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Content

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Analysis of Material Based Image Retrieval and DIM based Variable Length Signatures

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ABSTRACT
Multimedia data, especially images, are integrated more and more in various information systems such as the World Wide Web, digital libraries, geographic information systems, satellite observation systems or even police crime recording and investigation systems. A great deal of effort has been dedicated to visual applications that need efficient image similarity metrics and signature. Digital images can be easily edited and manipulated owing to the great functionality of image processing software. This leads to the challenge of matching somewhat altered images to their originals, which is referred as near duplicate image identification. In order to effectively retrieve a large database of images, a method of creating an image retrieval system MBIR (material based image retrieval) is applied based on a binary index which aims to describe features of an image object of interest. This index is called the binary signature and builds input data for the problem of matching similar images. To extract the object of interest, we propose an image segmentation method on the basis of low-level visual features including the color and texture of the image. Near duplicate image identification needs the matching of somewhat altered images to the original image. This will help in the detection of forged images. In this paper near duplicate images matched (DIM) using variable length signatures. These signatures are extracted from images using patch based approach. Similarity between two images is computed by comparing these signatures with help of earth mover's distance.

INTRODUCTION

Image retrieval systems as shown in fig:1 return a set of images which are similar to an image in a query by matching their features (Acharya and Ray, 2005; Liu et al., 2007; Liu and Yang, 2013; Muneesawang et al., 2014; Alzu'bi et al., 2015). Segmentation is the task of recognizing objects in an image. The rest of the image is background. The aim of image segmentation is the domain - independent partition of the image into a set of regions which are visually distinct and uniform with respect to low level information, such as gray level, texture or colour. The output of this is used as input in high level processing such as object recognition, scene analysis etc. Generally segmentation methods are based on two basic properties of the pixels in relation to their local neighborhood: discontinuity and similarity. Methods based on some discontinuity property of the pixels are called boundarybased methods, whereas methods based on some similarity property are called region-based methodsThere are two well-known techniques used in many systems: text-based and content-based (Liu et al., 2007; Acharya and Ray, 2005;

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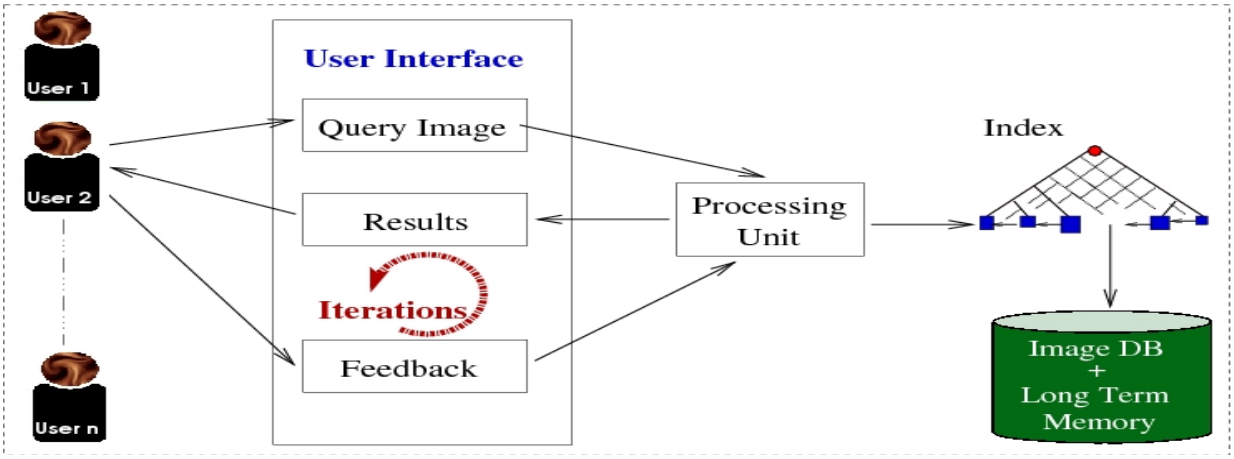

Muneesawang et al., 2014; Marques and Furht, 2002). Text-based image retrieval was introduced in the 1970s, and is used by traditional text retrieval techniques for image annotations[1]. It is very limited in terms of scalability due to the lack of automation when image annotations are manually created and labeled by a human. Content-based image retrieval, which was announced in the 1980s, applies image processing techniques to automatically extract image features and then retrieve relevant images based on the match of their features.

II. Duplicate Image Creation:

Near-duplicate images are created by taking independent pictures of the identical object under various conditions in resolutions, illuminations, and others[2]. Moreover, they can be generated by modifying the original images with the help of some transformations such as image scaling and rotation. Consider basic flow of image matching technique. In image matching, image is represented to some feature spaces using suitable technique[3]. As shown in Fig 2. Then some local or global features are extracted from image to represent them as vectors. These features are analyzed to compute the similarity between query image and reference database using different mathematical tools.

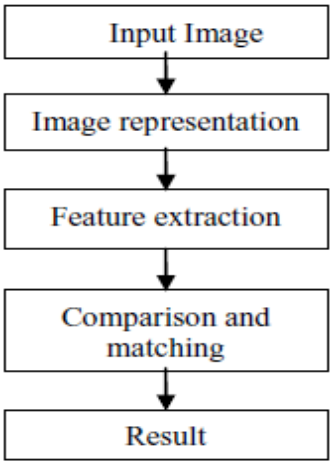

Fig.2. Picture matching technique

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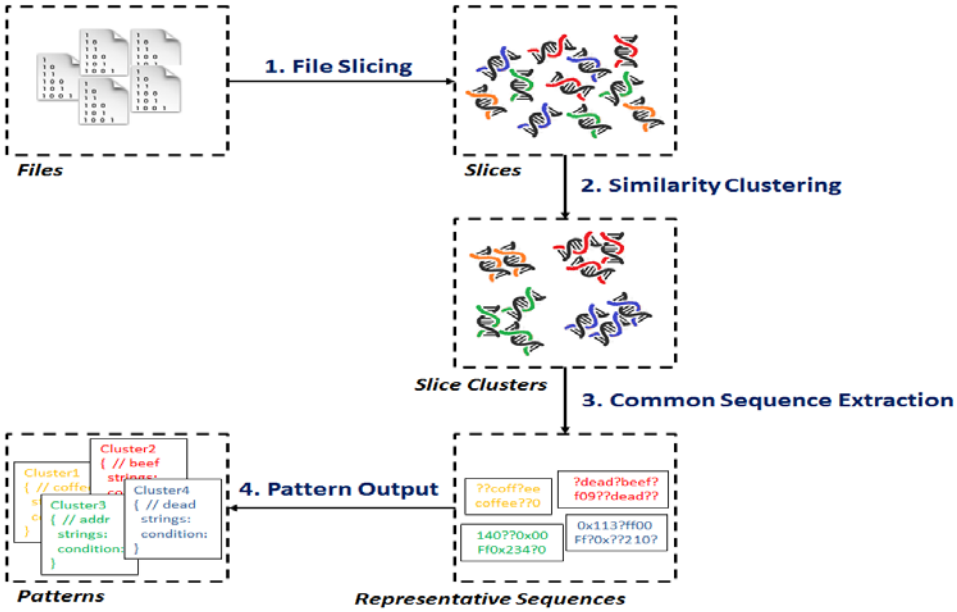
This paper is inspired by our earlier works (Van and Le, 2014c; 2014b). The main contribution of this paper is an alternative model for content-base image retrieval[4]. After describing the details of the model and proving its efficiency, we design a set of different experiments. The empirical evaluations are to measure the metadata size, accuracy and time delay of this model's implementation on three well known image databases: COREL, Wang and MSRDI (Wang, 2016; COREL, 2016; Microsoft, 2016). The widespread distribution of digital data and proliferation of digital images due to Internet has augmented problem related with copyright intrusion on digital images. Watermarking techniques have been introduced to protect copyrighted images.

III. Creating a Binary Signature

The contribution of the paper includes creating a binary signature to describe an image's content, giving a similarity measure between images based on binary signatures, combining the signature graph and SOM based on binary signature[5], clustering binary signatures in fig 3. and storing them in the signature graph. Then we present algorithms based on a combination between the SOM and signature graph to quickly query similar images[6].



However watermarks are susceptible to geometric distortions and image processing and may not be very efficient[7]. There are numerous applications of image matching algorithms that ranges from easy photogrammetry tasks like feature recognition to the development of 3D modeling software.

$$\mu_\alpha(sig_\alpha^I, sig_\alpha^J) + \mu_\alpha(sig_\alpha^J, sig_\alpha^K) \geq \mu_\alpha(sig_\alpha^I, sig_\alpha^K).$$

Their application persists to increase in a various fields day by day. In the recent decades, this has been a very active area of research and as shown by the huge amount of documentation and work published around this. As requirements change and become more demanding, researchers are encouraged to develop novel technologies to accomplish these requirements.

IV. Distance Measures among two distributions:

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It has benefits over conventional distance measures regarding the overlap among two distributions. It considers similarity of the non-overlapping parts plus that of overlapping parts. In order to represent image Kim [3] used ordinal measures of the discrete cosine transform coefficients. Aksoy and Haralick [4] represented an image using co-occurrence variances and line-angle-ratio statistics. Those were ordered into a feature vector of 28 dimensions. In [5], Meng et al. represented an image using 279D feature vector.

$$\begin{aligned} W(\phi,\psi) &:= \min H(\boldsymbol{\theta}) \text{ s.t. } \boldsymbol{\theta}_{\mathbb{A}} = \phi, \boldsymbol{\theta}_{\mathbb{B}} = \psi \\ &= \min H(X,Y) \text{ s.t. } \boldsymbol{\theta}_{\mathbb{A}} = \phi, \boldsymbol{\theta}_{\mathbb{B}} = \psi, \end{aligned}$$

$$\begin{aligned} V(\phi,\psi) &:= W(\phi,\psi) - H(\phi) \\ &= \min H(Y|X) \text{ s.t. } \boldsymbol{\theta}_{\mathbb{A}} = \phi, \boldsymbol{\theta}_{\mathbb{B}} = \psi. \end{aligned}$$

Enhanced Dynamic Partial Function used to measure similarity[8]. It adaptively activated a several number of features in a pairwise manner in order to accommodate the characteristics of every image pair. In some works [6], [7], the vectorial representations were first embedded into binary codes. Here, main issue was to make sure the images that were alike in the original vector space should be compact in the binary code space. Regardless of the simplicity, representing an image by a single vector generally fails to handle the variations between the near-duplicate images.

V. Characteristics of Image:

Dimension of the features has to be determined a priori, in spite of the characteristics of image. Furthermore, vectors are not good at modeling the relationships amongst different parts of the image. Chum et al. [8] represented an image based on its color histograms and then for fast retrieval used Locality Sensitive Hashing (LSH). The remainder of this paper is structured as follows. We discuss several related works in the next section[9]. After that, we describe the technical details of three main components of the model: the creation of a binary signature, the structure of the signature graph and image retrieval with the SOM. In the following section, we present an empirical experiment and discuss the evaluation result. Finally, we finish the paper with our conclusions and discuss the directions for possible future work. In the first matching stage, the distances among two blocks from the two images were calculated with the help of SIFT features. In the next stage, multiple block alignment hypotheses considering scale variations and both piecewise spatial shifts were proposed[10]. Then every descriptor from random image can be allocated to its nearest word in the vocabulary. Accordingly, an image can be characterized by a vector with every axis representing the occurrence statistics of the respective visual word in the image. There are some representations which are adapted to particular kinds of images, such as document images, face images and others. A renowned approach is to represent a face image using weighted sum of Eigen faces with the help of PCA.

VI. Algorithm 1:. Patch based variable length signatures

We first generate patches from given image, based on which the image is represented by a variable-length signature. The length of signature is variable and depends on the number of patches in the image. Fig 4.Number of patches varies due to individual image characteristics.

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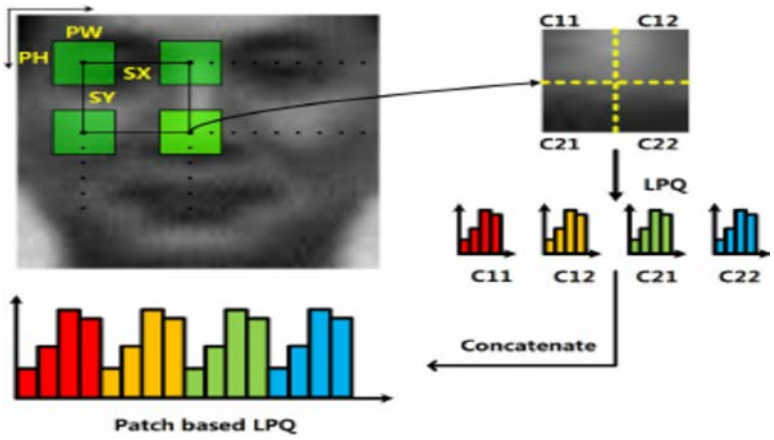

Fig 2: Patch based variable length signatures

Invariant descriptors matching methods are more preferable under complex image deformations. The vital point based on descriptors approach is to get stable and unique feature descriptors. Scale-invariant feature transform performs reliable matching under rotation, illumination and scale, changes, so SIFT feature is greatly distinctive[11]. The common practice is to first indentify some keypoints in the image using detectors such as Difference-of-Gaussian (DOG). The number of keypoints for each image changes in accordance with the image characteristics. Then a descriptor is used to characterize a support region around the keypoint. The most regularly employed descriptor is SIFT Algorithm.

