

MOBILES - an exploration

SPECIAL PROJECT

BY

PARUL PRADHAN

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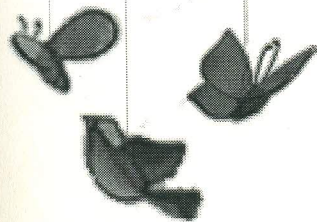
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GUIDE: VANMALA JAIN



APPROVAL SHEET

The Industrial Design Special Project titled

'MOBILES' - AN EXPLORATION

by

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is approved for the partial fulfillment of the requirements for the
postgraduate degree

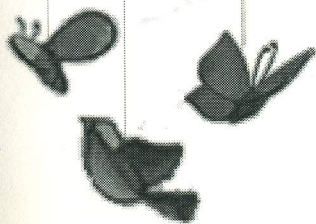
of

Master of Design
in
Industrial Design.

Guide Vannala Jain

Chairperson _____

Examiner M. Khosla

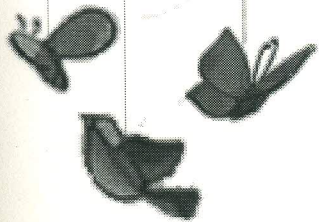


ACKNOWLEDGMENTS

I would like to thank Prof. Vanmala Jain for giving me this opportunity to experience this wonderful world of ceramic and so of mobiles. Without her involvement and encouragement this project could have never been able to reach the stage it has come.

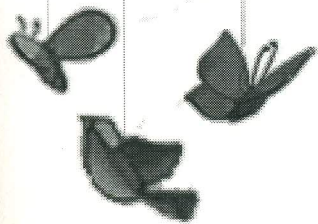
Never the less, guidance and help imparted to me by Mr. Patil, from the beginning of the project to the end, was another inspiring factor which kept my interest alive through out the project.

Last but not the least my heartfelt thanks to Sreejith and Priti for their constant emotional support. Also my family members and others friends and colleagues for their support.



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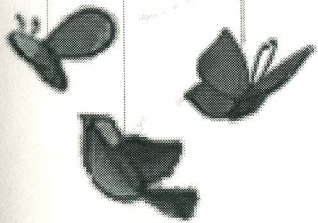
1. ABSTRACT

The project is a part of ongoing experimentation by Prof. Vanmala Jain. It is an attempt to fill up the gap in the field of mobiles where mobiles made of all other materials have already come a long way, but that of ceramics are yet emerging.

The project was carried on simultaneously in two separate channels: product and material as in Mobiles and Ceramics. The former dealt with study of concept of Mobiles in western as well as in Indian context, existing stage of the field chosen, various types of mobiles etc. to understand the structure of mobiles as a product. The later dealt with understanding of material by some experimentation and explorations. This was done to know the boundary of the project so that the scope of the project could then be defined.

The field being too vast to be covered in the available time it was decided to limit the material, process and basic form, so that this could be explored in detail. Since this was the first experience with the material the exploration gave a chance to learn the process from the basic level to the details and complexities of model making, mould making, casting, cutting, finishing, biscuiting, glazing and firing. Various concepts were developed and tried at different levels, some of them were developed further, as the experience in the material increased, depending on the complexities of the process and limitations of the material. The pieces made were then tried out to make mobiles as per the concepts developed and installed in the place of their emergence.

The project at each step was full of surprises and lots of information which helped in keeping the interest alive from the beginning to the end. This being an exploration project is supposed to be left open ended so that it could be then carried on further in future by others.



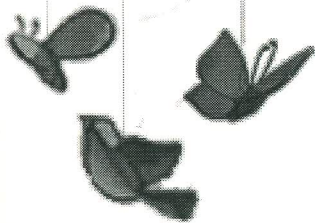
2. INTRODUCTION

"When everything goes right, a mobile is a piece of poetry that dances with the joy of life and surprises." - Alexander Calder, early 1930's

Ceramics industry has been largely branched onto the field of pottery and sculpture. There are small figurines and icon that are very prominent. But a void can be evidently felt for niche created in the market due to absence of ceramics mobiles.

This absence of mobiles may be because of the general perception about its being heavy, ability to hang, and balance. So this project was taken up to understand the material and to make its contribution for mobile sculpture.

Ceramics has always been associated with our lives in various ways. Using it for daily practices has become an activity which generally goes unnoticed. Making it a part of sculpture which would command back its lost attention by attracting eyes from all around, was the selfless aim of the project. Specially when its importance and popularity is increasing day by day through Feng Shui, etc.



3. PREMISES

NEED:

Due to personal fascination with the material and enthusiasm to explore the material in an interesting fashion not in the conventional pottery and sculptures. This project gave an opportunity to convert the imagination to live.

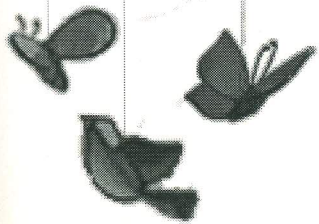
After investing the market and surveying the existing mobiles it became evident that the place of ceramics is still vacant and the gap needs to be filled sooner or later.

SCOPE:

The scope of the project was limited to understanding the structure of mobiles and ceramic as a material with its implications on 'mobiles'. The resources being limited it was decided to design and try out the pieces as samples to visual the designed products. Being an exploration project it is left open ended where lots of new and potential areas have been identified to carry on the explorations further.

LIMITATIONS:

The project boundary id decided according to the time and resources available. Since it is carried out in IDC premises only so best use of available resources was made which on one hand helped in deciding the channel of exploration but on the other hand restricted from exploring options like china clay, porcelain due non availability of high temperature kilns.



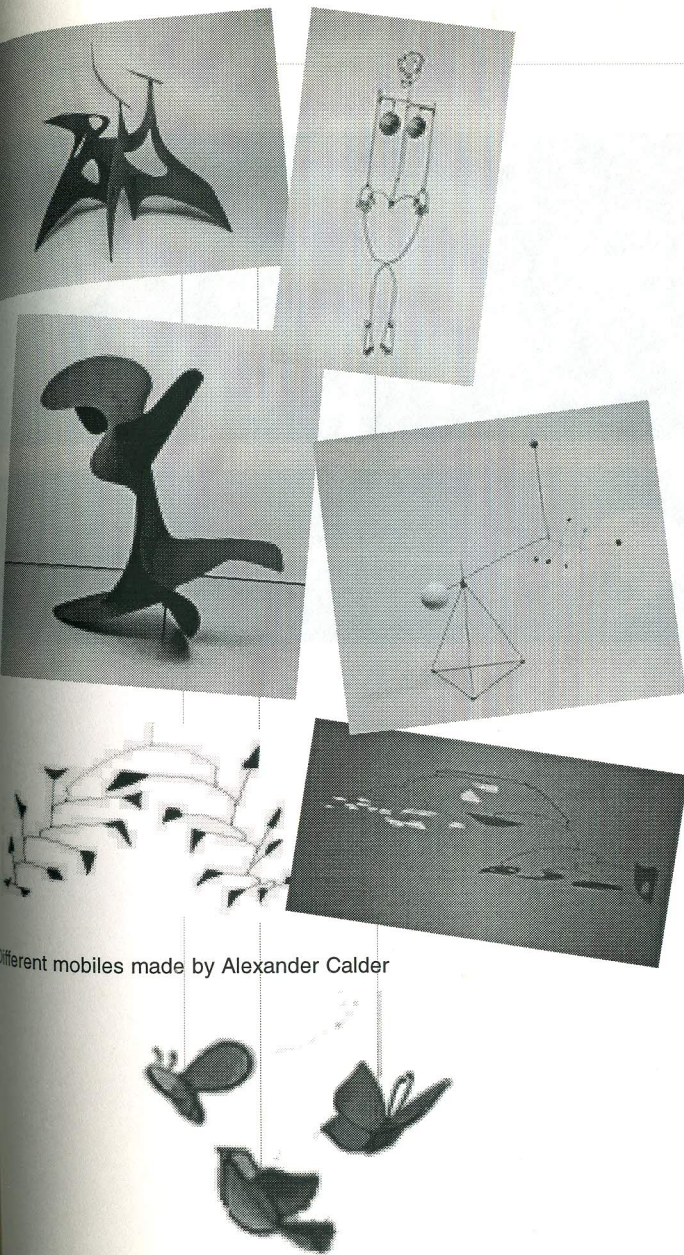
4. WHAT ARE 'MOBILES' ?

