းအနေနှင့် မိဘအတွက်မှာကြားခဲ့ပုံကို-

"မွေးသည့်မိခင်၊ မွေးဖခင်ကို

ဦးတင်ခဲ့ကြောင်း၊ ပြောပါလေ" [၃] (စာ-၂၃၇)

ဟူ၍ ဖော်ပြထားပါသည်။ မိမိ၏နောက်ဆုံးခွဲခွါရခြင်းတွင် မိဘနှစ်ပါးကို ရှိခိုးဦးတင် ကန်တော့ခဲ့ပါကြောင်းဖော်ပြချက်သည် မိဘကို အလေးထားသည့် မြန်မာတို့၏ ဓလေ့ထုံးတမ်း အစဉ်အလာ တစ်ရပ်ကို ပေါ်လွင်စေပါသည်။ မိခင်ဖခင်ကို ဦးထိပ်ပန်ဆင်သည့် စိတ်ဓာတ်ကို "ဦးတင်" ဟူသည့် အရေးအသား အသုံးအနှုန်းဖြင့် ပေါ်လွင်စေပါသည်။ စာဖတ်သူ၏ နှလုံးသားထဲသို့တိုင် ရောက်ရှိခံစားရသည့် အရေးအဖွဲ့ဖြင့် ဇာတ်ရှိန်ကို ပိုမိုမြှင့်တင်ပေးထားသည့် ဇာတ်တက်ပိုင်းပင် ဖြစ်ပါသည်။

ထို့နောက် ပြောက်ကျားစစ်သည်လေး၏ တိုင်းပြည်အပေါ် ထားသည့် သဘောထား နောက်ဆုံးမေးခွန်းကို မှာကြားဖြေဆိုပုံမှာ-

"ခရီးမတ်တပ်၊ လမ်းခုလတ်တွင်

ကိုယ်လွတ်ရှောင်ခွါ၊ ခွဲရပါ၍

အားနာခဲ့ကြောင်း၊ ပြောပါလေ"" [၃] (စာ-၂၃၇)

ဟူ၍ ဖွဲ့ဆိုထားပါသည်။ တိုင်းပြည်နှင့် လူမျိုးအတွက် လွတ်လပ်ရေးပန်းတိုင်သို့ ချီတက်နေကြသည့် အချိန်တွင် မိမိ သေဆုံးရသည်မှာ ကိုယ်လွတ်ရုန်း၍ ရှောင်ခွာ နေခဲ့ရသကဲ့သို့ ခံစားရကြောင်း၊ တိုင်းပြည်ကို တာဝန်မကျေသလို ဖြစ်နေသဖြင့် အားနာကြောင်း မှာကြားလေသည်။ ပြောက်ကျားစစ်သည်လေး၏ တိုင်းပြည်နှင့် လူမျိုးအပေါ်ထားရှိသည့် မျိုးချစ်စိတ်ကို "အားနာ" ဟူသည့် အသုံးက ထင်ရှားစွာ မြင်စေသည့် အပြောစကားပင် ဖြစ်ပါသည်။ စာဖတ်သူ၏ စိတ်နှလုံးခံစားမှုကို အမြင့်ဆုံးသို့ ပို့ဆောင်ပေးသည့် ဇာတ်ထွတ်ပိုင်း ပေါ်လွင်သည့် အရေးအဖွဲ့ ဖြစ်ပါသည်။ "အားနာ" ဟူသော စကားလုံးအသုံးအနှုန်းသည် အသုံးလှသလောက် အဓိပ္ပာယ်ပြည့်ဝသည့် အသုံးအနှုန်းပင် ဖြစ်ပါသည်။

ကဗျာနိဂုံး ဇာတ်လမ်းအဆုံး ဇာတ်သိမ်းပိုင်းကို-

"ယမ်းငွေ့အူအူ၊ တလူလူနှင့်

မေးမြူကြေတုန်း၊ အနောက်ကုန်းတွင်

နေလုံးကွယ်လေပြီတကား"" [၃] (စာ-၂၃၇)