VII. Image segmentation.

In this study, this introduces a new scheme using data mining framework that supports spatial temporal data based video retrieval and image matching[12]. Feature descriptors are extracted from image tiles and summarized into visual thesaurus.

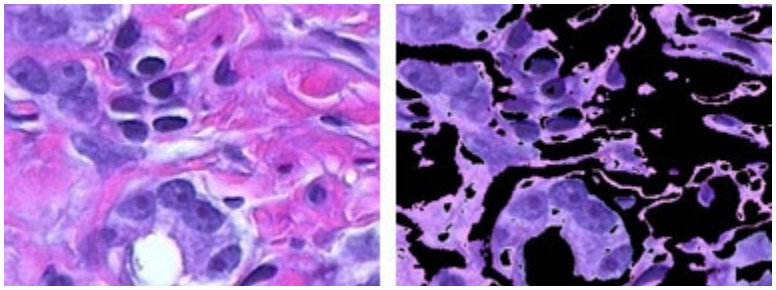

Fig 3: Color-based Segmentation

Visual thesaurus allows us to record spatial relationships among labeled descriptors using DSIFT approach. In a content-based image retrieval system, the interest regions of images are extracted and compared to find similar images. There are many different methods to define and segment the image regions of interest.

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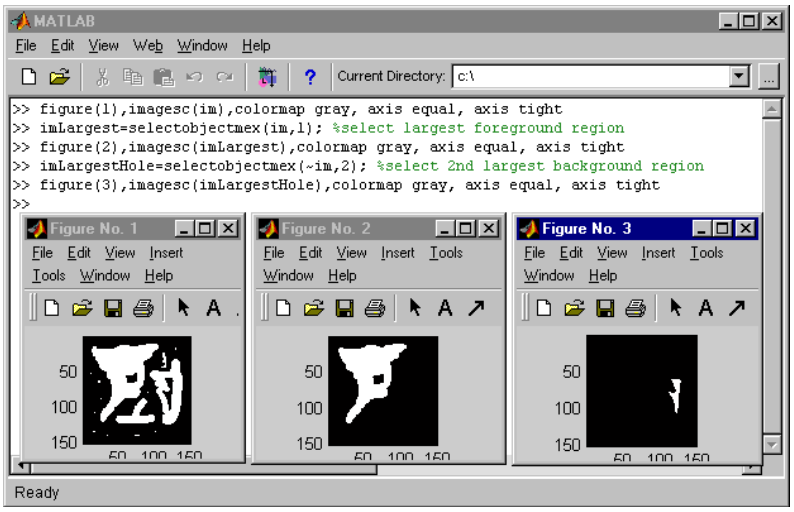

Fig 4: position on the images

They can be extracted from a specific position on the images, as shown in fig 4 for example, the center of their mage (Kim et al., 2003).

VIII.CONCLUSION

Patch based image matching method shows good robustness to image scale and orientation invariance. The key points obtained using SIFT are useful owing to their distinctiveness, which facilitate the correct match for a key point to be chosen from a large database of other key points. Scale-invariant feature transform is invariant to image rotation and scale and robust across addition of noise, and change in illumination. The system may improve with the above constraint in future. The proposed scheme is implemented as an application, in future this will be implemented in real time. Secondly if the video input is very large the frames will be more so it takes very long time to split the video into frames so this should be reduce in future. The system can also extend with some other descriptors other than dense descriptor.

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Environmental Pollution stress on physico-chemical parameters and Zooplanktons Studies in, Ancharlake Srinagar Kashmir

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ABSTRACT
Zooplanktons at the selected sites of, Anchar lake were carried out (July 2000 to Aug 2002 and March 2014 to April 2015) to find the changes in the water quality over the years. For physico-chemical analysis of water, sampling was done once in a month and samples were collected from both surface and bottom of the Lake in polyethylene bottles of 1 L capacity from pre-selected sites with the help of Ruttner type water sampler. The water temperature in general ranged from 6-29^{o}C respectively with usual trend maximum in summer and minimum in winter. The pH values fluctuated between 7.5 and 9.5 respectively indicating the Lake to be on alkaline side. A total of 40 taxa of Zooplankton were recorded during both the periods of study. Previous studies were carried out from July 2000 to Aug 2002, a total of 27 rotifer and 13 crustaceans and from March 2014 to Apr 2015, 8 rotifer and 5 crustacean taxa were recorded respectively. Due to anthropogenic activities the number of zooplanktons has been decreased from last decade in ancharlake.

INTRODUCTION

Kashmir, being predominantly an agricultural economy and having water and land as its most valuable natural resources, has lakes as the main sources of water, followed by rivers, streams and springs. These water bodies have a bearing on the economy of the state besides providing us the source of portable water, fish, vegetable foods and fodder. The freshwater bodies of Kashmir have not remained immune to anthropogenic pressures as a result of which many water bodies have got deteriorated during the last 50 years. As a result of degraded water quality, aquatic biodiversity has also got severely affected. In an aquatic ecosystem the life of aquatic biota is closely dependent on the physical, chemical and biological characteristics of water, each of which directly acts as a controlling factor. Therefore, for understanding the dynamics of an organism, a population or a community, knowledge of both the organism and its environment is required., the present study on crustaceans, an important component of zooplankton community in terms of its diversity and abundance has been undertaken during 2014-2015 with a view to obtain the baseline data on such an important group of animals serving as an important link in the aquatic food chain and being very good and sensitive bio indicators to monitor the trophic status of the water body. The importance of zooplankton in other studies has also been highlighted by many workers. The occurrence and abundance of zooplankton depends on the productivity of the lake, which in turn is influenced by abiotic factors and the level of nutrients in the water body. Further,

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zooplankton occupies a key position in ecological pyramids and their role in trophic-dynamics is noteworthy (Pandit, 1980, 99). The physico-chemical parameters and nutrient status of water body play an important role in governing the production of plankton (especially zooplankton) which is the natural food of many species of fishes and also support the necessary amount of protein for the rapid growth of larval carps (Rahman and Hussain, 2008). Major zooplankton forms vary in their relative abundance and they belong to three groups: (i) Phylum Protozoa, (ii) Phylum Rotifera and (iii) Class Crustacea which is itself composed of orders like Cladocera, Copepoda, and Ostracoda.

. **1.1 Literature Survey**

However, due to multiple of problems the lake is heading towards its destruction. With this back ground, the present study was carried out at the selected sites of Anchar lake ,at different periods of time to find out the changes in the water quality over the years and its impact on Zooplanktons especially crustaceans like calanoids, , coyclopoids, cladocerans, copepoda, rotifera and other organisms. The present study will also reveal the impact of de-weeding and the magnitude of threat imposed by discharges from urban human settlements to the ecology of the lake, so that possible conservative measures could be undertaken to restore the aquatic life

1.2 Materials and Methods

The present study would prove useful in understanding the conservative planning and management of polluting factors.

1. Water sample: Water samples were collected from four sites of, Anchar lake from March 2014 -April 2015 .

2. Physico-chemical analysis: Sampling was done once in a month and samples were collected from both surface and bottom of the Lake in polyethylene bottles of 1L capacity from pre-selected sites with the help of Ruttner type water sampler (Ruttner, 1968). Sampling was done between 10 am to 12 noon. For the physico-chemical analysis, standard methods a ssuggested by Welch (1948), Murphy and Riley (1962),Mackereth (1963), Golterman and Clymo (1969), Trivedy and Goel (1986) and APHA (1989) were followed.

3. Zooplankton sampling: Zooplankton sampling was carried out on monthly basis from March 2014 to Apr 2015. However, the sampling from March 2014 to Apr 2015 was done on seasonal basis(2 seasons) from the open water areas of the Lake almost devoid of aquatic plants. The study of zooplankton was divided into two parts, viz., qualitative and quantitative analysis. For Qualitative analysis, standard planktonic net (64 nm pore dia) was hauled through vertical and horizontal planes of the lake at selected sites. The plankton collected in the 50 ml polyethylene bottle connected at the lower end of the net was preserved in5% formalin. Then, 1 mL of this sample was taken at a time in a Sedgwick Rafter chamber and studied under the phase contrast inverted microscope (Nikon) and simple microscope. The identification was done with the help of keys given by Ward and Whipple (1959),Mellan by (1963), Pennak (1978) and Tonapi (1980).To collect sample for quantitative analysis of zooplankton population, 10 L of water was filtered through the plankton net and the water was allowed to filter through the net, the planktons were concentrated in the 50 ml polyethylene bottle connected at the lower end of the net. The sample thus, obtained was preserved in 5% formalin and further reduced in volume to 5 ml by centrifugation. About 1 ml of concentrated preserved sample was taken at a time in a Sedgwick Rafter Chamber (Whipple et al.,1927) and counting was done for each zooplankton taxon. The entire 5 ml of the concentrated sample was studied under phase

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contrast inverted microscope(Nikon) and other microscope.

The results are expressed as individuals per litre.Parameters Range

Parameters Range	Parameters Range Anchar lake
Temperature (oC)	3.1 – 25.6
pH	7.96 – 8.39
Conductivity (µS/cm)	2.964 – 461.10
Dissolved oxygen (mg/L)	2.0 – 06.9
Calcium (mg/L)	13.8 – 58.6
Magnesium (mg/L)	3.7 – 16.8
Total alkalinity (mg/L)	236.4 – 381
Chloride (mg/L)	20.2 -52.8
Nitrate-nitrogen (µg/L)	137.3 – 323.4
Total phosphorus (µg/L)	287.7 – 512 .4

RESULTS AND DISCUSSION

The physico-chemical features of water are summarized in Table 1. The water temperature in general ranged from 6 to29^{o} respectively, with usual trend with maximum in summer and minimum in spring. The pH values fluctuated between 7.5 and 9.5 indicating the Lake to be an alkaline. The conductivity values put the Lake water under β-mesotrophic. The calcium and magnesium values follow the progression as Ca>Mg. The total alkalinity showing that the water is moderately hard. The rich chloride contents in these Lake indicate the presence of organic pollution. Overall, the , Anchar lake water is alkaline, moderately hard and nutrient rich in NO_3-N andP-PO_4. Zooplankton in the Anchar lake is represented by rotifers and crustacean (Jeelani*et al.,* 2005). A total of 40 taxa of Zooplankton of anchar lake were recorded during both the periods of study. In the past studies carried out from July 2000 to Aug 2002, a total of 27 rotifer and 13 crustaceans and from March 2014 to Apr 2015, 8 rotifer and 5 crustacean taxa were recorded respectively (Table 1 and 2). The rotifer fauna shows single peak in population density during summer at all the sites in both the studies. The site-I is open water area of these Lake which does not receive domestic water directly. The site-II is shallow and densely vegetated with macrophytes and at this site, species diversity and population was highest of all the sites. Both site-III and site-IV receive direct discharge of domestic sewages. The species composition has been found to be almost similar except *Brachionusangularis* Pallus which is found at site-IV. However, over a period of one decade, there has been a decline in the number of taxa of rotifer in the Lake evident from the studies carried out from March 2014 to Apr 2015 in which only 8 rotifer taxa were recorded. Crustacean population in both the periods of study increased during summer with a single peak. In all, 13 crustaceans belonging to cladocera and copepod were recorded during July 2000 to Aug 2002.Out of these, 12 were present at site-I and 13 each at all other sites of the Lake. However, during the studied period from March 2014 to Apr 2015, the crustacean diversity has shown a considerable decrease over a period of time.

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Table 2 Zooplankton Enumertation for the month of March-June 2015 for the open water expanse of the Ancharlake

	Site-I	Site-II		Site-III		Site-IV	
		(S)	(B)	(S)	(B)	(S)	(B)
March							
Rotifera	72	41	37	36	36	41	36
Cladocera	15	17	34	22	20	35	14
Copepoda	11	14	22	20	16	17	06
April							
Rotifera	41	35	38	31	20	21	12
Cladocera	18	19	12	21	11	10	05
Copepoda	13	06	11	09	11	04	05
May							
Rotifera	41	23	21	44	12	14	17
Cladocera	31	15	10	21	07	13	09
Copepoda	14	03	07	12	06	03	05
June							
Rotifera	64	70	32	21	19	17	21
Cladocera	24	14	13	11	06	12	10
Copepoda	18	06	11	05	06	06	05

Findings:-Rotifera>Cladocera>Copepoda>

The excessive load of nutrients in the *Anchar* Lake has resulted into excessive growth of aquatic vegetation. In the recent past, a large scale mechanical de-weeding in the *Ancharlake* has resulted aquatic vegetation provides food and shelter to them.