A mobile is a hanging sculpture of moving parts that twist and sway in the breeze. Mobiles are very light, skeletal constructions, often made of wires and plates that seem to float in space. They are thought of as abstract sculpture, but this is only because it is very, hard to make one that actually looks like something.

The concept of 'mobiles' can be replicated in terms of its dynamism form being just physical to visual also. Mobiles have been used in various places under varied circumstances and for different purposes. Different sculptors, Designers, and other associated people have been using mobiles as a part of their creations in places like exhibitions, interior decorations, installations etc.

A LITTLE HISTORY

Mobiles are most famously associated with Alexander Calder, third in a family line of sculptors, who began experimenting with hanging wire constructions in the late 1920's. Credit for the invention may actually be due to Naum Gabo, the Russian constructivist artist who made articulated hanging constructions earlier in the decade. Gabo was exploring a new idea in art: Sculptures that continually change their appearance, but are constant in what they represent. It is Calder who fully developed the idea of a mobile as a kinetic assemblage that sculpts space. Calder's early kinetic sculptures were abstract motorized constructions, plays on mechanical models of the solar system whose planets and moons would carve circles and cycloids out of space as they whirled about each other. To these Marcel Duchamp gave the name "mobiles" in 1931. Soon after, Calder abandoned motors and began exploring wind-powered mobiles, building very delicate wire sculptures tipped with metal sails to catch the breeze.



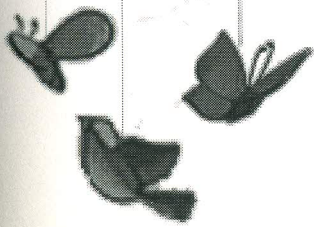
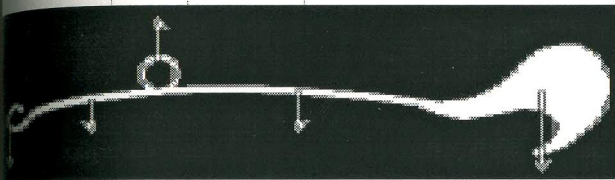
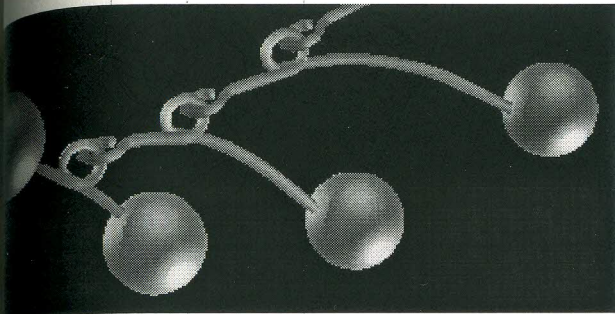
different mobiles made by Alexander Calder

5. MOBILE MECHANICS

Mechanically, a mobile is a cascade of levers. Each lever is suspended from above, and has masses or other levers suspended from its ends.

As shown in the image, each lever is formed of a single piece of metal bent into a loop and hook at exactly the right place for balance. The fulcrum (loop) is located so that it balances the counterweight, the weight of the wire, and the weight of the sub-mobile that hangs from the hook.

The hook-and-loop construction makes the mobile behave like a spring when it twists. When a loop twists in its hook, it climbs up the sides, converting the mobile's kinetic energy into potential energy as it hoists itself up. Some cleverly designed mobiles use this to control how energetically parts move relative to each other. The hook-and-loop construction also moves the fulcrum above the rest of the wire, which makes it possible to balance the lever at a skewed angle. (This is why rod-and-string mobiles are always horizontal and dull.) Hook-and-loop looks interesting, but it is often hard to get the balances right.



6. MOBILE CONSTRUCTION

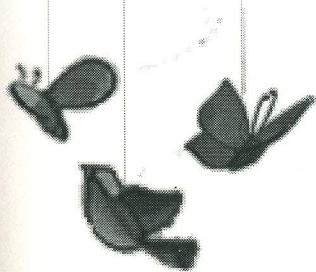
Mobiles are a difficult medium. It can be quite hard to make a mobile look "as intended." Where the masses will float in space, how long the wires are, and where the fulcrums wind up are largely dictated by the mechanics of balance. This is probably why nearly all mobiles are abstract and not representational.

INSIDE-OUT CONSTRUCTION

Even Calder meant to make one thing and wound up making another. His mobiles were built from the inside out, first looping and hooking a wire, then looking for a spot along its length where a weight would balance. It is purely an trial and error method. Calder even built two or three models of the same mobile, trying to find a set of balance points that would allow him to place the weights exactly where he wanted them to float in space.

OUTSIDE-IN CONSTRUCTION

Alternatively, a mobile can be built from the outside in: Choose where the weights will float, sketch wires, estimate balance points, and repeatedly revise the wires until they pass through their balance points. Because the wires have mass, revisions change the balance points, making outside-in method rather painstaking. However, because it allows much more control over the what the mobile will actually look like, it opens the door to a realm of much more expressive and representational kinetic sculptures.



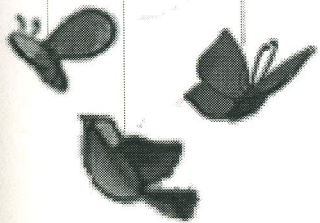
BASIC STRUCTURE

THE SECRET: START FROM THE BOTTOM AND WORK TO THE TOP. There are many ways to design a work of hanging sculpture, and as many materials, but the assembly is always the same: start from the bottom.

1. SELECT & ARRANGE THE PIECES: Find, create the shapes you wish. Lay them on a large piece of paper. Draw lines connecting the bottom or end pieces.

2. BEGIN WIRING THE PIECES: Starting with the small end pieces first, then connecting the middle size systems together.

3. CONNECT THE TOP: The top bar is last. Connect the middle systems to the top bar, balance, and hang up your new creation.