ဟူ၍ ရေးဖွဲ့ထားပါသည်။ ပြောက်ကျားစစ်သည်လေးနှင့် ရွာသူ ရွာသားများ အပြန်အလှန် မေးမြန်းပြောဆို နေစဉ်တွင် အချိန်ကာလ မှာလည်း ညနေစောင်း နေဝင်တော့မည် ဖြစ်ပေသည်။ တစ်နေ့တာ၏ ကုန်ဆုံးခြင်းဖြစ်သော နေဝင်ချိန်သည် ပြောက်ကျား စစ်သည်လေး၏ ဘဝနေဝင်ချိန်ပင် ဖြစ်နေသည်။ သူရိန်နေမင်းသည် ကမ္ဘာမြေမှ စွန့်ခွာသွားသကဲ့သို့ ပြောက်ကျားစစ်သည်လေးသည်လည်း တိုင်းပြည်ကို ခွဲခွါသွားကြောင်းကို "နေလုံးကွယ်လေပြီတကား" ဟူသော ကာလနောက်ခံအဖွဲ့ဖြင့် ဇာတ်လမ်းကိုအဆုံးသတ်၍ ဇာတ်သိမ်း ထားသည်။

ကဗျာတွင် အကြောင်းအရာနှင့် လိုက်ဖက်သော လှပကာ ထိမိသည့် စကားလုံးအသုံးအနှုန်းများ လိုအပ်သကဲ့သို့ အဓိပ္ပာယ် ပေါ်လွင်ထိမိပြီး ခွန်အားရှိရန်လည်း လိုအပ်ပါသည်။ စကားလုံး အသုံးအနှုန်း ကောင်းမွန်လေ ကဗျာသည် ပို၍ အသက်ဝင်လေ ဖြစ်ပါသည်။ "သူမှာတမ်း" ကဗျာတွင် အမေးအဖြေ၊ အပြော စကားများနှင့် ရေးသားထားသောကြောင့် ကဗျာသည် ပိုမို အသက် ဝင်လာသကဲ့သို့ စာဖတ်လည်း သွက်လက်လာစေသည်။ ထို့ပြင် ခက်ခဲနက်နဲသော စကားလုံး အသုံးအနှုန်းများ မပါဝင်ဘဲ ရိုးရှင်း လွယ်ကူသော အသုံးအနှုန်းများသာ သုံးနှုန်းထားကြောင်း တွေ့ရှိ ရပါသည်။ ရည်ရွယ်ချက်သို့ရောက်ရန် ရေးဖွဲ့ရာ၌ ဆိုလိုသည့် အဓိပ္ပာယ် ရောက်စေရန် တစ်ဆင့်ပြီးတစ်ဆင့် ဆွဲဆောင်စည်းရုံး ရေးဖွဲ့ ထားကြောင်း တွေ့ရှိရပါသည်။