MACROZOOBENTHOS COLLECTION STRATEGY

PLANKTONIC COLLECTION STRATEGY

MACROPHYTES PRESENT IN THE LAKE

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III. CONCLUSION

Several measures are being taken to restore the pristine glory of the Anchar lake . However, few measures adversely affect the Lake ecology in general. The machines in place for the removal of nutrient rich sediments and aquatic plants from the Lakes resulted into loss of biodiversity as is evident from this study. The use of mechanical de-weeder has also resulted in to the loss of species diversity of Zooplankton in the Lake over a period of time. The entry of untreated sewage ,agricultural run-off from the floating gardens and solid waste within and outside into the Lake water has resulted in nutrient enrichment of the water that has led to luxuriant growth of aquatic plants. In the recent past reduction/erratic precipitation levels has led to decrease of fresh water entry into the Lake. At present, there is a very little control over point and non-point source of pollution and the lack of public participation have also resulted into deterioration of the Anchar lake .Concept of polythene recycling machine named (polyrecyler) designed by Ar.Taha Mughal under the supervision and guidance of Author Urfan Ali. This project was presented in 15th national children science congress 2007 at department of science and technology.

IV. DESIGN

This machine is made up of rotter blades and used on sites where polythene bags and other non-disposable items are thrown .By the help of rotter these materials is extracted from weeds(azolla)and the allow to shift into oil chambers where oil and other impurities was allow to absorb by any absorbent or hair could be used as substitute. Now from oil chamber polythene would be shifted to burning incinerator, which was a connected burning outlet. It is of two types one. Used for emitting gases and the gas were treated and made it suitable for extinguishers. While as other one outlet contains residue matter which would be set into steel mould and mixed with the material which could be used to make sanitary tiles

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Quartz Reef at Punagarh Hill, Pali district, Rajasthan- A comparative study

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Abstract:

The Quartz Reef at Punagarh Hill shows vide variation in color, consists of opalescent quartz with disseminations of feldspar, pyrite and emplaced along the shear zone with polymetallic sulphide mineralization. The various textures observed in the form of cockade/ colloform texture, crustification, brecciation, symmetrical banding etc. indicates the presence of the hydrothermal activities. The quartz reef also involve intrusives of a variety of rock types that include pegmatites, quartz veins, silicified quartz veins in the area.

Study Area:

The study area, Punagarh lies immediately west of the Aravalli ranges and is on the fringe of the Thar Desert which is the western part of the northwestern Indian shield in vicinity of Pali town of Rajasthan (Figure 1). The region is, largely, of low relief. There are few isolated hillocks in the region with highest point being Punagarh Hill, which rises as a cone about 200m above the general plain level.

Geology of the Area:

The rocks of the study area belongs to the Sojat Formation of Delhi Supergroup. The major rock units of the area are slate, quartz reef [in literature it is referred as brecciated quartz rock (G.S.I. memoir, vol 123, 1997)[1] and quartz-barytes rock (D.M.G. mineral resources of Rajasthan, 1981)][2], and quartz-chlorite schist with or without magnetite & hematite and thin bands of quartzite. The rocks of the Sojat Formation has been intruded by younger intrusive. In Punagarh area, the major rock units exposed as a low lying slates and schist surrounding the Punagarh Hill. The Quartz Reef exposed at the western edge of the Punagarh Hill. The quartzite is interlayered with slate and quartz reef as thin bands (Figure 2).

Quartz Reef:

The detailed studies of the rock (Quartz- Barytes Rock) of the Punagarh Hill, reveals that this rock has a peculiar characteristics similar to the "Quartz Reef" (Sharma 1982[3], Pati *et al*. 2007[4]; Mondal, 2010[5] and Bhattacharya 2013[6]). Therefore an attempt has been made to understand the features of the known "Quartz Reef".

In the literature "Quartz Reefs" have been described as a monomineralic rock (Sharma, 1982) or as mega veins of almost pure quartz occasionally mildly sheared (Basu, 1986, 2004) or as giant quartz veins (Pati *et al*., 2007; Mondal, 2010). Bhattacharya (2013) studied the quartz reefs of Bundelkhand massif and revealed that the quartz reefs show wide variation in color. Quartz is definitely the most abundant mineral constitute in the reefs but there are local disseminations of pyrite, epidote, feldspar, hematite and rarely chalcopyrite and galena (Plate 1 & 4). The quartz reefs are dominantly greyish

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white but pinkish white and milky white in color are also present. The emplacement of the quartz reef along brittle – ductile shear zone and their associated polymetallic sulphides, denote hydrothermal activities and metasomatism. The quartz reef shows a complex petrogenetic history, injection of hydrothermal veins followed by emplacement of quartz veins possibly at the end of the petrogenetic cycle. The quartz reefs also involve intrusives of a variety of rock types that include pegmatites, quartz veins, silicified quartz veins and granites.

These rocks mainly correspond to acidic magmatic activities in which minerals with hydrous phases such as muscovite, hornblende etc. are absent. On the other hand, a variety of other minerals mainly magnetite, siderite, limonite, chalcopyrite, galena and pyrite are occasionally present as disseminated to pocket type in quartz reefs. Occurrence of younger phase of quartz veins within the reef is a common feature. The reef shows complex shearing history involving both silica rich rocks and staking of sheared slices. Intimate association of quartz rocks with mylonitic biotite gneisses suggests that quartz reefs are lithological diverse in nature and that during their development deformation may play an important role, this has not been highlighted so far in the literature. Similarly, occurrences of the shear packages has also not been highlighted so far in the literature.

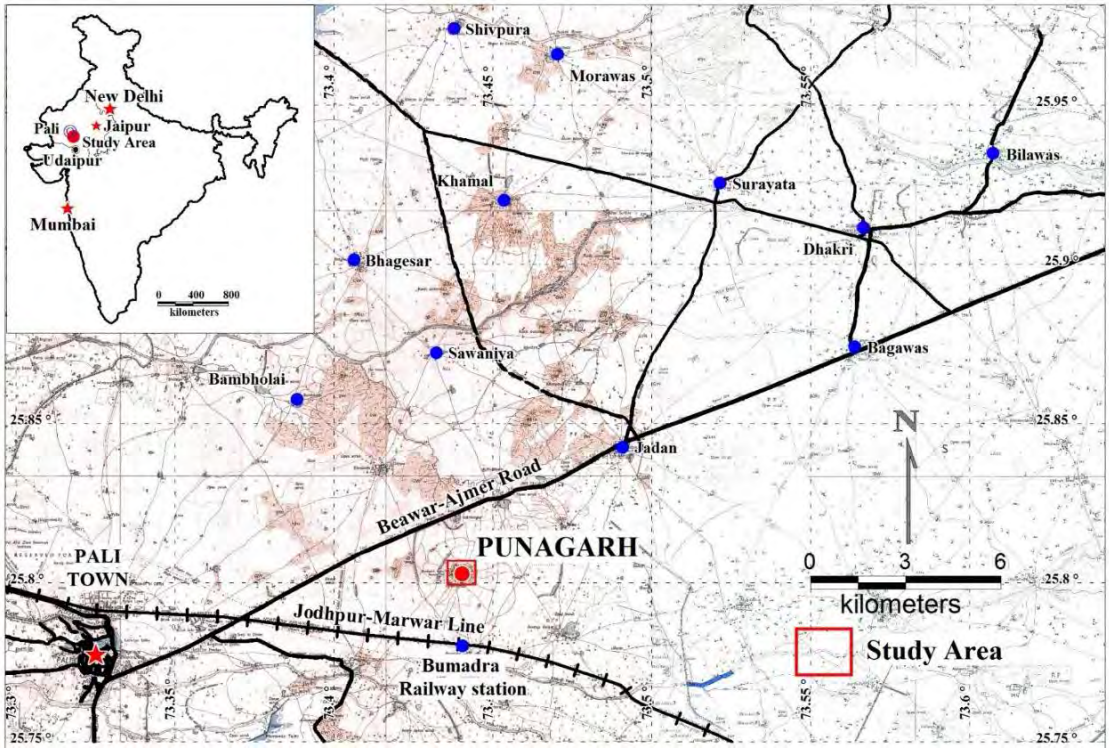

Figure 1: Location map of Study area (part of Survey of India Toposheet no 45G/5).

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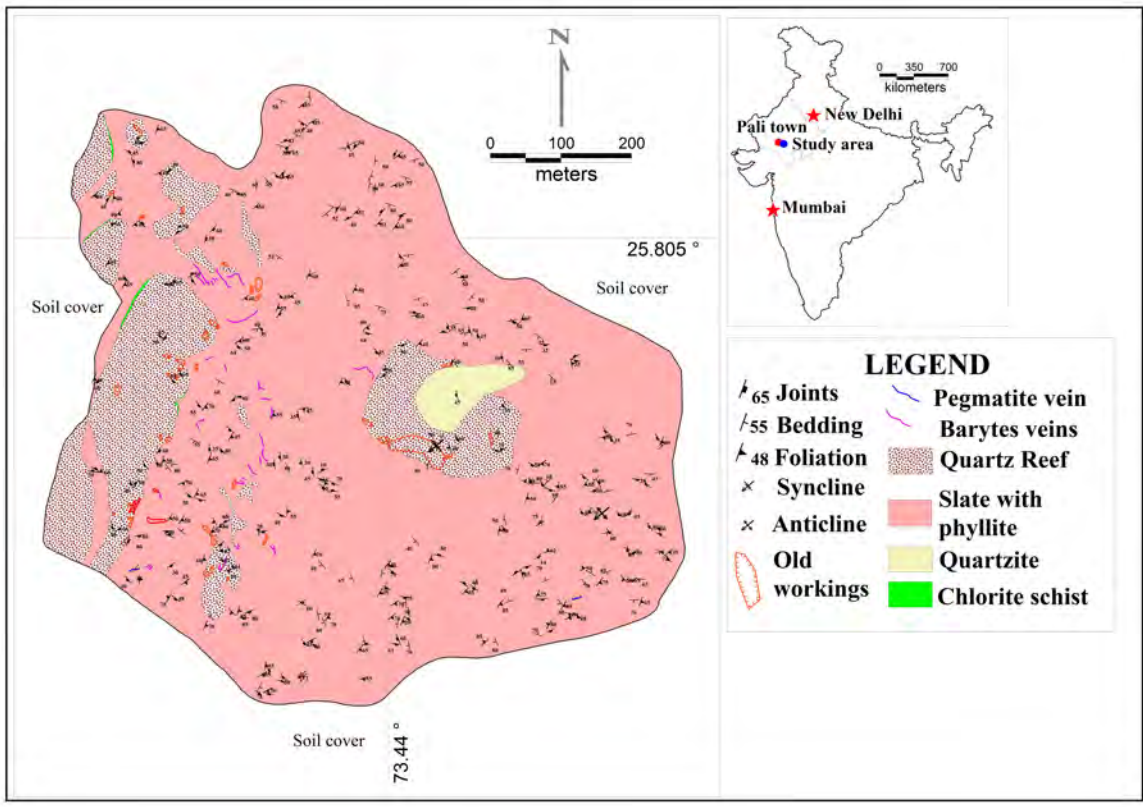

Figure 2: Geological map of Punagarh area.

A comparative study has been made and the following observations has been recorded and compare with the that the Punagarh Hill rock (so far called as "Quartz- Barytes rock in literature) has similar features of "Quartz Reefs".

Bundelkhand massif	Punagarh Hill
Quartz reefs show wide variation in color *i.e.* greyish white, pinkish white - milky white and brownish (Plate 1).	Quartz reefs show wide variation in color *i.e.* light grey to brownish in color (Plate 2)
The emplacement of the quartz reef along brittle – ductile shear zone and their associated polymetallic sulphides.	Its emplacement along the shear zone with polymetallic sulphide mineralization *viz.* pyrite, chalcopyrite, sphalerite and galena (Plate 3).
A variety of other minerals mainly magnetite, siderite, limonite, hematite, chalcopyrite, galena and pyrite are occasionally present as disseminated to pocket type in quartz reefs.	A variety of other minerals *viz.* hematite, magnetite, and limonite are also recorded.

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Bundelkhand massif	Punagarh Hill
The quartz reefs shows a complex petrogenetic history, injection of hydrothermal veins followed by emplacement of quartz veins denote hydrothermal activities (Plate 4).	Presence of the hydrothermal activities (Plate 5 & 6) observed in the form of cockade/ colloform texture, crustification, brecciation, symmetrical banding (Plate 7).
The quartz reefs also involve intrusives of a variety of rock types that include pegmatites, quartz veins, silicified quartz veins and granites.	Occurrences of the younger quartz veins, silica rich bands and staking of sheared slices. The quartz reefs also involve intrusives pegmatites (Plate 8), quartz veins, silicified quartz veins in the area.

Conclusion:

On the basis of the above comparative facts it has been concluded that the "Quartz- Barytes- Rock" (as described in the literature) has similar characteristics of the "Quartz Reef". Therefore, this rock has been designated as "Quartz Reef" and same nomenclature has been adopted for further studies.

Plate 1: Quartz Reef (Bundelkhand) showing vide variation in colors.