7. DIFFERENT TYPES OF MOBILES

Mobiles can be categorized differently depending on:

A) Made of different materials:

- simple materials like paper, card board, tissue paper.
- large materials like wood, metals, plastics.
- Unusual material like drinking straw, dry branches or leaves or flowers, match sticks, waste cutouts of any materials.
- Soft materials like fabric, strings, foam.
- Also combination of the above described material.

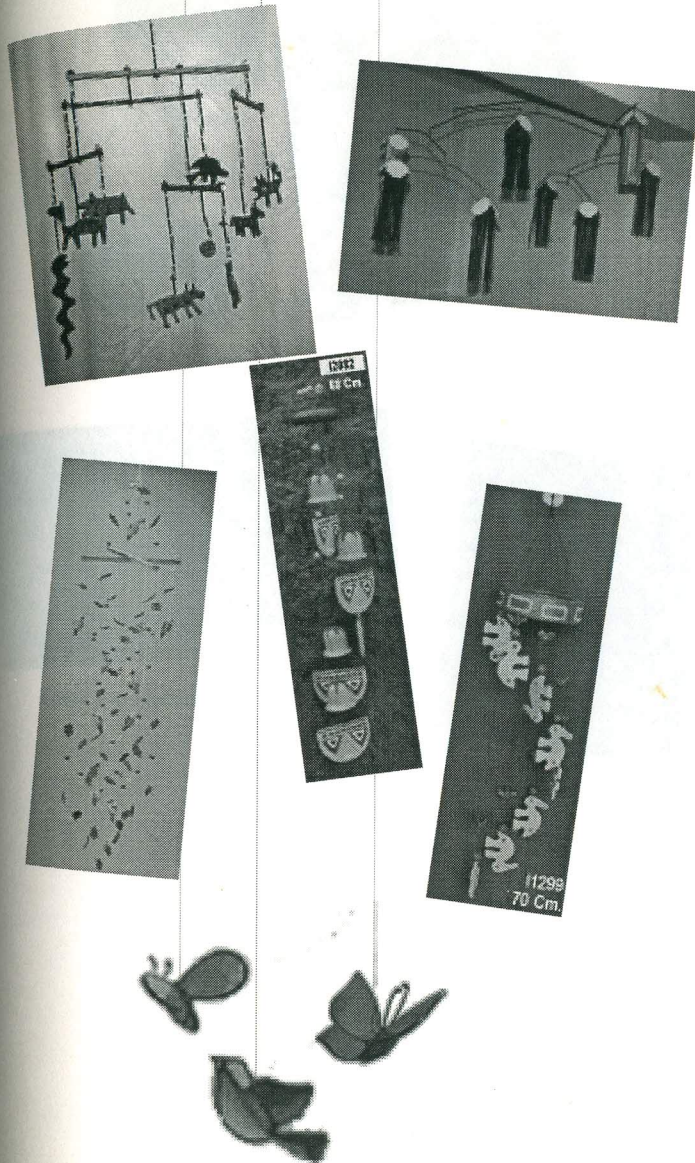
As such there is no restriction on the kind of material used but the main consideration being its weight so that it is able to move freely with air currents.

B) Area or purpose specific:

- Mobiles can be made to hang outdoors.
- To hang Indoors as a part of interior decoration of offices, homes etc.
- Place specific mobiles as in for industries, museums, exhibitions etc.

C) Suspension system of the mobiles:

- can be hung as a single piece
- two pieces hung from single point
- typical structure in form of branches where suspension is at one level on one hand and next suspension system on the other hand.
- The above can be hung individually or as a part of a series where each piece is a part of whole composition.



8. OTHER SIMILAR SCULPTURES

STABLES:

Static sculptures that suggest volume in multiple flat planes, as well as standing mobiles, in which a mobile is balanced on top of a stabile. Developed by Alexander Cadler.

KINETIC SCULPTURES:

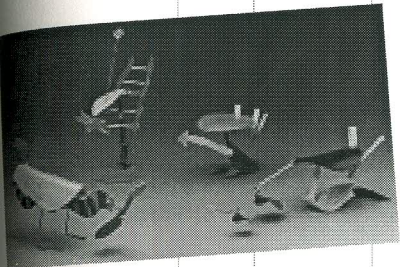
Basically kinetic compositions may be big or small. Include wind sculptures, moving fountains, motorized wall reliefs. One of the major contributors was George Baker who developed various sculptures from table top sculptures moved by hand, through large wind pieces integrated into the landscape, using nature as a drive force. He even developed an extensive array of fountain sculptures, from the intimate to the monumental. Gently moving wall sculptures, and freestanding works animated by an imperceptible electric motor.

HANGINGS AND DECORATIONS:

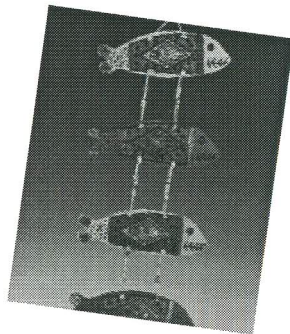
Exists in Indian Culture in various forms like puppets, *bale totas*, (fabric stuffed bird forms made in Rajasthan and Gujrat), beaded suspended partitions decorations, etc. The concept of hangings and decoration is used in contemporary forms like point of purchase advertising for various products.



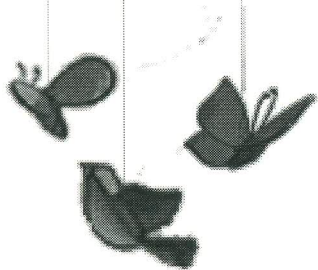
Kinetic Sculptures



Desk top stables



Hangings and decorations



9. MOBILES IN INDIAN CONTEXT

Looking in our own homes it can be said that the concept of 'mobiles' has been existing in Indian Culture long before it was formally articulated as an invention of Calder. Like most of the advanced toys in the world, mobiles would have also originated in India., though no conclusive evidence is available.

In Kerala, a fan shaped toy with coconut leaves folded in the shape of a swastika has been the cheapest and the most popular toy. This is called the "kattaadi". "Kaattu" meaning "breeze" and "aadi" meaning "moving". This when put in the way of a breeze would rotate as does a windmill.

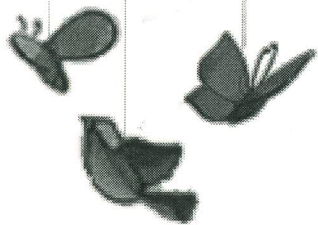
In Western India, especially Rajasthan and Gujarat, puppets made of bright colored cloth, laced with gold ribbons and hung from strings can be found. These puppets, light in weight and hung from strings may have been our ancestors' quest for "mobiles". These are usually found used as curtains in homes.

In the times of the kings and kingdoms, religious and stately processions were dotted with the presence of "umbrella-like" accessory which consisted of basically the skeleton of the umbrella with ornamental objects hanging from them. These objects were usually bright in color or in gold and when rotated in the hands of the accompanists added the "mobility" in the air.

Mobiles in the form of bells, lamps and chandeliers are found in temples from ancient times. These added the elements of ever-changing sound and light to the ambience of the temple. The lamps were usually made of clay, brass or bronze. Not only for decorations as hangings, it has been used as an utility item for storages, where various stories, specially those of Lord Krishna, are evidences of its association with our daily lives.