ပထဦးစွာ လူတစ်ဦး၏ချင်းနှင့် သက်ဆိုင်သည့် ချစ်သူ၊ ထို့နောက် လူသားတိုင်းနှင့် သက်ဆိုင်သည့် မိဘ၊ နောက်ဆုံးအနေနှင့် လူမျိုး တိုင်းနှင့် သက်ဆိုင်သည့် တိုင်းပြည် စသည်ဖြင့် တစ်ဆင့်ပြီး တစ်ဆင့် ဆွဲဆောင်စည်းရုံး၍ ဇာတ်ရှိန်ကို မြှင့်တင်ကာ ရေးဖွဲ့ထားပါသည်။ စာဖတ်သူများ၏ ခံစားမှုများကိုလည်း တစ်ဆင့်ပြီးတစ်ဆင့် မြင့်တက် ခံစားမိလာအောင် ရေးဖွဲ့ထားသည်ကို တွေ့ရှိရပါသည်။ 'ခွင့်လွှတ်' ဟူသော အသုံးသည် မြန်မာလူမျိုးတို့၏ မြင့်မြတ်သည့် စိတ်ဓာတ်ကို ဖော်ကျူးနေသကဲ့သို့ ချစ်သူအပေါ် အလေးထား မြတ်နိုးသည့်စိတ်ကို ပေါ်လွင်စေပါသည်။ ထို့ပြင် 'ဦးတင်' ဟူသော အသုံးသည်လည်း မိဘနှစ်ပါးကို မည်သည့်အကြောင်းအရာ ပေါ်ပေါက်သည်ဖြစ်စေ ကာမူ အစဉ်အမြဲအလေးထား၍ ဦးစီးပိပ်ရွက်ပန်ဆင်သည့် မြန်မာ ယဉ်ကျေးမှု ထုံးတမ်းအစဉ်အလာကို သိမြင်လာစေပါသည်။ 'အားနာ' ဟူသော အသုံးသည် ကဗျာတစ်ပုဒ်လုံး၏ အသက်ပင် ဖြစ်ပါသည်။ တိုင်းပြည်အတွက် အသက်ပေး ဆောင်ရွက်လိုသော်လည်း ခရီးဆုံးထိ မဆောင်ရွက် နိုင်တော့သည့်အတွက် တာဝန်မကျေသလို ခံစားမိ သောကြောင့် အားနာ မိကြောင်း ပြောကြားခြင်းပင် ဖြစ်ပါသည်။ ပြောက်ကျားစစ်သည်လေး၏ ရိုးသားဖြူစင်သည့် တိုင်းပြည်အတွက် သက်စွန့်ကျိုးပမ်း ဆောင်ရွက် လိုသောစိတ်ဓာတ် ပေါ်လွင်စေသော အသုံးပင် ဖြစ်ပါသည်။ ကိုယ်၊ နှုတ်၊ နှလုံး ယဉ်ကျေးမှု အမူအရာများ ပေါ်လွင်စေပါသည်။

ကဗျာတစ်ပုဒ်လုံးသည် ခက်ခဲနက်နဲသောအသုံး အနှုန်းများ၊ အဓိပ္ပာယ်များ မပါဝင်သည့်အတွက် ရိုးရှင်း လွယ်ကူသည့် ပသာဒ ဂုဏ်ကိုတွေ့ရပါသည်။ ပြောက်ကျားစစ်သည်လေး၏ ဘဝနိဂုံးကို ဖော်ပြရာ၌ တိုက်ရိုက်ဖော်ပြခြင်းမရှိဘဲ "အနောက်ကုန်းတွင် နေလုံး ကွယ်လေပြီတကား" ဟူ၍ သွယ်ဝိုက်ကာ ဝက်ဝုတ္တိအလင်္ကာဖြင့် ရေးဖွဲ့ထားကြောင်း တွေ့ရပါသည်။ ထို့ပြင် ကဗျာတစ်ပုဒ်လုံးကို ဖတ် ကြည့်ပါက ပြောက်ကျားစစ်သည်လေး၏ မျိုးချစ်စိတ်ကို တွေ့ရ သကဲ့သို့ တွေ့ကြုံ ခံစားရသည်များကို ပေါ်လွင်အောင် ရေးဖွဲ့ထား သည့်အတွက် သနားကရုဏာသက်စေသည့် ကရုဏာရသကိုလည်း ပေးစွမ်းသည့် ဇာတ်လမ်းပါကဗျာကောင်း တစ်ပုဒ်ဖြစ်ကြောင်း တွေ့ရှိရပါသည်။