Plate 2: Quartz Reef (Punagarh Hill) showing vide variation in colors.

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Plate 3: Polymetallic sulphide mineralisation at Punagarh Hill.

Plate 5: Ferruginous chert layers (silica+ hematite+ barytes) formed due to mixing of hydrothermal fluids at Punagarh hill.

Plate 7: Symmetrical banding of hydrothermal fluids in Quartz Reef at Punagarh Hill.

Plate 4: Hydrothermal veins in Quartz Reef in Bundelkhand massif.

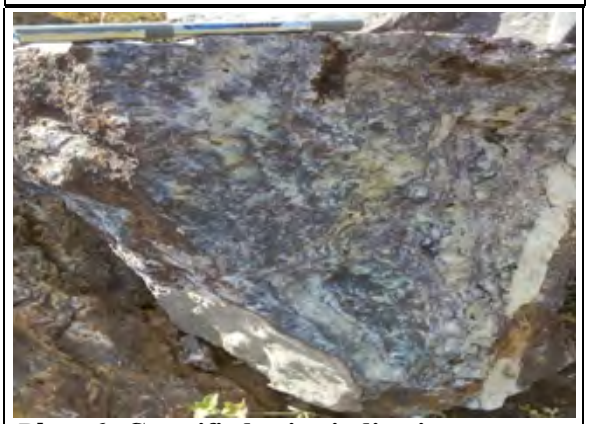

Plate 6: Crustified veins indicating movement of the hydrothermal fluids in quartz reef at Punagarh hill.

Plate 8: Pegmatite intrusion in Quartz Reef at Punagarh Hill.

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Socio-economic Profile of Respondents Working in MGNREGA in Anantnag District of the State of Jammu and Kashmir

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ABSTRACT
Unemployment, underemployment and vulnerable employment pose high cost to society as well as to economy in terms of loss of human and productive potentials and loss of social and economic welfare. Policies aimed at tackling the structural causes of dearth of employment opportunities for people usually focus on increasing their employability and access to formal education, skill trainings, availability of apprenticeships and basic human necessities to downtrodden people. In our country, the poverty alleviation programs were designed at tackling the problems of poverty and backwardness by helping weaker sections to increase their incomes through self employment and wage paid employment. The National Rural Employment Guarantee Act was introduced on the lines of Gandhian Directive Principles of State Policies laid out by the Constitution of India with the very purpose of bridging the gap and empowering the rural poor by increasing their buying capacity and making them more self sufficient. This rural welfare scheme underpins the sole objective to reduce rural poverty and rural unemployment to create better socio-economic conditions for the rural people. The present paper attempts to assess the socio-economic conditions of rural people working in MGNREGA scheme for last 10 years since the inception of the scheme in terrorism affected district Anantnag of the State of Jammu and Kashmir.

INTRODUCTION

Rural Development is a process of change, by which the efforts of the people themselves are united, those of government authorities to improve their economic, social and cultural conditions of communities in to the life of the nation and to enable them to contribute fully to national programme (United Nations 2012). The large swathes of the Indian land at the eve of Independence faced with economic problems such as the abject poverty. There were differences in the levels of per capita income and consumption, literacy, medical and health facilities, population growth, infrastructure development, employment opportunities. Independent India thus, inherited a backward economy in which prevailed extreme poverty and deprivation, characterized by stagnant agricultural output, an uneven and weak industrial sector and low capital resources (Narang, 1996). Economic development of a country depends on the proper utilization of both human and non-human resources. The government's objective then was to attain and accelerate the economic development of the country (Bhuimali, 2004). Till date, numerous programmes have been taken up by Indian government to address the problem of rural unemployment so that the rural people are not

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forced to move out for survival. Some past important welfare schemes such as Food for Work Programme, Sampoorna Gramin Rozgar Yojana (SGRY), Wage Employment Programmes, Jawahar Rozgar Yojana/ Jawahar Gram Samridhi Yojana had eroded their basic objective of providing needful employment in areas of extreme poverty and chronic unemployment because of universalisation of schemes and malfunction of the system. In spite of these programmes, our country witnessed a declining growth rate of employment in rural areas during the period from 1972-73 to 2004-05.

For anti-poverty programmes had not delivered as per desired results so a debate on the National Rural Employment Guarantee Bill had sparked. The "Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)" was enacted to reinforce the commitment towards livelihood security in rural areas. The Act provides a legal guarantee of 100 days work in a financial year (1st April-31st March) to every rural household whose adult members are willing to do unskilled manual work at a statutory minimum wage rate. (Eleventh Five Year Plan, Vol. 3; 86).Now, the scheme has completed a decade in year 2016, an important question arouses whether scheme has been successful in achieving its very basic objectives. The present paper is conducted to assess the socio-economic profile of workers participating in MGNREGA scheme since its inception in the study area.

Some review of literature related to present study.

Singh and Nauriyal (2009) studied the impact of MGNREGA in three districts of Uttrakhand. They found that activities of MGNREGA were supplementing the income of the household to the extent of 10-20 per cent and hence no significant improvement in their income. The study found that due to lack of procedures, low awareness regarding provisions of scheme Panchayat Raj Institutions were reasons for low performance of MGNREGS in sample districts.

Bhat & Mariyappan (2014) conducted study on the socio economic impact of MGNREGA on lives of unskilled labourers in Panchayats of Bakihakar and Behnipora of Rajwar Block in Kupwara district of state of Jammu and Kashmir. The study revealed that majority of job card holders were males, educated, dependent on agricultural work and belong to joint family system.

Farooqi & Saleem (2015) conducted study focusing on empowerment of women from BPL families through MGNREGA of district Aligarh. They made an effort to find out the factors that have affected the women involvement in MGNREGA and also impact on their socio-economic condition. The study suggested there was need for expansion of MGNREGA that will be suitable for natural instinct and provision of work with skill development.

T.K Karthika (2015) studied impact of MGNREGA on socio-economic development and women empowerment. The attempt was made to find out the benefits, implementation and the role of MGNREGA in rural development. The study suggested people should be mere about the scheme and government should give importance to productive work and also the programme should be expanded in other relevant area like construction,industry,agriculture etc.

Kharkwal and Kumar (2015), conducted a study on socio-economic impact of MGNREGA in district of Udham Singh Nagar in Uttrakhand. They made an attempt to find out the impact on socio-economic condition of the beneficiaries. The study suggested that implementing agencies need to take more steps to increase the person days employment and the scheme should be continued in future.

2. Need and Objectives of the Study

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In selected district for present study Anantnag climate is very different and land remains covered with snow in winter from November to March. There are some sensitive factors such as terrorism, flood and climate mark selected region for study district Anantnag different from other regions of the state of Jammu and Kashmir and rest of India. The selected district Anantnag is terrorism affected area so people's earnings are substantially affected by terrorist activities. Since there is very low investment by entrepreneurs in small business such as small scale and cottage industries so a great proportion of working population is involved in agriculture activities in general and horticulture activities in particular. This creates disguised unemployment in the region.

Consequently, the present study has been carried out to examine the socio-economic status of people in district Anantnag of Jammu Kashmir.

3. Methodology

The present study is based on primary data collected by researcher from six villages Chinegund, Lehindagan, Katsoo, Bon-Numbal, Akoora situated in two Blocks i.e. Dachinipora and Khoveripora Block in District Anantnag by applying simple random sampling. From each village of the two blocks, 60 beneficiaries holding active job cards in year 2015-16 were selected. In all, a total of 360 beneficiaries have been chosen for study.

4. Results and Discussion

4.1 Social Profile of Respondents

4.1.1 Gender-wise Distribution

Table1 shows distribution of respondents who participated in scheme. An overwhelming majority of 337(93.6%) respondents are male and the number of female respondents are 23(6.4%). out of 360 samples in the six villages surveyed, it is evident that men constitutes majority of the workers under scheme.

Table 1 Distribution of respondents on the basis of sex

Sex	Anantnag													
	Dachinipora Block						Khoveripora Block							
	Chingund		Lehedingan		Katsoo		Bon-Numbal		Akoora		Fohar		Total	
Male	57	95%	56	93.3%	58	96.7%	49	81.7%	60	100%	57	95%	337	93.4%
Female	3	5%	4	6.7%	2	3.3%	11	18.3%	0	0%	3	5%	23	6.4%
Total	60	100%	60	100%	60	100%	60	100%	60	100%	60	100%	360	100%

Source: Primary data

At the time of survey in six villages it was found that mostly working women preferred work in their own agricultural land other than MGNREGA. Besides this, there are some other constraints like family problems, religion, social borders etc become reason of low participation of females in scheme. It can be concluded the scheme is largely male dominated in the study area. There is no sign of improvement in women work participation, women social and economic participation as a result of launching this scheme.

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4.1.2 Age-wise Distribution

The table 2 reveals that out of total sample of 360 respondents in the age group of 18-24 years, only 0.8% respondents participated and in age group 25-30 years 5% respondents participated. In the age group 31-36 years 15.8%, age group of 37-42 years, 25.8%, in the age group 49-54 years, 15.3% respondents participated and 10.3% respondents are above age 54. The maximum participation of respondents is found in the age group 43-48 years and lowest participation of respondents is found in the age group of 18-24 years. The majority of the workers are in the most productive age group. They would be performing at the best of their potential.

Table 2 Distribution of Respondents on the basis of Age

Age	Anantnag													
	Dachinipora Block						Khoveripora Block							
	Chingund		Lehedingan		Katsoo		Bon-Numbal		Akoora		Fohar		Total	
18-24	2	3.3%	0	0%	0	0%	1	1.7%	0	0%	0	0%	3	0.8%
25-30	5	8.3%	0	0%	1	1.7%	12	20%	0	0%	0	0%	18	5%
31-36	16	26.7%	12	20%	6	10%	7	11.7%	5	8.3%	11	18.3%	57	15.8%
37-42	21	35%	15	25%	9	15%	9	15%	13	21.7%	26	43.3%	93	25.8%
43-48	10	16.7%	13	21.7%	19	31.7%	15	25%	21	35%	19	31.7%	97	26.9%
49-54	5	8.3%	12	20%	16	26.7%	8	13.3%	11	18.3%	3	5%	55	15.3%
Above 54	1	1.7%	8	13.3%	9	15%	8	13.3%	10	16.7%	1	1.7%	37	10.3%
Total	60	100%	60	100%	60	100%	60	100%	60	100%	60	100%	360	100%

Source: Primary data

4.1.3 Distribution of Respondents on basis of Literacy

The table 3 reveals that out of total sample of 360 respondents, 222 respondents (61.7%) are illiterate, 70 respondents (19.4%) are educated upto primary education, 36 respondents (10%) are educated upto high school, 8 respondents (2.2%) are educated upto intermediate, 15 respondents (4.2%) are graduate and 9 respondents (2.5%) are post graduate. So, it can be concluded that the majority of the sample respondents are illiterate but analysis also shows educated unemployment in rural areas that have to work in such scheme especially made for unskilled workers.

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Table 3 Distribution of respondents on basis of Literacy

Education	Anantnag													
	Dachinipora Block						Khoveripora Block							
	Chingund		Lehedingan		Katsoo		Bon-Numbal		Akoora		Fohar		Total	
Illiterate	15	25%	44	73.3%	46	76.7%	31	51.7%	33	55.0%	53	88.3%	222	61.5%
Primary Education	10	16.7%	15	25%	11	18.3%	9	15.0%	18	30%	7	11.7%	70	19.4%
High School	21	35%	1	1.7%	2	3.3%	5	8.3%	7	11.7%	0	0%	36	10%
Intermediate	3	5%	0	0%	0	0%	5	8.3%	0	0.0%	0	0%	8	2.2%
Graduate	7	11.7%	0	0%	0	0%	7	11.7%	1	1.7%	0	0%	15	4.2%
Post Graduate	4	6.7%	0	0%	1	1.7%	3	5%	1	1.7%	0	0%	9	2.5%
Total	60	100%	60	100%	60	100%	60	100%	60	100%	60	100%	360	100%

Source: Primary data

4.1.4 Type of School Education of Children of Respondents

The table 4 reveals that out of sample, of 360 respondents majority of respondent's children are going to government school. It shows households are not providing good quality of education of their children because of their low income.

Table 4 Distribution of Respondent on the basis of children's School Education

Type of School Education of Children of respondents after MGNREGA	Anantnag													
	Dachinipora Block						Khoveripora Block							
	Chingund		Lehedingan		Katsoo		Bon-Numbal		Akoora		Fohar		Total	
No Schooling	0	0%	1	1.7%	0	0%	0	0%	0	0%	1	1.7%	2	0.6%
Govt. School	38	63.3%	54	90%	46	76.7%	39	65%	29	48.3%	46	76.7%	252	69.8%
Private School	22	36.7%	5	8.3%	14	23.3%	21	35%	31	51.7%	13	21.7%	106	29.4%
Total	60	100%	60	100%	60	100%	60	100%	60	100%	60	100%	360	100%

Source: Primary data

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4.2 Economic Profile of Respondents

4.2.1 Occupation of the Respondents

The table 5 reveals that out of total sample of 360 respondents, 293 (81.2%) are farmer, 54 respondents (15%) are working as wage labour and 13 respondents (3.6%) are self employed. The study found majority of the respondents working in scheme are farmers possessing their own land.