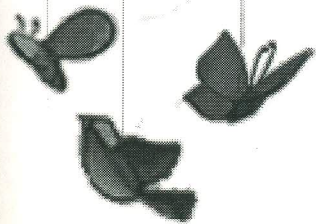
Cradles are never complete in India without a tinkling mobile above the baby's head. This has proven medical benefits also as opposed to the common notion that it is just for the entertainment of the child. The mobile above the child's head invites him for an interaction with his new world and hence activates his limbs.

Dates



Thus it can be said that mobiles , in some form, has been a part of our lives be it religious, decorative or utility etc.

Hanging sculptures that adorn large museums are also found in India. But those are modern elements of Interior Design and hence may be concepts borrowed from the west.



10. CERAMIC MOBILES

Mobiles have been exploited in various directions as in purpose, place, form, dynamism etc. The various materials from which it is made, changes the statement of the final suspended product.

The use of ceramic as a material in field of mobiles to give a new direction to explore the field of mobiles. The general perception of fragility and heaviness attached with the material has restricted its use in hanging sculpture to only singly hung elements like bells. It is difficult to accept the fact that ceramics can be used to make light and freely suspended balanced structures. Besides this the clinging sound produced by the ceramic mobiles adds priceless value to the product.

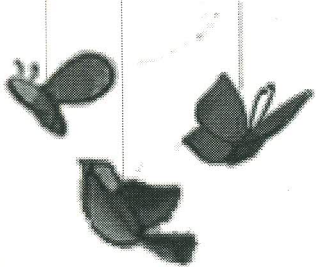
Depending on the nature of the body and glaze, all clayey bodies can be divided in 5 groups:

1) Terra Cotta: means Baked Clay where all ware have a porous body and no glaze. Fired at comparatively low temperature it is commonly available as village pottery. Vitrifies at $900 \pm 50 \text{ deg C}$

2) Earthen Ware: All permeable pottery made of white or colored clay with a coating of glaze on them. Said to be the oldest form of pottery as old as 5000 BC. Vitrifies at $1000 \pm 50 \text{ deg C}$.

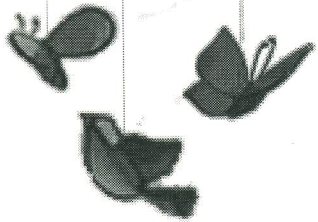
3) Stoneware: Vitrified and opaque pottery either made of white burning or colored clay with salt glaze. Developed in Germany around 14 AD. Vitrifies at $150 \pm 50 \text{ deg C}$.

4) Porcelain: Developed by Chinese around 200 B.C. White impermeable glazed clay wares, translucent when thin. Always made of pure white china clay where body is vitrified at a very high temperature. Vitrifies at $1300 \pm 50 \text{ deg C}$.



5) Refractories: Bodies made of either fire clays or other high heat resitting materials. These are always unglazed bodies fired at very high temperature and remain porous. Used for construction of furnaces, melting of metals, glass etc. Vitrifies at 1400+ - 50 degC.

Except the refractories rest all of them can be used to explore mobiles.



II. EXPLORATION

My first experience with mobile started much before registering for the project. As a result of personal enthusiasm various paper and other small models, which were made as parts of other projects, were hung as single elements from the ceiling. Glimpses can be seen in the images attached. With the movement of fan interesting movement was created specially a dance of shadows was experienced at different times of the day. This formed the basis for understanding the principle of mobiles and encouraged to do the project.

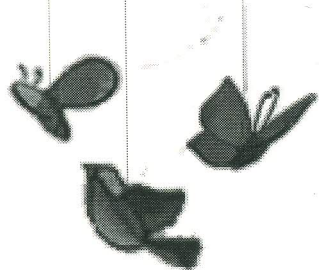
'Mobiles' can be exploited in various directions:

- number of elements hung suspended in each mobile,
- structure in which they are hung,
- connecting material and its relation to the mobile
- relation of mobile to the space around.
- various viewing points, angles and levels.
- different materials used in each mobile
- combination of materials used and planned and random

shapes.

After looking at various possibilities of directions for carrying out the exploration it was decided to freeze on material, process and form. This helped in directing the exploration on a planned track and exploit the chosen form to the details. Thus the exploration was carried out in two main directions

- 1) possibilities in structure of mobiles,
- 2) forms and shapes developed from the basic form of cylinders.



MATERIAL

The material freezed was earthen ware and other options of stone ware, china clay, porcelain etc were kept aside due to limited available resources.

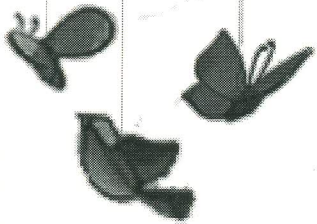
Basic ingredients for earthen ware body:

- felspar 16%
- quartz 14%
- china clay 29%
- ball clay 41%

China clay gives whiteness whereas ball clay gives necessary plasticity helping in great production and cheap products. Quartz give whiteness and hardness while felspar serves as a flux. The above mentioned materials are ground uniformly in measured quantities with water in Ball Mill for minimum 72 hrs. These compositions keep changing as per place, artist, process of mixing etc. Vitrification or Maturing temperature 1020° C

Shrinkage Calculation:

$$(\text{original length} - \text{shrinkage length}) \times 100 / \text{original length} = \text{shrinkage \%}$$

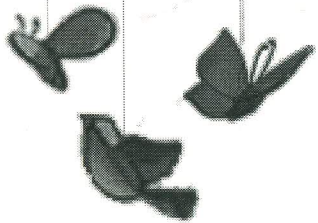


PROCESS

The process freezed was of 'slip casting'. The starts from making a model of the required form, mould making, casting, releasing the cast. The process is followed for complicated shapes but in order to fasten the production process even simple shapes can be made by this method instead of trying for throwing on wheel. The process can be briefly described as follows:

- Model of requires form is made in POP. The model made should be based after giving the allowances for shrinkages of the cast. The model in this case was made on plaster wheel.
- This model is know used for making moulds of POP. Any mould has 2 pieces base and body. Body can be either single piece or again 2 to 3 pieces depending on the complexity of the form being developed. In this case 5 molds were made to achieve a level of perfection in mould making and different techniques of mold making were tried.
- the mold made is set at place and joints are sealed with the help of clay keeping the inner surface clean.
- The slip is then poured from the opening. The level of the slip poured is to maintained above the brim.
- Depending on the required thickness the slip is kept inside the mould and then poured out. The slip that touches the mould adheres to the mould which forms the cast. In this case the slip was left in the mold for about 10 to 12 min.
- the brim is then cleaned to achieve a finished edge of the cast.
- Cast automatically releases itself from the mould due to absorption by the mold walls.
- Cast is then stored away till it reaches the leather hard stage.

Each stage deals with a great deal of detail understanding and practise thereby resulting in a trained professional.



Some Common faults in slip casting are:

1) Pinholing: Small holes just beneath the surface on the mould side of the article. Caused due to low fluidity and can be remediable by increase in water content.

2) Wreathing: Small uneven ridges on the slip side of the article. Caused by low plasticity and can be increased by decreasing alkali content.

3) Brittleness: Difficult to fettle or cut. Caused by low plasticity and can be corrected by decreasing alkali content.