၅။ ခြုံငုံသုံးသပ်ချက်

ဆရာကြီးမင်းသုဝဏ်၏ ဖိုးမောင်လာပြီနှင့် သူမှာတမ်း ကဗျာ နှစ်ပုဒ်လုံးသည် ဇာတ်လမ်းပါဝင်သည့် ကဗျာဖြစ်သည်နှင့်အညီ အဓိက ဇာတ်ဆောင်တစ်ဦးနှင့် အခြားအရံဇာတ်ဆောင်များ ပါဝင် ကြောင်း တွေ့ရပါသည်။ ဇာတ်လမ်း တွင်ပါဝင်ရမည့် ဇာတ်လမ်း အစပျိုးသည့် ဇာတ်ပျိုးပိုင်း၊ စာဖတ်သူ၏ သိလိုစိတ်ကို မြှင့်တင် ပေးသည့် ဇာတ်တက် ပိုင်း၊ သိလိုစိတ် အမြင့်ဆုံးသို့ ရောက်ရှိစေသည့် ဇာတ်ထွတ်ပိုင်းနှင့် ဇာတ်လမ်းကို အဆုံးသတ်သည့် ဇာတ်သိမ်း ပိုင်းတို့ကို တွေ့ရှိရပါသည်။ ဖိုးမောင်လာပြီနှင့် သူမှာတမ်းကဗျာ တို့တွင် အဓိကဇာတ်ဆောင် တစ်ဦးစီ ပါဝင်သော ဇာတ်လမ်းလေးဖြင့် မိမိဖော်ပြလိုသော အကြောင်းအရာများ ကို ရေးဖွဲ့ တင်ပြထားသည် ကိုတွေ့ရပါသည်။

မိမိရပ်ရွာတွင်ကျရောက်လာသည့် အန္တရာယ်များကို ကာကွယ် ရမည်မှာ မိမိဇာတိကိုချစ်ခင်သူ၊ အများအကျိုးကို သယ်ပိုးဆောင် ရွက်မည့်သူ၊ ရွာသူရွာသား တိုင်းသူပြည်သားများပင် ဖြစ်ပါသည်။ ထိုသို့သောစိတ်ဓာတ်များ နိုင်ငံသားတိုင်း၌ ရှိစေလိုသည့် အတွေး စိတ်ကူးဖြင့် ဖိုးမောင်ကဲ့သို့သော ဇာတ်ဆောင်ကို ဖန်တီးရေးဖွဲ့ကာ ပုံဖော်ရေးဖွဲ့ထားပါသည်။ "ရေဆိပ်အနား၊ ရွာတံခါး" ဟူသော ကာလနောက်ခံအသုံးများ၊ "ဂုတ်ကျား၊ ဖိုးမောင်" ဟူသော ဇာတ်ဆောင်အဖွဲ့ များ၊ "အုပ်ဆောင်း၊ တက်ချောင်း၊ ငါးပလိုင်း" စသော လုပ်ငန်းသုံး ဝေါဟာရများက ဇာတ်လမ်းနှင့် ဇာတ်ဆောင်ကို ပိုမိုအသက်ဝင် စေပါသည်။ ကဗျာကို ရေးဖွဲ့ရာတွင် ခက်ခဲနက်နဲသော စကားလုံးများ မသုံးဘဲ လွယ်ကူရိုးရှင်းသော နေ့စဉ်သုံး စကားလုံး များဖြင့် ရေးဖွဲ့ ထားပါသည်။

သူမှာတမ်း ကဗျာတွင်လည်း မျိုးချစ်စိတ်ဖြင့် တိုင်းပြည်နှင့် လူမျိုးအတွက် သက်စွန့်ကြိုးပမ်း ဆောင်ရွက်သူများကို ချီးကျူးဂုဏ် ပြုလိုသောကြောင့် အဓိကဇာတ်ဆောင် ပြောက်ကျား စစ်သည်လေး ကို သာဓကပြုကာ ဇာတ်လမ်းဆင်ရေးဖွဲ့ထားကြောင်း တွေ့ရှိရပါ သည်။ ချစ်သူကို မှာကြားခဲ့သော"ခွင့်လွှတ်" ဟူသောအသုံး၊ မိဘကိုမှာ ကြားခဲ့သော "ဦးတင်" ဟူသောအသုံး၊ တိုင်းပြည်ကို မှာကြားခဲ့သော "အားနာ" ဟူသော အသုံးများသည် ရိုးရှင်းလွယ်