Table 5 Distribution of respondents on the basis of Occupation

Occupation of respondent	Anantnag													
	Dachinipora Block						Khoveripora Block							
	Chingund		Lehedingan		Katsoo		Bon-Numbal		Akoora		Fohar		Total	
Farmer	59	98.3%	52	86.7%	49	81.7%	47	78.3%	38	63.3%	48	80.0%	293	81.2%
wage labour	1	1.7%	7	11.7%	11	18.3%	3	5%	22	36.7%	10	16.7%	54	15%
self employed	0	0%	1	1.7%	0	0%	10	16.7%	0	0%	2	3.3%	13	3.6%
Total	60	100%	60	100%	60	100%	60	100%	60	100%	60	100%	360	100%

Source: Primary data

4.2.2 Distribution of respondents on the basis of Agriculture land

The table 6 reveals that out of total sample of 360 respondents, 29 respondents (8%) possess no land, 145 respondents (40.2%) possess 1-4 kanals land, 103 respondents (28.5%) possess 5-8 kanals land and 83 respondents (23%) owning land above 8 kanals.

Table 6 Distribution of respondents on the basis of Agriculture land

Agriculture land (in kanal *)	Anantnag													
	Dachinipora Block						Khoveripora Block							
	Chingund		Lehedingan		Katsoo		Bon-Numbal		Akoora		Fohar		Total	
No land	0	0%	5	8.3%	12	20%	1	1.7%	1	1.7%	10	16.7%	29	8%
1-4	10	16.7%	29	48.3%	16	26.7%	35	58.3%	34	56.7%	21	35%	145	40.2%
5-8	15	25%	22	36.7%	22	36.7%	20	33.3%	13	21.7%	11	18.3%	103	28.5%
Above 8	35	58.3%	4	6.7%	10	16.7%	4	6.7%	12	20%	18	30%	83	23%
Total	60	100%	60	100%	60	100%	60	100%	60	100%	60	100%	360	100%

Source: Primary data Note: *8 kanal =1 Acre

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4.2.3 Number of Days Respondents go to MGNREGA job in a Year

The table 7 reveals that out of total sample of 360 respondents, 40 respondents (11.1%) have worked between 1 to 25 days, 111 respondents (30.7%) have worked between 26 to 50 days, 122 respondents (33.8%) have worked between 51 to 75 days, 84 respondents (23.3%) have worked between 76 to 100 days and only 3 respondents (0.8%) have worked above 100 days.

The majority respondents have worked between 51 to 75 days and only fewer respondents have worked above 100 days.

Table 7 Distribution of Respondents on the basis of Number of Days of Employment in MGNREGA

No. of Days respondents goes to MGNREGA job in a year (in days)	Anantnag													
	Dachinipora Block						Khoveripora Block							
	Chingund		Lehedingan		Katsoo		Bon-Numbal		Akoora		Fohar		Total	
1-25	9	15%	9	15%	5	8.3%	10	16.7%	0	0%	7	11.7%	40	11.1%
26-50	11	18.3%	38	63.3%	18	30%	17	28.3%	6	10%	21	35%	111	30.7%
51-75	19	31.7%	10	16.7%	21	35%	14	23.3%	38	63.3%	20	33.3%	122	33.8%
76-100	18	30%	3	5%	16	26.7%	19	31.7%	16	26.7%	12	20%	84	23.3%
Above 100	3	5%	0	0%	0	0%	0	0%	0	0%	0	0%	3	0.8%
Total	60	100%	60	100%	60	100%	60	10%	60	100%	60	100%	360	100%

Source: Primary data

4.2.4 Annual Earnings of Respondents from MGNREGA

The table 8 reveals that out of the total sample of 360 respondents, majority of respondents earn an income above Rs. 7000.

Table 8 Annual Earnings of Respondents from MGNREGA

Annual earnings from MGNREGA job (in Rs)	Anantnag													
	Dachinipora Block						Khoveripora Block							
	Chingund		Lehedingan		Katsoo		Bon-Numbal		Akoora		Fohar		Total	
1000-3000	8	13.3%	4	6.7%	5	8.3%	10	16.7%	0	0%	6	10%	33	9.1%
3001-5000	5	8.3%	16	26.7%	4	6.7%	11	18.3%	0	0.0%	5	8.3%	41	11.4%
5001-7000	3	5%	27	45%	13	21.7%	6	10%	5	8.3%	17	28.3%	71	19.7%
Above 7000	44	73.3%	13	21.7%	38	63.3%	33	55%	55	91.7%	32	53.3%	215	59.6%
Total	60	100%	60	100%	60	100%	60	100%	60	100%	60	100%	360	100%

Source: Primary data

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4.2.5 Annual Income of Respondents including from other sources

The table 9 reveals that out of 360 sample of 360 respondents, 31 respondents (8.6%) fall in the income group Rs 20000-40000, 56 respondents (15.5%) fall in the income group Rs 400001-600000, 147 respondents (40.7%) fall in the income group Rs 600001-800000, 31 respondents (8.6%) fall in the income group Rs 800001-100000 and 95 respondents (26.3%) fall in the income group Rs 100001-120000. Maximum respondents fall in income group 600001-80000 come under below poverty line defined by government authorities.

Table 9 Distribution of respondents on the basis of Annual Income

Annual Income after working in MGNREGA (in Rs	Anantnag													
	Dachinipora Block						Khoveripora Block							
	Chingund		Lehedingan		Katsoo		Bon-Numbal		Akoora		Fohar		Total	
20000-400000	0	0%	18	30%	7	11.7%	0	0%	0	0%	6	10%	31	8.6%
40001-60000	20	33.3%	31	51.7%	0	0%	0	0%	0	0%	5	8.3%	56	15.5%
60001-80000	22	36.7%	9	15%	29	48.3%	30	50%	36	60%	21	35%	147	40.7%
80000-100000	11	18.3%	2	3.3%	10	16.7%	0	0%	0	0%	8	13.3%	31	8.6%
100000-120000	7	11.7%	0	0%	14	23.3%	30	50%	24	40%	20	33.3%	95	26.3%
Total	60	100%	60	100%	60	100%	60	100%	60	100%	60	100%	360	100%

Source: Primary data

4.2.6 Average Annual Income

The table 10 describes average annual income of workers before joining and after joining the scheme. It shows maximum change in average annual income of Rs 14666.67 in Bon-Numbal village followed by Akoora village Rs 13666.67, Chinegund village Rs12000,Fohar village Rs 11666.67, , Katsoo village Rs 9333.34 and in Lehindagan village Rs 7666.67.In Lehindagan village majority of respondents belong to Schedule Tribe (ST) category.

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Table 10 Average Annual Income of Respondents before and after joining MGNREGA

Average Annual Income	Anantnag					
	Dachinipora Block			Khoveripora Block		
	Chinegund	Lehindagan	Katsoo	Bon-Numbal	Akoora	Fohar
Before MGNREGA	59666.66	40666.66	55166.66	75333.33	72333.33	68666.66
After MGNREGA	71666.66	48333.33	64500.00	90000.00	86000.00	80333.33
Change in Average Annual Income	12000	7666.67	9333.34	14666.67	13666.67	11666.67

Source: Computed from Primary Data

5. Summary and Conclusion

The foregoing analysis of primary data regarding MGNREGA workers ostensibly describes very low participation of female workers in the scheme. The scheme is less successful in bringing down gender disparity in the study area. Albeit there is exception that large number of female respondents belongs to Muslim religion. The researcher found that females in Muslim religion reluctant to actively participate in paid job outside their homes. Only male workers go to outside home for work. The scheme has provided work to maximum workers belonging age group of 43-48 and least participation of young generation. The focus of scheme to provide work to illiterate jobless workers is gained as maximum workers working under MGNREGA in selected study area are illiterate and unskilled. The study also finds children of all MGNREGA workers are going to school. Out of total 360 respondents holding land so it is evident that there is less participation of landless wage labour in MGNREGA. The reason being for such kind of pattern is migration, the landless wage workers still prefer to work at other places instead of MGNREGA. So MGNREGA is less successful in stopping migration in the study area. As far as annual earnings from the scheme maximum (60%) respondents are getting above Rs 7000 annually, however it varies with workers contribution in terms of working days. The overall analysis of income side of respondents still large portion of workers working under MGNREGA comes under below poverty line (BPL). The study also finds increase in annual average income of workers in comparison of their income before joining the scheme. However it also includes their income earned from other sources. But increase in average annual income is not so sufficient to enable workers to come out from poverty and impoverishment.

Suggestions

1. MGNREGA should be diversified into the activities which require technical skill and ability.

2. Government should give significance to productive work.

3. There is need for development of MGNREGA work appropriate to the natural instinct of women from the prospective of augmentation the scope of women employment.

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"A new approach to effect of covalency on cohesive energy and high pressure phase transition and compression on ThS & US"

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ABSTRACT
Interaction potential with modified ionic charge to study the structural, elastic and thermal properties of ThS and US have been investigated by using three body potential model (TBP) and technique of minimization . it includes van der waals attraction and Covalency effect. The present compound exhibits rock salt (NaCl) structure and transform into Cesium chloride (CsCl) structure under high pressure. A modified interaction potential model (MIPM) (including the covalency effect) has been developed. Phase transition pressures are associated with a sudden collapse in volume. At compressed volumes, these compounds are found in CsCl phase. The phase transition pressures and associated volume collapses obtained from present potential model show a generally good agreement with available experimental data and others. The result on phase transition, volume collapses, elastic constants, bulk modulus, cohesive energy and second order elastic constants were calculated and compared with the available experimental data.

INTRODUCTION

All metals which are available as solids in sufficient quantity have undergone structural investigation at elevated pressure and can be systematically compared. Systematics is much less complete for the pressure behaviour of the compounds. It is clear that sufficient information is only available for some of the 1:1 compounds with elements from the fifth and sixth main groups of the periodic table, the monopnictides and the monochalcogenides. The available information on high-pressure structures, transition pressures and compressibility is present in the form of graphs and tables. The present paper centres on high pressure studies and effect of Covalency on cohesive energy of the ThS and US where the largest amount of data has been obtained. The rare-earth mono-pnictides and mono-chalcogenides are considered to be part of the green technology industry, helping to improve energy efficiency in magnets, batteries, glass and computers. The rare-earth pnictides have become more important due to their interesting semi conducting properties and a wide range of practical applications in the field of non-linear optics, electro-optic components, glass-making, grinding alloys, composite lasers, phosphor lasers and electronics

The kinetics of structural phase transitions, both theoretical and experimental is reviewed by Shekhar and Rajan [1]. Much of the earlier work on 'classifying' the changes from one structure to another was based on the rate with which the transition was effected. His brief section on classification scheme is included to

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review the status of kinetics as a parameter for classifying phase transitions. While crystallographic differences were recognized, a scheme for the classification of the transitions based on the nature of the crystallographic change was in fact the last to be developed. In between these two developments, the well-known work of Ehrenfest provided a rigorous treatment of the thermodynamics to the case of transition between two solid phases. Roy (1973) [2] has reviewed these classifications systematically. He has identified four principal approaches to the problem by classifying phase transitions based on kinetic, thermodynamic classification, thermochemical, and structural considerations.

The basis of all important theories of phase transition and interaction potentials are developed by Born [3] and Born and Mayer [4] , who postulate that the forces for bonding in ionic crystals arises from the long range electrostatic interaction between the oppositely charged ions and from their short range overlap repultion [5] . Looking at the interesting properties of these less explored monopnictides and the fact that no work has been done with the potential model including covalency effects, we thought it pertinent to apply a modified interaction potential (MIPM) model, which includes the covalency effect in the potential model. Tosi and Fumi [6] have demonstrated the significance of vander Waals (vdW) attraction due to the dipole–dipole (d–d) anddipole–quadruple (d–q) interactions.

The interatomic interactions is very important as it provided clear understanding of the crystal properties. These interaction are generally Long-range many body (LR) interactions and Short-range (SR vdW) interactions. In equilibrium state of a crystal, these interactions give rise to an energy defined, as the energy required to separate its constituent's ions by and infinite distance relative to each other. This is called cohesive energy which is a function of the lattice spacing (r). It is seen from the current literature that three body potential model (TBP) used and developed by Singh and co-workers [7-10] has been found to be remarkably successful in giving the unified description of structural and elastic properties of ionic and semi conducting crystals.

The structural and elastic studies on alkaline earth [11, 12] RE chalcogenides [13, 14] and other compounds [15] have further widened the scope of future theoretical and accurate experimental investigations of crystallographic phase transition from B1 to B2 in RE compounds.

An interaction potential consisting of two-body and three-body covalent interactions is proposed for the given compounds. The interaction potential is used in molecular-dynamics studies of structural and dynamical correlations of crystalline, molten, and vitreous states under various conditions of densities and temperatures. The two-body contribution to the interaction potential consists of steric repulsion due to

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atomic sizes, Coulomb interactions resulting from charge transfer, and charge-dipole interaction to include the effects of large electronic polarizability of anions. The three-body covalent contributions include inter atomic interactions which are angle dependent. It is felt that this potential model is suitable for this group of compounds. The High Pressure Structural Properties of given Mono-pnictide and mono-chalcogenides formulation of the present potential model and the method of calculations are described in the next section.