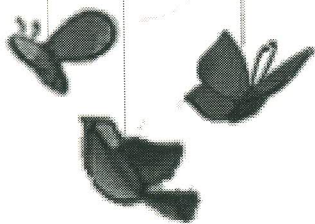
4) Casting spot: Discolored patch appearing on the mould side after firing. Caused due to low plasticity and can be corrected by decreasing alkali content.

5) Cracking: Small cracks where handles join the body of the article. Caused due to low plasticity and corrected by decreasing alkali content.

6) Flabbiness: Soft cast difficult to handle without distortion. Caused due to high plasticity and can be corrected by increasing alkali content.

7) Slow casting: Casting time too long. Caused due to high fluidity and low plasticity. Can be corrected by decreasing water or alkali content.

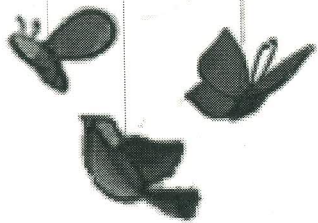
8) Bad draining: Slip failing to drain from narrow section. Caused due to low fluidity and high plasticity and can be corrected by increasing water or alkali.



FORM

Freezed form was 'cylinder', which was chosen to accommodate the property of clay to shrink inwards in round forms. Also that it will be possible to deform it easily in organic shapes to achieve new forms.

The hollow cylinder of outer diameter is 7cm and thickness of 3mm with height of 10cm was freezed on. This cylinder was then used as a base to make other shapes out of it like, rings, curves planes, deformed derivatives of cylinder etc... Thereby opening up a new directions to exploit the form and use it effectively in mobile form. The pieces made were then glazed to check the effect of colour on the pieces thereby adding a new dimension to the project.



12. AREAS OF EXPLORATIONS

The exploration was done keeping various concepts in mind which kept changing and developing as the project proceeded.

1) THEME BASED MOBILES

- These may be area specific or theme based where one scenario can be described by breaking it in small elements. Representation of each of these elements in form of cut pieces is done by hanging them in the desired sequence or hierarchy.

- These can be used for educational purpose along with decoration.

e.g. for children's room where half cylinders are used as single piece and cut outs of shape of kids in different activity are made. The cutouts are themselves hung with sperate string giving a look as if the kids have jumped out of their domains to play.

Similarly taking a theme of a story and picking out different characters of the story. These characters are then hung by links as a scenario or situation builder. The concept can be better understood in sketches.

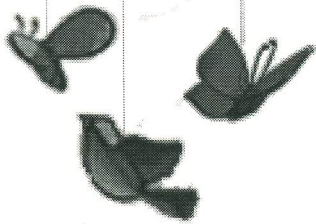
- The mobiles developed can be standardized and finally mass produced following industrial practices.

2) DESK TOP MOBILES

- Using small pieces in different random shapes in form of desk top mobiles which not only brings the view point closer but totally changes the scalae of mobile from hanging in free space from ceiling to a smaller environment.

- The links used to hang these pieces can form a design element in itself.

- These can also be a part of industrially produced products.



3) MODULAR

- The concept was to develop an ever growing structure which can involve the user in its construction giving him the freedom to design his own module.

- The package may have some abstract pieces and a few links. The pieces will be so designed to facilitate hanging in different orientations with the help of detachable links. Thus the structure of the mobile can keep changing giving new form every time.

- After the first few trials and the process limitation the shape of the pieces had to be restricted in scale and size as well but could be so designed such that depending on the orientation it is hung it would form a different metaphor.

- So each piece can be hung from two to three points and can be interconnected with other pieces by the links only.

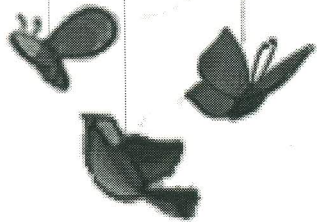
- The concept can be produced in large scale with industrial processes.