ကူ၍ ခွန်အားရှိသောအသုံးများပင် ဖြစ်ပါသည်။ စာဖတ်သူ၏ ရင်တွင်း ခံစားချက်များထိ ရောက်အောင် တစ်ဆင့်ပြီး တစ်ဆင့် ဆွဲဆောင် စည်းရုံးသိမ်းသွင်း နိုင်သည့် အသုံးအနှုန်းကောင်းများပင် ဖြစ်ပါသည်။ ခွင့်လွှတ်ခြင်း၊ ဦးတင်ခြင်း၊ အားနာခြင်းစသည့် မြန်မာ့ဓလေ့သုံး စကားလုံးများသုံး၍ နူးညံ့သိမ်မွေ့သော မြန်မာစိတ်ဓာတ်ကို ပုံဖော်ထားကြောင်း တွေ့ရပါသည်။ ကဗျာ(၂)ပုဒ်လုံးသည် မြန်မာ တို့၏မျိုးချစ်စိတ်ဓာတ် ရှင်သန်ထက်မြက်ရေးကို ဇာတ်ဆောင်များ ဖြင့်ဖန်တီးရေးဖွဲ့ထားရာ ပီပြင်ကြောင်း တွေ့ရပါသည်။

၆။ နိဂုံး

ရသစာပေဖြစ်သော ကဗျာများတွင် စာဆိုတို့၏ခံစားချက်၊ အတွေးစိတ်ကူးများကို စာဖတ်သူများ ခံစားသိအောင် ပုံဖော်ရေးဖွဲ့ ထားသည်ကို တွေ့ရှိရပါသည်။ ဆရာကြီးမင်းသုဝဏ်၏ ဇာတ်လမ်းပါ ကဗျာများသည် စာဖတ်သူကို နှစ်သက်ခြင်းရသနှင့်အတူ ဘဝအသိ အမြင်များကိုပေးသော ကဗျာများဖြစ်ကြောင်း လေ့လာတွေ့ရှိရပါ သည်။ ဆရာကြီးမင်းသုဝဏ်၏ ဇာတ်လမ်းပါကဗျာများကို သရုပ်ဖော် အရေးအဖွဲ့များ၊ စကားလုံးအသုံးအနှုန်းများ စသည့်ကဏ္ဍများ မှလည်း သုတေသနပြုလေ့လာနိုင်ပါသည်။

ကျမ်းကိုးစာရင်း

၁။ ဇော်ဂျီ။ (၂၀၀၄) ။ ရသစာပေနှင့် အဖွင့်နိဒါန်း။ ရန်ကုန်၊ အင်ကြင်းဦး ပုံနှိပ်တိုက်။

၂။ ဘုန်းနိုင်(တက္ကသိုလ်)။ (၁၉၈၁) ။ ဝတ္ထုရှည်ဟူသည်မှာ၊ ဝတ္ထုရှည် စာတမ်းများ (ပထမတွဲ)။ ရန်ကုန်၊ စာပေဗိမာန်ပုံနှိပ်တိုက်။

၃။ မင်းသုဝဏ်။ (၁၉၉၇) ။ ကဗျာပေါင်းချုပ်။ ရန်ကုန်၊ စာပေလောက စာအုပ်တိုက်။

၄။ မြန်မာစာအဖွဲ့။ (၁၉၉၁) ။ မြန်မာအဘိဓာန်။ ရန်ကုန်၊ ဖိုတိုလစ်သို ပုံနှိပ်တိုက်။

၅။ မြန်မာပြည် ပညာပြန့်ပွားရေးအသင်း။ (၁၉၃၇) ။ ခေတ်စမ်းကဗျာများ၊ ပထမတွဲ။ (တတိယအကြိမ်)၊ ရန်ကုန်၊ ပြည်ကြီးမဏ္ဍိုင် ပိဋ္ဌကတ် ပုံနှိပ်တိုက်။

၆။ Pearson Education Ltd., “Longman Dictionary of Contemporary English,” Fifth Edition (LDOCE 5), 2009.

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