METHODOLOGY

The effect of covalency are taken into account with the reduction of the effective charge of the long range coulomb interaction between ions , the attraction force due to covalency and the field induced charge flow. Thus, the total expression for the crystal in view of the above description can be written as

$$\varnothing(r) = \varnothing c(r) + \varnothing r(r) + \varnothing \operatorname{cov}(r) + \varnothing v(r) + \varnothing R(r)$$

Where various terms correspond to the coulomb attraction $(\varnothing c(r))$, three body interaction $(\varnothing c(r)),$, $(\varnothing c(r))$, vdW interaction, overlap repulsion $\varnothing R(r)$ and $(\varnothing_{\text{cov}}(r))$ term indicates interaction potential due to effect of covalency between the atoms. The long-range interaction between the ions of charge +ze with separation (r) is the electrostatic interaction _z^2e^2/r, which attractive between the ions of opposite charges and repulsive between the ions of the same charges.

$$\varnothing c = -a_m \frac{Z^2}{r_0} \frac{e^2}{}$$

During the lattice vibrations, the shells of the adjacent ions suffer appreciable overlap and consequently get deformed. This electron shell deformation gives rise to transfer or exchange of charge between the overlapping ions. These transferred charges, in turn, interaction with all other charges of lattice view the coulomb field and lead to the long range many body interaction, whose most significant component is the three body interaction the existence of the three body interaction (TBI) . Therefore, we have

$$\varnothing_c^m = \varnothing_c + \varnothing_T$$

Taking the Covalency effects into account, two polarization effects are specified one comes from the usual polarization effect and the other polarization effect originates from changes in Covalency due to electric fields. Coulomb energy for the crystal can be represented as $\varphi_c^m = \varphi_c + \varphi_T + \varphi_{\text{cov}}$

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As two atoms brought together, the charge distribution gradually overlaps. Electron distribution of atoms with closed shells can overlap only if accompanied by the partial promotion of electrons to unoccupied high-energy states of the atoms. Thus, the electron overlap increases the total energy of the system and gives a repulsive contribution of the interaction.

$$\varphi_R(r) = B\exp(-r/p)$$

With B and ρ as the hardness and range parameters.

In rare gas solids, the atoms are rigid and spherically symmetric in charge distribution, the atoms will not affect each other due to their charge neutrality. The spherical symmetry is, however, disturbed because of correlated motion of the electrons in different atoms. This induces instantaneous dipole moment, which gives rise to the dipole-dipole van der Waals forces. Van der Waals energy in written as

$$\phi v = C/r^6 - D/r^8$$

Where C and D are the overall van der Waals coefficient.

AT T= 0 k and transition pressure P, the Gibb's free energy for the NaCl (B1) structure is given by

$$G_1 = \varnothing(\mathrm{B1}) + pv_1$$

and then for CsCl (B2) structure in given by

$$G_2 = \varnothing(\mathrm{B2}) + PV_2$$

AT the phase transition pressure $P_{t,,}$

$$G_1 = G_2$$

$$i.e. \varnothing(B1) + PV_1 = \varnothing(\mathrm{B2}) + \mathrm{PV}_2$$

From equation (3.21) by putting $P=P_{t,}$ we get

$$P_t = \frac{\varnothing(B2) - \varnothing(B1)}{V_1 - V_2} = \frac{\Delta\varnothing}{\Delta v}$$

Where Δ v is the volume change and is called the phase transition volume and

$\Delta\varnothing$ is the difference between the cohesive energies of phases B1 and B2.

For NaCl phase (B1) the volume is given by

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$$V_1=2r1_1^3$$

And the volume for the CsCl phase (B2) is given by

$$V2=(8/3\sqrt{3})r_2^3$$

The relevant expression for the cohesive energy $\varnothing$ (B1) per unit cell for NaCl Structure in the framework of modified Hardy's DDM of Motida [61] is given by

$$\varnothing(B1)=-\alpha_m\frac{Z^2e^2}{r_1}-\frac{12ame^2Z}{r_1}[f_T(r)+f_E(r)]-\frac{C}{r_1^6}-\frac{D}{r_1^8}+6b[\beta_{+-}\{\exp(r_+ +r_- -r1)/p_{+-}\}$$

$$+\beta_{++}\{\exp(2r_+ -k_1-r_1)/p_{++}\}+\beta_{--}\{\exp(2r_- -k_2-r_1)/p_{--}\}$$

And the same for CsCl structure is given by

$$\varnothing(B2)=-\alpha_m\frac{Z^2e^2}{r_2}-\frac{16\alpha_m e^2Z}{r_2}[f_T(r)+f_E(r)]-\frac{C'}{r_2^6}-\frac{D'}{r_2^8}+8b[\beta_{+-}\exp\{r_+ +r_- -r_2)/p_{+-}\}]$$

$$+8b[\beta_{++}\exp\{r_+ -k_2r_2)/p_{++}\}]+8b[\beta_{--}\exp\{2r_- -k_2r_2)/p_{--}\}]$$

With α_m and $\alpha_{m'}$ as the modelling constants for NaCl and CsCl structures respectively. Where the first term is the coulomb energy .The second is term is addition of three-body interaction and covalence effect.

The input constants and model parameters for ThS and US are calculated and presented in table 1. A phase transition occurs when change in the structural details of the phase are caused by a variation of the free energy. The van der Waals coefficients have been evaluated by making use of the SKV method. The present potential model contain three model parameters [b, ρ, f (r)], namely hardness, range and three body force parameter. The input crystal data and calculated model parameters for the present compound are given in Table 1. The positive values of cohesive energy difference show the relative stability according to TBP model and presented in table 4.In table 3 the high pressure behaviour with available experimental data is presented.

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Table 1: Input data and model parameters for given mono-sulphide.

Crystals	ThS	US
r_0	2.840	2.740
b (10^{-12} ergs)	2.856	3.130
ρ	0.239	0.261
f_T **(r)**	0.1923	0.2604
B_T	145	105

As, the stable phase is associated with minimum free energy of the crystal, we have followed the technique of minimization of Gibbs free energies of real and hypothetical phases. The cohesive energies of the compounds confirm that at ambient conditions all compounds are stable in the NaCl structure and transform to the CsCl structure at high-pressure. The phase transition occurs when Δø approaches zero (Δø→0). At phase transition pressure (Pt) these compounds undergo a (B1–B2) transition associated with a sudden collapse in volume showing a first order phase transition.

Table 2: Cohesive properties and relative stability of given mono-sulphide.

Crystals	Equilibrium separation(^{0}A)		Cohesive energy (KJ/mole)		ΔØ
	r_0 (B1)	r_0 (B2)	Ø(B1)(-)	Ø(B2)(-)	(KJ/mole)(+)
ThS	2.7500	2.900	-2883.2	-2812.1	71.1
US	3.07	3.206	-2420.5	-2126.30	294.2

At elevated pressures, the materials undergo structural phase transition associated with a sudden change in the arrangement of the atoms. The atoms are rearranged in new positions leading to a new structure. The

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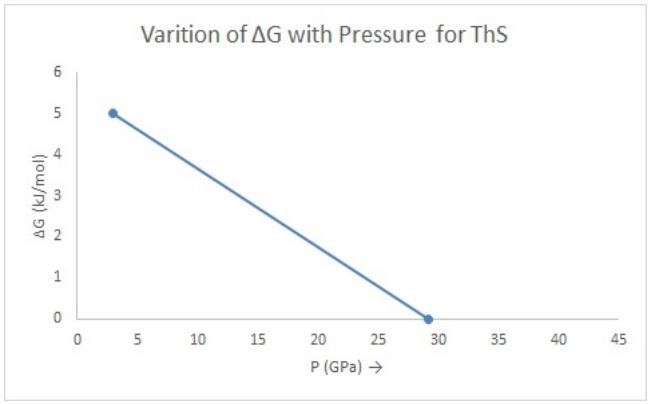
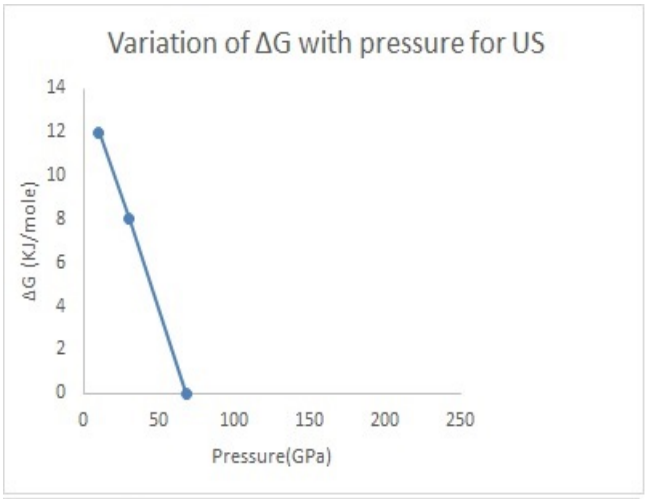
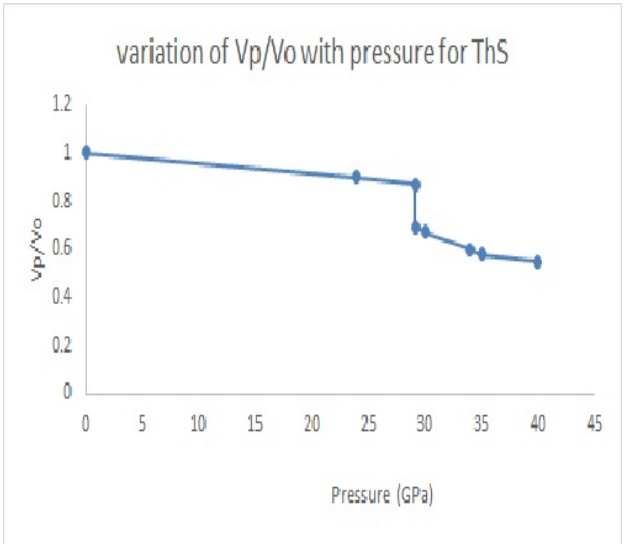
B1 (NaCl) structure is most stable in these compounds and at high pressure they transform to body centred B2 (CsCl) structure. Experimentally one usually studies the relative volume changes associated with the compressions. Relative volume changes V(p)/V(0) have been plotted against pressure. The values of volume collapse (%) are given in Table-3. Our potential model can effectively explain the high pressure behaviour of these compounds.

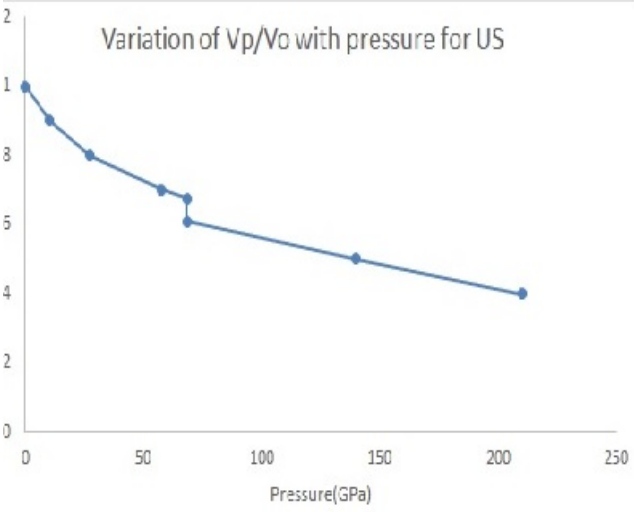
Table 3: High pressure behaviour of given mono-sulphide.

Crystals	Phase transition pressure (GPa)		Relative change in volume (%)	
	Cal.	Exp.	Cal.	Exp.
ThS	29.20	23.2	17.7	-
US	68.52	12	6.54	-









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RESULT AND DISCUSSION:

By using technique of minimization of Ø (B1) and Ø (B2) at different pressure the interionic separation r_o (B1) and r_o (B2) corresponding to phase B1 and B2 is determined. The calculated value of transition pressure is found close to the available experimental data. The obtained values of free parameters allow us to predict the phase-transition pressure and the associated volume collapse. The elastic constants of these compounds are calculated and show a linear relation with the lattice constants. The success achieved in the present investigation can be ascribed to the inclusion of the covalency effect and charge transfer (or three body) as they seem to be of great importance at high pressure when the inter-ionic separation reduces considerably and the coordination number increases. The required input constants and parameters for the crystals and potential are given in tables. Our calculations show that the structural phase transition of these compounds is in good agreement with the available experimental and theoretical data. The inclusion of three body interactions with covalency effect has improved the prediction of phase transition pressures over that obtained from the two-body potential and TBI without covalency. The use of suitable functional form for three body force parameter with covalency, instead of using it as a structure independent model parameter, might have improved the usefulness of the present model for estimating the actual high pressure behaviour of the present compounds.