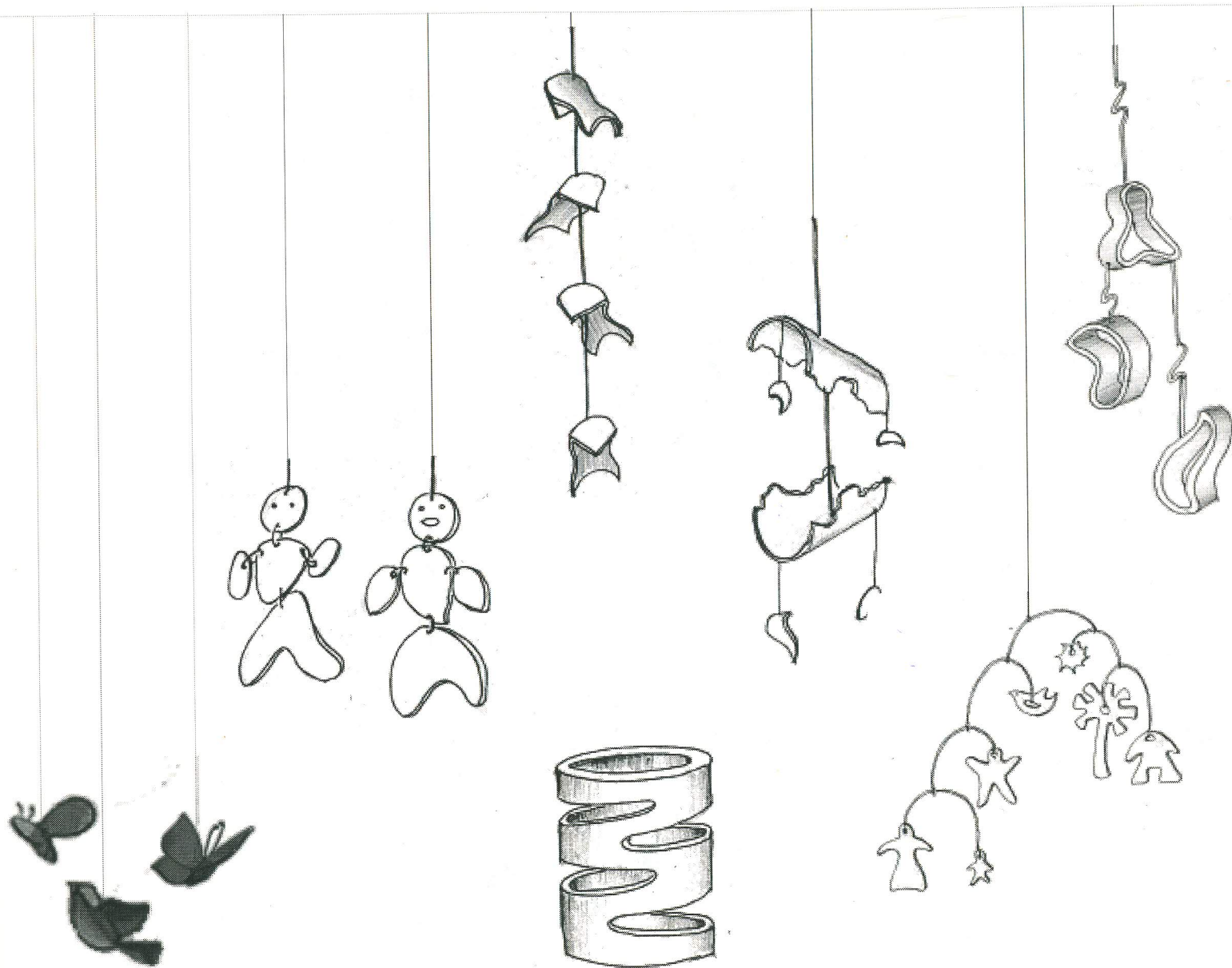
4) DEFORMED ORGANIC SHAPES

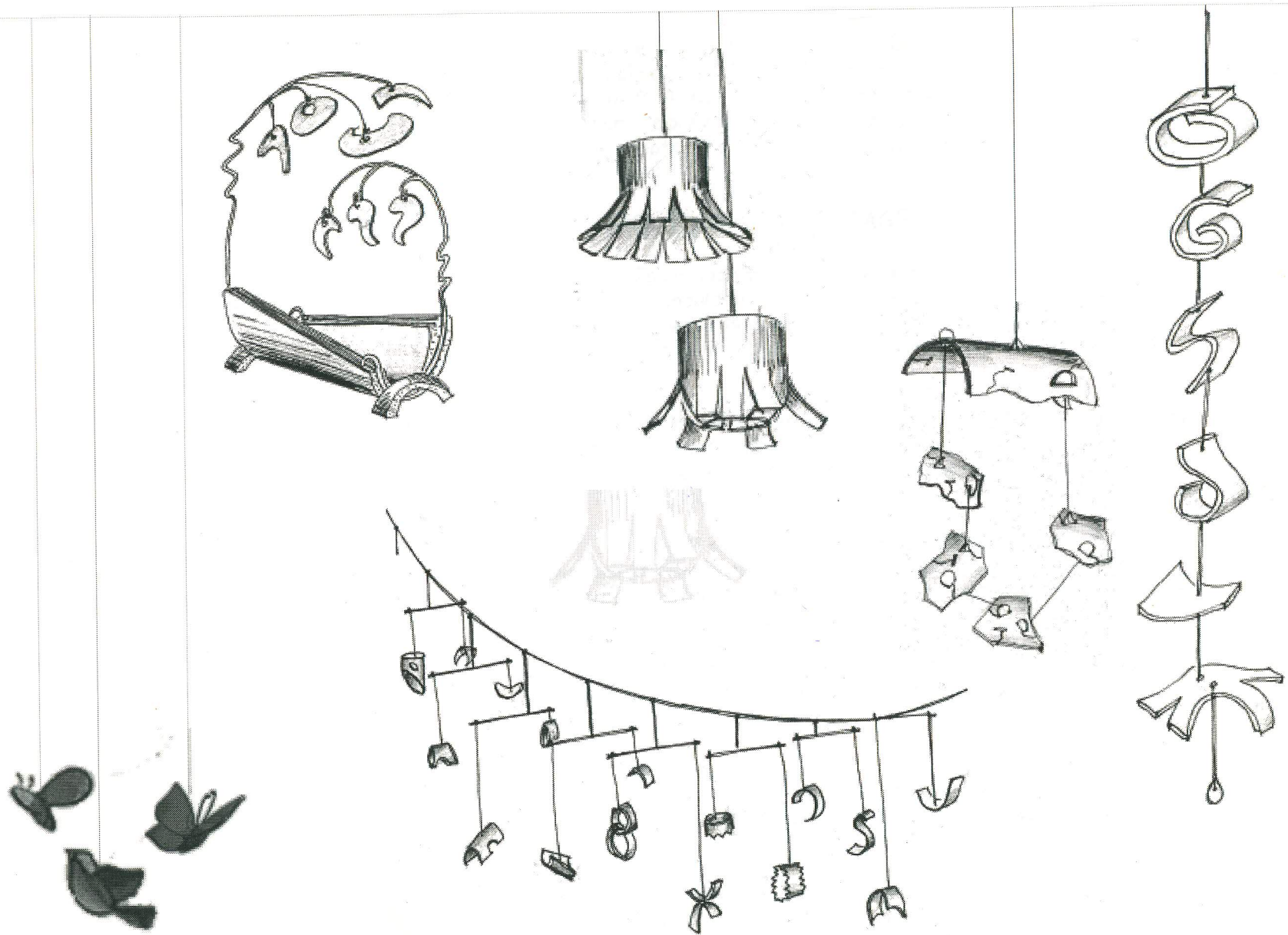
- After cutting the cylinders at various angles the shapes obtained can further be exploited by deforming them at green stage only.

- This gives a chance of bringing personal and artistic touch to each piece.

- These pieces combine both industrial as well as manual skill.







13. OBSERVATIONS:

Various observations have been made at various stages as the project proceeded which can be counted as important lessons from the project. As each stage was reached new observation were made based on the previous stage which helped in development of form and later concepts. The following description is purely of personal observations.

- AT MOULD MAKING STAGE:

- The mould forms the outer surface of the form so the model for it should be as per the outer dimensions of the form. In case of cylinders model was made for the outer diameter of the form keeping in mind that final cylinder will have around 3mm less inner radius.

- the model as well mould should have a plane surface as any error will become a repeated error, making the releasing a tedious and messy process. Textures should be a part of post casting process for easy release of the cast block.

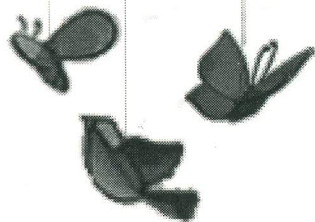
- Moulds should be of uniform thickness (approx. 3"). Unequal thickness will cause unequal absorption of water from cast thereby resulting in slow releasing of cast and even cracking of the cast pieces.

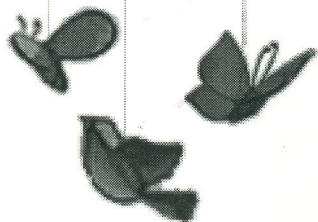
- Behavior of the mould changes as their age goes higher. Moulds require regular drying for fast releasing of cast and talc coating for longer life.

- AT CASTING STAGE:

- Care should be taken to cover all the leaks and openings in the mould parts.

- No other clay should be used in the inner surface of the mould, i.e. surface should be well cleaned before casting.





- After clay body has been poured in the mould, the level of clay keeps moving down due to absorption by the mould. So the level has to be maintained over the brim of the mould.

- After pouring out the clay body the mould should be left undisturbed till automatic release of the form. Any kind of disturbance would result in cracking of form in the green stage itself.

- Before pouring in the clay body the mould has to be set in position and well tightened by rubber bands.

- The cast form should not be left in the mould after it has reached the stage of releasing as it might result in crack development in the form.

- If the cast is taken out of the mould in its wet stage before it is released automatically, it might remain stuck to the mould walls thereby causing deformation of the form.

- This auto release can be taken as an indication for the right timing for releasing the cast from the mould.

- AT CUTTING STAGE:

- The rough idea of shape to be cut and position of hole from where it is to be suspended should be decided before starting the cutting as random shapes may not result in interesting forms. That is the orientation of the suspended item is to be decided at this stage.

- To cut out any patterns the cast shape should be in leather hard state. If cut when it is in green stage extra materials come out which is difficult to be surfaced and looks unfinished. If cut when it is dry the cast would start chipping, cracking and breaking.