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Article

Differentially Abled Children and their Reintegration in the Society – A Social Work Intervention

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(This paper is based on the secondary sources and thirty years PG teaching experience and fieldwork supervision of social work students by the author.)

INTRODUCTION

The problems of the differentially abled have many facets. In a developing country with long years of economic and social backwardness they become much more complex and acute. It is in the fitness of things that with growing social awareness and with the desire to optimize the totality of human resource development of the nation, the position of the differentially abled and philosophy and strategy to tackle the situation should increasinglyreceive greaterattention.

The different social, economic cultural and religious groups in asociety must have harmonious relations among them. Only throughgive and take and mutual help they will be able to make headway intheir cherished goals. If some section of the population make progressat the cost of others then it may be difficult for the latter to achieverightful place in the society. In such an atmosphere, unlike in theprimitive society, where the "Survival of the Fittest", was the law, man'sinhumanity to man was very much in evidence in the treatment thatwas meted out to those who were differentially abled for no fault oftheir own. The killing, exposure or banishment of the afflicted beginswas the rule rather than the exception. A deformed or weakling child,an incapacitated elder or any person becomes disabled by accident orillness was condemned to physical extinction. In still later times, adifferentially abled person instilled f ear, suspicions and superstitiousawe in the non-disabled members of his community, who regard himas an 'incarnation of the devil'. In the Middle Ages, myths and legendsgrew around these fears and fancies of the primitive man. For manycenturies, the belief persisted that the decrepit and maimed were insome way connected with sin and evil.

Disability or Incapability:

The term 'Disability or Incapability' is a very hard subject to study and a difficult word to define. The terms 'Differentially abled', 'Disabled' and 'Impaired' have been defined in various ways by various authorities. No twocountries subscribe to the same definition. The reasons precisely are:

a) There is no clear cut demarcation between the so-called"able bodied" and the "disabled".
b) The title "Disabled or Differentially Abled" conceals behind it a loosely connectedheterogeneous group of many disabilities, which affect differentindividuals in different ways. There range varies from a slight andpartial disability like the amputation of a finger, which may haveno affect at all on the routine life of an individual, to the mostsevere and total disability, like complete blindness or the loss ofboth extremities, which produces pronounced change in thepattern of life and work of the individual.
c) Definitions of disability have been introduced for various purposesand, as such, they have been based on various criteria. No singlestandard, therefore, exists in the world

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in order to evaluatedisability, and they cannot be provided by legislative fiat.

They must emerge as a result of the extension of knowledgeamong the professional and educated classes, and from them to thegeneral citizens, as services develop which give meaning to the termsas they are understood by the people who use the services and benefitfrom them.

Between the definitions of the disabled, there is no unanimity.For some the disabled is a physically disabled person whose mentalcapacity is normal. For others those who are mentally disabled orrelated are included. In some countries even diabetes are categorizedas disabled while in others the foams is an extreme physical handicapor mental retardation.

Generally speaking physically disabled are persons who haseither completely lost the use or who can make only a restricted use ofone or more of their limbs. i.e. the total or partial functionaldisablement. On the other hand disabled is a much wider termcovering all those who suffers from malformations, deformities andother deficiencies, physical or mental which prevent their normalfunctioning. These defects cause special problems of education,employment and adjustment in society.

Marwin B. Susman defines disability using the term impairment -any deviation from the normal, which results in defective functioning.Structure organization or development of the whole or in part of theindividual's facilities. Disability thus reflects to any limitationexperienced by an impaired individual in comparison with the activitiesof an unimpaired individual of similar age,sex and culture. Because ofthis inadequacy the disabled suffer many disadvantages such as feelingof insecurity, lack of confidence and limited social participation.

The disabled is thus a disadvantage imposed by an impairmentor disability upon a specific individual on his activities, physical,mental, social, psychological, vocational etc. The degree to which anindividual is disabled depends on the extent and nature of his physicalor mental disability and social definition given to his impairment.

The definition of disabled varies according to the country'sculture, tradition and level of development. This may not be true in adeveloping country. Accordingly such a person is disabled not only bydisability but also by social and economic conditions prevailing in thecountry.

The most accepted definition of a disabled person is given by theUnited Nations. A person unable to ensure by himself of herself whollyor partly the necessities of normal individual and / or social life as aresult or deficiency either congenital or not in his or her physical ormental capabilities.

The disabled thus include differentially abled persons, theblind, the dumb, the orthopedically deformed, the mentally retardedor deficient and also those suffering from incurable diseases like polio,leprosy etc.

Classification of WHO's:

'WHO' has developed and published an internationalclassification of 'Impairments','Disabilities' and 'Handicap'. Thoughthe terms 'Impairment', 'Disability' and 'Handicap' are related to thedifferent planes of disadvantages, a disabled person according to theWHO is one who suffers from any one of the following tree types:

a) Impairment: It means a permanent or transitory psychological,physiological or anatomical loss or abnormality of structure orfunction (e.g. an amputated limb, paralysis after polio, diabetes,mental retardation, impaired hearing, nearsightedness, etc.)

b) Disability: It refers to restrictions on or prevention of carryingout an activity because of impairment in the manner or withinthe range considered normal for a human being. (e.g., difficultyin walking, seeing, speaking, hearing, counting, lifting, reading,writing, etc.) A disability may last for a long or short time, bepermanent or reversible, progressive or regressive and may varyin its impact from one situation to another

c) Handicap: This term is used to denote a disability that interfereswith what is expected at a particular time in one's life. (e.g.inability to care for oneself, communicating thoughts and concerns,developing a capacity for independent economic activity).

Orthopedically Challenged or Orthopedically Differentially abled:

OrthopedicallyChallenged are those whose physical capacityis impaired by the loss, deformity or

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paralysis of one or more limbs.They are the victims of diseases or injuries which could leave behind acertain disability which is permanent and life-long.

The Association of the differentially abled, Bangalore, hasfurther clarified the orthopedically handicapped as persons who havedefects which cause deformity or an interference with normal functionsof the bones, muscles or joints.

Reintegration in the society of the differentially abled persons:

About Reintegration in the society facilities and services Dr.Robert M.Goldensons in his article 'Reintegration in the society Medicine Institute in Disabilityand Reintegration in the society Handbook' (p.674-678) he states in the followingwords. 'Institute of Reintegration in the society is a treatment centre it offers a rangeof diagnostic and restoration services conducted by interdisciplinaryteams'. All patients receive a wide variety of therapies, geared toindividual need to help them reach their potential.

The physical therapist starts treatment at the acute stage ofillness. First efforts are directed at assisting bed positioning to aidcirculation and disorder patients are given breathing exercises whenneeded. As soon as possible range of motion exercises are invited tomaintain joint mobility and manual testing is started to evaluate thepatients muscle strength.

Physical therapy is given for range of motion and muscle strengthto establish a baseline for the patients Reintegration in the societyprogramme.Treatment consists of exercise techniques for strengthening muscles,coordinating body movements and maintaining and increasing jointmobility for those patients who need surgery therapists work with pre- surgical and post-surgical patients who are taught proper breathingmechanisms and movement to prevent complications.

Training activities of daily living is part of the physical therapyprogramme practice is given in getting into and out of bed, from thewheelchair, dressing and undressing and taking care of normal dailygrooming and personal needs.

The occupational therapy service is an important unit of theReintegration in the society team. The occupational therapists primary concern intoimprove the patient functional skill, techniques are used to meet goalsand will vary from patient to patient depending on the diagnosis anddisability, improving functional skills, improving skill in functionalactivities such as eating, grooming, writing, typing etc.

The psychology department is responsible for making anevaluation of the patient's emotional condition, intellectual status andany psychological obstacles that might impede the Reintegration in the societyprocess.

The nursing department is focusing on functional and self-fulfillment. The speech pathology service is a combined clinic, researchand teaching programme.

The social service department helps both the patient and thefamily deal with the emotional stresses which results from disability.

The vocational services department provides programmecounseling, development of educational and training plans and jobplacement and follow up all designed to enable patients to realize their fullest potential for work.

Volunteers serve the varied areas of the institute at all times.Among their activities are helping patients get settled and oriented,giving reassurance to patients and their families reading to patients andwriting their letters, helping them to select books from the institutelibrary, taking them to classes, religious and recreational activities andarranging for child patients to attend summer camp.

According to Kamala Iyer the Reintegration in the societyprofessionals are:

a) psychiatrist– in a Reintegration in the society center the psychiatrist may makea special study of the effect of physical disability on thepersonality of then client and may be involved in the communityand public health aspects of mental disorder.
b) Neurologist – neurologist or nerve specialist and treats, organicdiseases and disorders of the nervous system
c) Orthopedist – hetreats diseases and deformities of the spine,bone, joints etc.
d) Ophthalmologist –the ophthalmologist or eye physiciandiagnoses and teats diseases and injuries of the eyes.

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e) Pathologist –pathologists investigates the nature, cause anddevelopment of diseases etc.
f) Radiologist – specialize in the use of X-ray and radio-active substances in diagnosis and therapy.
g) Non-medical specialists. According to Raymond A. Earle the non-medical specialists are social workers and Reintegration in the society nurse. According to Lena M. Plasted.

- Reintegration in the society Counselor
- Special Education
- Speech Therapist
- Audiologist
- Optometrist

According to Leo A. Raman recreational specialist (therapeutic) corrective therapist, occupational therapist is the team.

ThusReintegration in the societyprogramme of the physically and mentally handicapped children needs the above-mentioned team of experts to rehabilitate them in totality.

Social Work Intervention

Primary concern of social work profession being people-in-their-life-situations where they have to constantly strike a delicate balancebetween compulsions of their social environment on one hand andtheir capacity to cope with on the other; Zastrow (1990) had definedsocial work principles, skills, techniques and values for helpingindividuals; groups, or communities to enhance or restore theircapacity for psycho-social functioning and to create societal conditionsfavourable to their goals. The professional values and the scientificbody of knowledge equip the practitioner with the right skills andattitudes towards children in their challenged situation and facilitatehis/her helping role while working independently or in collaborativeaction while working with and for challenged children.

Social work interventions is often discharged through use of asingle method or a combination of methods as found necessary.Following are the six widely recognized scientific methods of social workprofession.

a) *Working with Individuals and families or Social Case Work* is aimed at helping individuals, on a one-to-onebasis, to enhance or restore their psycho-social functioningthrough application of professional principles, skills, techniquesand values;
b) *Working with groups or Group Work* is a process of social work in which the qualifiedworker helps individuals in a group by providing a desirablegroup experience through various programme media with a viewto enabling members to move towards improved socialrelationships and their psycho-social functioning.
c) Working with communities or Community work is the process of stimulating andassisting the local community to identify, evaluate, plan and co-ordinate its efforts to meet its own 'felt' and 'un-felt' needs anddevelop co-operative and collaborative spirit in working together.
d) Administration of social welfare services or Social Work Administration involves directing the overallprogramme of a social service agency. Administrative functionsinclude setting agency and programme objectives, analyzingsocial conditions in the community and making decisions aboutwhat services will be provided by employing and supervising staffmembers, setting up an organizational structure administeringfinancial affairs and securing funds for the agencies operations.
e) Social activism or Social Action is concerned with changing the social environmentto meet the recognized needs of individuals or disadvantagedgroups by application of tactics involving conflict, confrontationand negotiations.
f) Social research or Social Work Research may be defined as systematic investigationintended to add to available knowledge in a form that iscommunicable and verifiable.

Thus, the present paper is based on secondary sources and willlook into the fact whether only basicor necessary conditions are to be fulfilled if the intervention activity isto be impactful and fruitful. The present paper also focus on thepre-conditions for the

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intervention activity with the differentially abled children.

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Lyrical Notes in the Plays of Rabindranath Tagore

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ABSTRACT
The present paper focuses on the lyrical notes in the plays of Tagore, a versatile genius, a poet, a dramatist, a composer of songs, a painter, a lyricist above all a multitalented personality whose works give us a soothing freshness to our mind and heart with his musical and magical lyrical touch. His musical or lyrical quality is not limited only in poetry but also to his plays.

INTRODUCTION

Lyrics are the songs usually consisting of verses and choruses that express deep feelings or emotions in a work of art; an artistically beautiful or expressive quality. If we talk about the lyrical notes in the plays of Tagore, some plays like *Muktdhara, Valmiki Pratibha, Sanyasi, The Cycle of Spring* etc. are filled with such notes. Tagore expresses deep personal feelings. This is the unique quality of Tagore which makes his work different from others. In his works Tagore chooses highly suggestive, melodies and expressive words from a rich treasure. His works has a rare felicity of diction which arises from the use of apt and melodious words which convey his meditative and reflective feelings.

Tagore's lyrics are distinguished by the beauty and richness of imaging. Tagore's dramas are impressive but he is considered as a lyric poet who has produced attractive plays too. He weaves his words into a most delicate pattern of poetic prose. Tagore is primarily a lyric poet and his dramatic art is so poetic that it would be more appropriate to call his plays as lyric dramas or dramatic lyrics. Tagore's lyrics are the fountain of love, love for the beloved, love for humanity, love for nature and love for divinity. As a poet Tagore is one of the greatest lyric poets in the whole world. For his great lyric collection *Gitanjali,* he was awarded the most prestigious Nobel Prize.