- For deforming the shape the body needs to be in green stage.

- While cutting punch outs minimum gap between two openings should be around 1cm to avoid breaking of form and breaking when handling. In case of loops, opening of atleast 1 finger allowance should be made which makes it easier for cleaning.

- Drilling for holes is done at this stage only.

- The forms cut should also give consideration to the position it is to put while glazing.

- The cutouts produced can be reutilized to make different mobiles pieces.

- AT FINISHING STATE:

- After the cut shapes are fully dried.

- Cleaning the edges with wet sponge requires utmost care as slightest mis handling may result in breaking of forms.

- The sponge used should not have too much water as the clay might start oozing out.

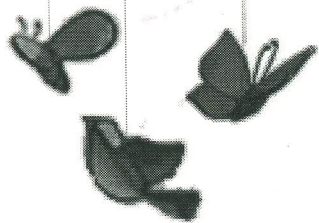
- all the sharp edges are removed by whipping it off with wet sponge.

- The cut pieces are to be held very carefully as while cleaning maximum pieces break.

- AT GLAZING STAGE:

- while applying the glaze the decision of colour and form is important

- While loading the furnace with glazed pieces care should be take as to no two pieces should touch each other.



- the way each piece is loaded has to be predecided as that portion has to be left unglazed.

- While applying glaze care should be taken that smooth application is maintained. Also thickness of layer should be min 1mm as while glazing thin layers gets absorbed leaving patchy glazed surfaces.

- The furnace should be set at 50 deg more than the vitrifying temperature. As in this case the vitrifying temperature being 1000 degC furnace should be set at 1050 degC.

ADVANTAGES:

1) ceramic being a versatile material offers innumerable possibility in terms of form, colour, texture, finishes etc.

2) It can be combined with certain different materials like paper, glass fibre, etc and gives surprising results.

3) Easily available and a bio degradable resource.

4) Remains unaltered under various weather conditions.

5) Can be made heavy as well as light weight depending on the requirement of sculpture.

6) Offers a flexibility of techniques in which it can be processed be it industrial or artistic.

7) Technically a simpler material to process as working radii need not be calculated.

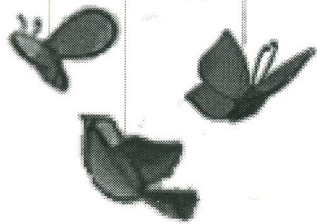
8) Produces a clinging sound when struck softly thereby adding value to the product.

9) No by products are produced as wastes since all waste produced can be softened and molded again.

LIMITATIONS:

1) Ceramics unlike other materials can't be mastered as it behaves differently under different circumstances which remain unpredictable.

2) The process depends on lot of natural material which can't be overcome artificially.



3) Clay has a tendency to shrink. Even after calculating the shrinkage percentages the final product need not be as designed.

4) Form designing is commanded by the process limitations and not every shape can be manufactured.

5) Even after firing and maturing of clay chances of breakages are always there.

6) The complete procedure requires immense patience and concentration at every stage.

RANDOM THOUGHTS

During the project it appeared as a good idea to arrange all the explorative pieces in form of installation of mobiles. Various places were suggested as the venue for the installation as a part of brain storming.

- IDC first floor lobby to the ceiling of staircase leading to the second floor.

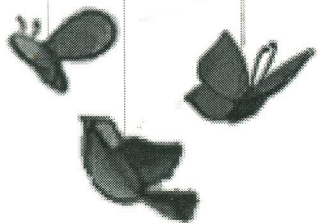
- Corridors opposite the studios.

- Tree opposite IDC as it is the junction for informal meeting by students. Also the mobiles would form an object of play for birds on the tree.

- Main Building atrium as the staircase surrounding it would give different viewing levels for the mobiles.

- IDC courtyard as even this gives different viewing levels and it would have been much safer with the back drop of trees and building.

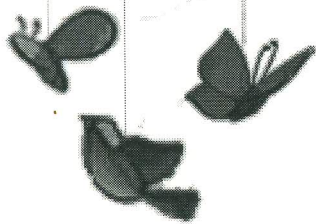
- Ceramics Studio as all other places required places specific mobiles and random exploration pieces would not have made any sense. Ceramic studio being the origin place for the mobiles would be the most appropriate place for installation.



14. DESIGN SCOPE

As the project preceded it was realized that each trial opened a new area which could be explored further in detail. Thus it became evident that ceramic mobiles have immense scope of design. If the project has to take further various directions suggested would be:

- Trying out ceramics in combination with other material like paper, plastics, glass fibre where advantages properties of each of these could be used to make amazing products.
- Developing different other shapes (cylinders) regular or irregular and composing them in the various scenarios.
- trying out different techniques other than slip casting, like throwing, hand modelling etc.
- Developing different product specific techniques to make the complicated shapes.



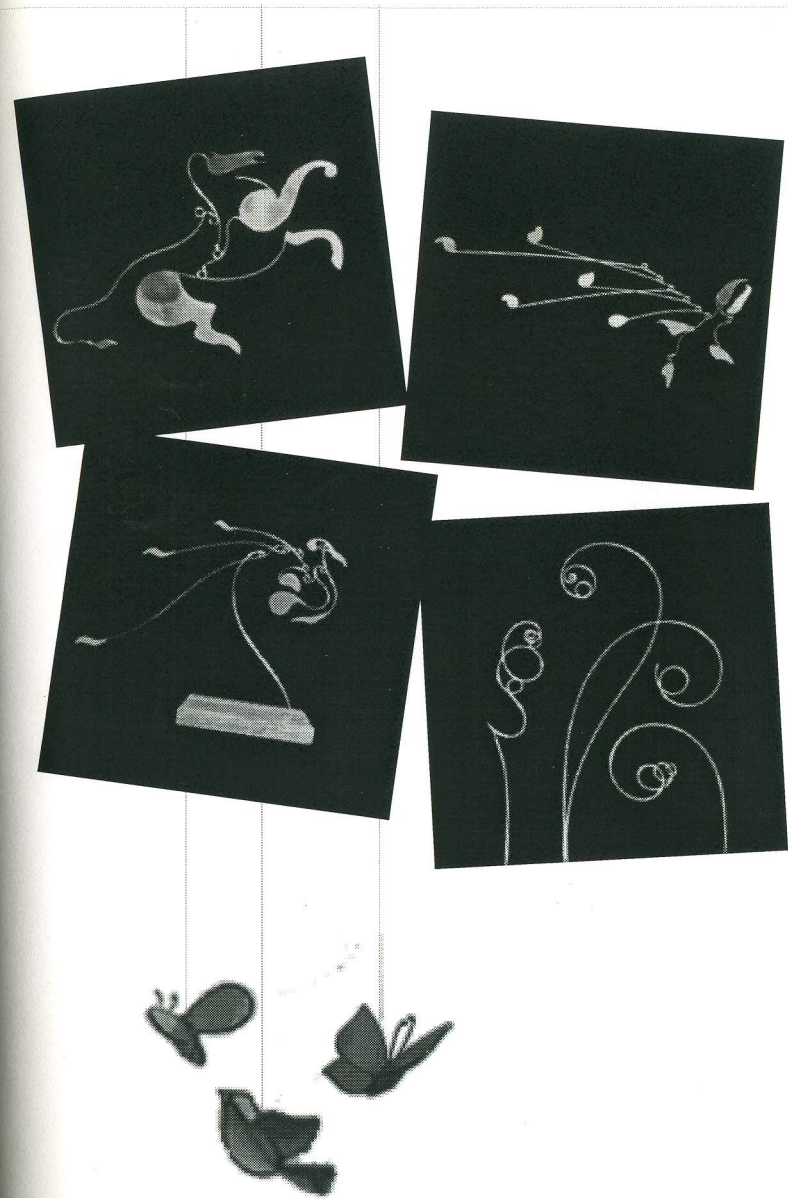
15. HOW FAR HAS MOBILE DESIGNING COME TODAY....?