Tagore's plays are composition in prose and poetry accommodated to action and intended to exhibit a picture of human life. His plays are filled with lyricism and philosophy of life. It is the musical appeal of drama, which has perhaps impressed Rabindranath more than action. He has not written plays for the public but has rather created a public for his plays.

This comment is justified in the sense that, though his plays were written without any concern for popular approval, he succeeded in arousing the interest of a large number of people in the experiments he was making in this field. The plays may be classified into eight groups, which may sometimes overlap; musical, verse, poetic symbolic, prose, comedies nature and dance drama.

Discussion

In the musical play *Valmiki Pratibha* (*The Genius of Valmiki*) Tagore tried to combine Indian classical music and the folk music of Bengal with western operatic music. The most significant dramatist of the pre-independence era who gained wide recognition as Indian dramatist after his plays were translated into English was

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Rabindranath Tagore. Nobody bothers to know if the lyrics were first composed in his mother tongue Bengali. In a similar way, his best known plays translated into English from Bengali; *Sacrifice, Chitra Muktdhara, The Post Office, The King of the Dark Chamber* and *Red Oleanders* are generally accepted as Indian plays in English. Tagore's contribution of lyrical excellence, over touches and allegorical significance to Indian drama enriched the genre.

A direct and more musical dramatization of denouncement of renunciation as done in *The Cycle of Spring* where Tagore places possession and renunciation as two extremes of life balanced only for the creativity in life. In the introduction to *The Cycle of Spring* we can find so many lovely lyrics, in this story we find how the king is greatly disturbed when the queen discovers two grey hairs behind his ear. He feels that this is the invitation of death. He feels aversion towards his royal duties and wants to renounce the world. So the king sent for pundit with his book of devotions with him called the Ocean of Renunciation, the pundit says there is a verse in my book of devotion which runs as follows:

Fortune, as field as lotus flower closes her favours when comes the hour. Oh, foolish man, how can you trust her, who comes of a sudden, and goes in a fluster. (TCOS 8)

The king was much impressed with the views of pundit about the teaching of renunciation; he forgets his duties towards his starving subject.

That fetters are binding, all are aware; but fetters of hope are strange. I declared. Hope's captive is tossed in the whirlpools' walk. And only grows still when the fetters break. (TCOS 59)

About money the pundit explains to the king that money is the cause of pain. He says.

He who gives gold,
gives only pain;
when a lakh, or crore, of gold is spent
grief only remains in the empty tent.
(TCOS 10)

How beautifully Tagore links these verses with the play, we can sees that his lyrical quality is so easy and convenient that anyone can understand the innermost feeling of the writer. Here is another example of his lyrical quality;

Kings coffers are well stored where wealth alone with is powered.
(TCOS 12)

According to Tagore, Pundit's views were inspiring and knowledgeable without any doubt but his way to find renunciation was totally different, negotiation to himself is not a true renunciation, but to fulfill his duties first that is an essential part of any human in this world. In this play the views of pundit about the renunciation was not good enough for anyone because he flatters the king and he advises him to sit in null and wait for the death without performing his duties towards the starving subject. At this time Shekhar, the poet comes and advises the king to perform his duties, in spite of detachment, for therein lies true renunciation. If physical youth is going to decline, then let it decline. It will be replaced by vigorous intellectual youth based upon mature wisdom and a spirit of detachment. He was the lover of humanity in true sense, he persuades the king to give up his desires for religious renunciation, he explain the king about his grey hair that another queen of youth is about to come and she eagerly wants to put a garland of pure jasmines round his head to marry him. He further says to the king that our creator is like a painter and our mother nature is trying to rub out the greenery of youth and to paint everything white, on that white background. Nature will paint new colours. Just as the spirit of autumn festival is not the spirit of

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idleness and inactivity, in the same way, the festival of spring is to be celebrated not in idle enjoyment but in disinterested work and service.

Shekhar further says that those who have never put life in to the test, in all possible ways those always keep on crying by saying this;

Life is fleeting life is waning,
Life is like a dew drop on a lotus leaf. (TCOS 21)

In *The Cycle of Spring,* the lyrical notes of poet is trying to understand the true meaning of renunciation, he says whoever moves and journeys with this life movement dancing and playing on his flute as he goes, "he is the true renouncer, he has to fulfill his duties first" call, he exhorts the king to rise up and move.

He succeeds to inspire the king through his lyrical notes to understand the real meaning of renunciation, he says;

Come out; come out into the open world.
Come out into the highways of life
Come out ye youthful renounce. (TCOS 16)

Prakritir Pratisodh (Sanyasi) is well known among the earliest plays written by Tagore. Its importance lies in the fact that it illustrates the basic idea of the entire literary output of Tagore, it also has some lyrical notes, a sanyasi who has renounced the world to meditate in a cave:

In this dark cave I am alone merged in myself..... I sit chanting the incantation of nothingness..... I am free, I am the great salitary one. (Sanyasi 28)

First of all it is noticed that the Sanyasi outside the cave boldly declare...

I am Sanyasi. I have neither hatred nor attachment in my heart. I never claim you as mine; therefore, I can never discard you. (Sanyasi 28)

Another example of lyrical quality of Tagore in this play-

I think I must leave her now, and go. But coward, must you run away – run away from this tiny thing? These are Nature's Spiders webs; they have danger merely for moths and not for a Sanyasi like me.
(Sanyasi 28, 29)

This is the quality of Tagore that through his simple lyrical notes, he made it understandable the real meaning of life;

But what languor is this is creeping into my blood and drawing before my eyes a thin mist veil of all the rainbow colours? Is it Nature herself weaving her dreams round me, clouding my senses? (Sanyasi 29)

Here is another lovely example from Sanyasi –

The gold of the evening is melting in the heart of the blue sea. The forest, on the hillside, is drinking the last cup of the daylight. (Sanyasi 31)

In another play *The Dancing Girl's Worship,* there many lyrical notes that make the play let very interesting like *Srimati*, the place dancer says in a place –

Thy feet are the transforming fire
That will transmute my dross to gold.
Let all that is dark within me, burst into the flame,
And the veil of error be turn away. (TDGW 77)

Here is another beautiful lyrical note from this play. At a place she further says:

"What whishper come to me at dead of night?
I known not?
Was it waking, was it sleeping?
I know not

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I work at home, I wonder on the road,
But what voice is this that sings in my freest?
I know not. (The Dancing Girl's Worship, Act VII, 23)

Srimati further says:

In waves of rhythm surge's up a sea of peace,
on the bosom of which beauty is born.
All my senses, all my sorrow, are bringing their last sacrifice.
Same me not by refusing my offering.
My love of three overlous in the music of my gestures.

His *Mukthdhara* is a representation of the tragedy of modern life; science has placed today great power in the hands of man. But man has not been able to combine power with virtue. The result is that he has lost happiness and peace of mind. Here is an example.

I, who am a desert, stretch out my hand to you, a tiny blade of grass and cry; I am bare, I am weary; The flaming thirst of this desert licks up one fertile field after emotion, only to enlarge itself – it can never annex the life of the frailest of grassed. (Muktdhara 105)

Another beautiful lyrical note from this play-

Your dream that you make the world dance,
to the tune of your own desire,
Suddenly your eyes open, you see,
that things happen which you never wish? (Muktdhara 64)

Likewise *Muktdhara* also contain some beautiful lyrical notes:

Victory to the fearful flame,
That tears the heart of Darkness,
That burns to ashes things which are dead.
Victory to Him whose voice thunders forth Truth.
Whose right arm Smites the unrighteous.
Whose guidance leads mortals across death. (Muktdhara 66)

His *Malini* also have some lovely lyrical notes, the dominant idea of the play is that purify is the essence of religion and religious bigotry can lead only to missing and sad feeling. Malini and Kemankar is the main character of the play. Rabindranath Tagore in his poetic play Malini presents a story of love and hatred. The play deals with a conflict between love and hatred as well as Selfish way of thinking and broadmindedness. It is based on the concept that love in its absolute and pure form is all radiance, all pervading, and all compassionate. Here is an example from this play:

King I never bent my knees to any mortal in my life. I am a Brahmin. Your caste is lower than mine. Yet in all humility, I pray to you give me only one day's time. (Collected Poems & Plays 493)

When we see Malini for the time in the beginning of the play we find that under the influence of a new religion she is preparing to dedicate her life to a great ideal. It is this ideal which draws her into the outside world where she meets Supriya for the first time. When they meet each other in the palace garden Supriya speaks to her in a spirit of self surrender:

I have left all arguments and books behind me. Lead me,
princess, and I shall follow you,
as the shadow follows the hamp.(Collected Poems and Plays 493-494)

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The king understands the secret of his daughter's heart and truly express it when he days:

> I feel I have found back, my child
> once again not the bright star of the
> sky, but the sweet flower that blossoms on earthly soil.
> She is my daughter, the darling of my heart.
> (Collected Poems and Plays 493-494)

Here Sanyansi sees that the appearance of the ragged girl reminds him of Radhu's daughter and Nature at last has had her revenge upon him. His transformation is now complete. He realizes his folly and cries out at the beginning of the last scene:

> Let my vows of Sanyasi go, I break my staff and my alms-bows. This Stately ship this world, which is crossing the sea of time – let it take me up again, let me join once more the pilgrims. (Sanyasi 30)

His play *Sacrifice* is also filled with lyrical quality, which enchants the viewer. King Govinda of Tipper is moved by the tears of Aparna, the beggan girl whose pet goat has been sacrificed before the image of Goddess Kali in the temple. He realizes the cruel stupidity behind this old age convention and forbids animal sacrifice in the temple. Raghupati is a priest in the temple of Goddess Kali stands against the king who has dared to prohibit animal sacrifice in the temple. Here is an example:

> To kill is but to kill it is neither sin nor anything else. Do you not know that the dust of this earth is made of countless killings? Old time is ever writing the chronically of transient life of creatures in letters of blood.
> (Collected Poems and Plays 517-518)

Jay Singh says:

> Is, then love a falsehood and mercy a mockery,
> and the one thing true, from beginning of time
> the lust for destruction....?
> The mother, who is thirsting for our, love,
> you accuse of blood thirstiness. (Collected Poems and Plays 517-518)

Aparna addresses the Goddess thus:

> Art thou so irredeemably false, that not even my love can send the slightest tremor of life through thy nothingness? O fool, for whom have you upturned your cup of life, emplying it to the last drop? – for this unanswering viod – truth less, merciless, and motherless.
> (Collected Poems and Plays 525)

Rabindranath Tagore creates his lyrical notes with simplicity that anyone can understand the theme and concept, here is an example from *Sacrifice*.

> My ancestors have sat upon thrones, and there are rules of men in my mother's line. I have kingly blood in my veins. Take it and quick thy thirst for ever.
> (Collect Poems and Plays 527)

The King of the Dark Chamber is a remarkable achievement of Rabindranath Tagore in the domain of symbolist art. The king stands for God or the universal soul and the Dark chamber represents the universal soul and inner consciousness of man. Queen Sudarshna stands

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for the human soul. Here are some lyrical examples of Tagore's work.

> I see that the darkness of the infinite heavens, whirled into life and being by the power of my love, has drawn the light of a mind stars into itself, and incarnated itself in a form of flesh and blood. (First edition, reprinted 1943, 52)
>
> Another beautiful examples from same play,
>
> In my own heart you are no longer the daily individual, which you think you are.....you are verily my second self.
>
> At a place queen Sudarshna descirbes the terrible features of the king as he looked in the blaze for the fire.
>
> You looked like the awful night when a comet swings fearfully into our ken oh, then I closed my eyes – I could not look on you anymore. Black as the threatening storm – cloud, black as the shoreless sea with the spectral red tint of twilight on its tumultuous waves. **(**First edition, reprinted 1943, 110**)**

At last Tagore's plays has lyrical qualities in his best way with the touch of lyricism. Tagore's plays have a vast and sublime range of poignant emotion, and in some of them he reveals the teeming storm of life with a new orientation. Through lyrical notes he express his own emotions, Love, Wrath, Sorrow, Joy and Chivalry – all human emotions find their place in his plays, and the delicate and sure touch with which they are conveyed by the music and the dancing is revelation of art at its highest.

Tagore wrote probably the largest number of lyrics ever attempted by any poet. In an introduction to *Gitanjali*, W.B. Yeats affirmed this; "These lyrics display in their thought a world I have dreamed all my life. The work of a supreme culture"

Conclusion

At last summing up with the beautiful lyrical note from *The Cycle of Spring* with which the play ends:

> Come and rejoice
> For April is awake.
> Flying yourselves into the flood of being
> Bursting the bondage of the past,
> Spiral is awake.
> Life is shoreless sea
> is heaving the sun before you.
> All the losses are lost,
> And death is drawned in its waves
> Plaunge into the deep without fear
> With the gladness of Aprail in your heart. (TCOS 121)

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