Since the time mobiles have been invented it has been to make personal expressions by various sculptors or artists. Now certain 'artificial artists' have been created which helps in designing mobiles specifically kinetic sculptures. Mobiles as an art form have been developed mostly as abstract forms, perhaps because it was difficult to make representational mobiles, or there have been no innovations since Calder decided he wanted to sculpt space rather than form. New techniques make it possible to create kinetic sculptures that are essays on living forms and movements.

The artificial artist is a robot sculptor. It looks at animals and studies the drama in their bodies—centers of power, tension, and expressiveness. It describes what it sees by designing kinetic sculpture, taking artistic license to create artifacts that are both elegant and eloquent on their subjects.

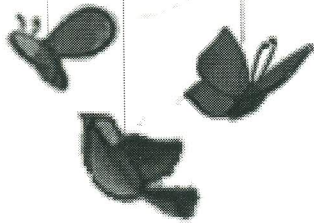
Efforts are being made to turn artificial artist into an interactive sculpture exhibit where the artistic process could be combined with designing a mobile together with the computer. As it creates a mobile, it is possible to push, bend, and mold the wires and masses as if they were clay. The computer makes sure that the resulting curves are attractive and that the mobile is perfectly balanced. The result blends the talents of human and machine.

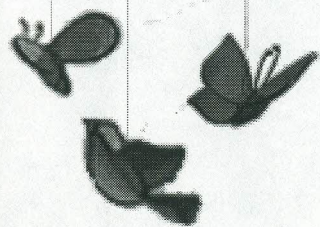
Ref. [Http://www.media.mit.edu/people/brand/artist.html](http://www.media.mit.edu/people/brand/artist.html)



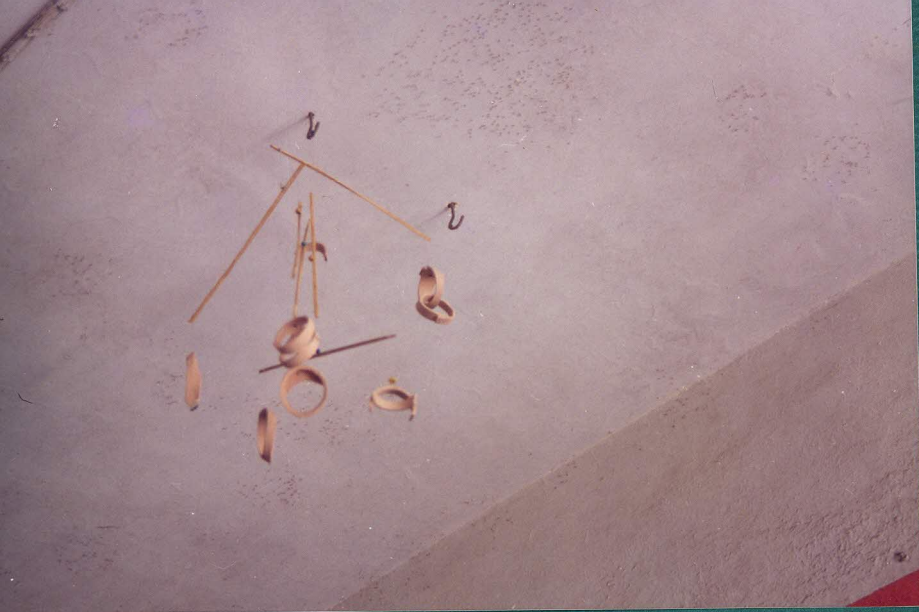
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- <http://calder.org>





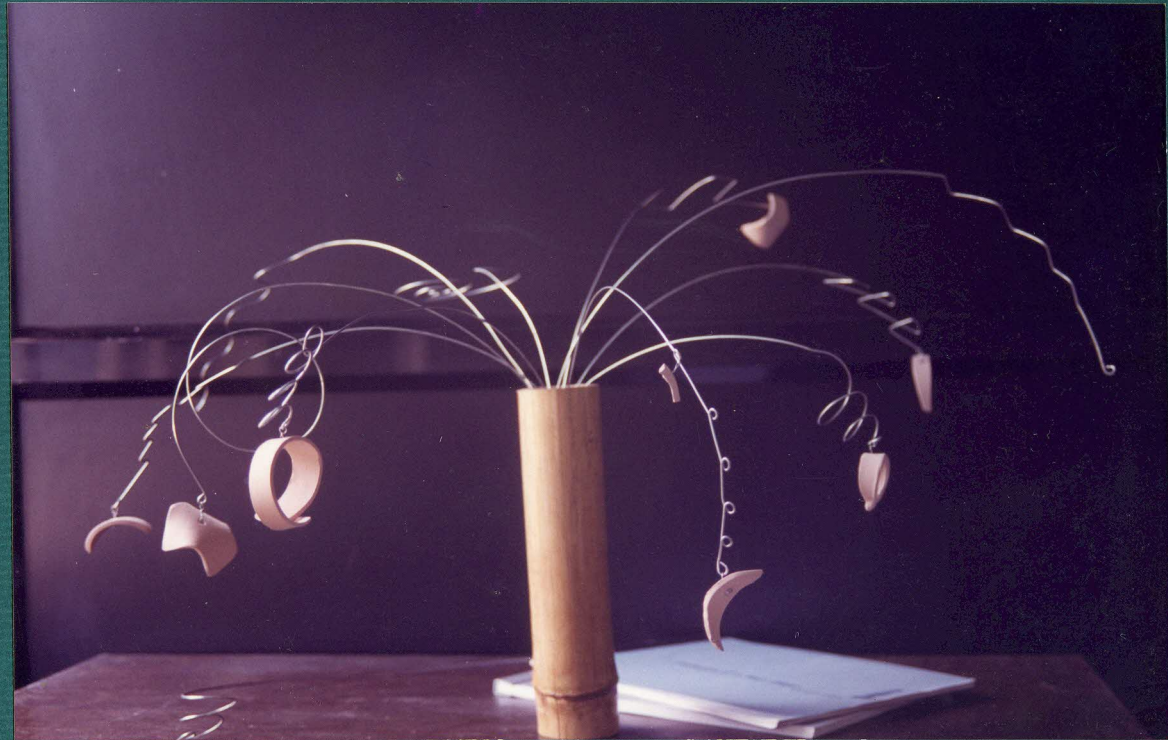
MSR(99-01 Batch)
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IDC, IIT Bombay.
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▼ DESKTOP MOBILE

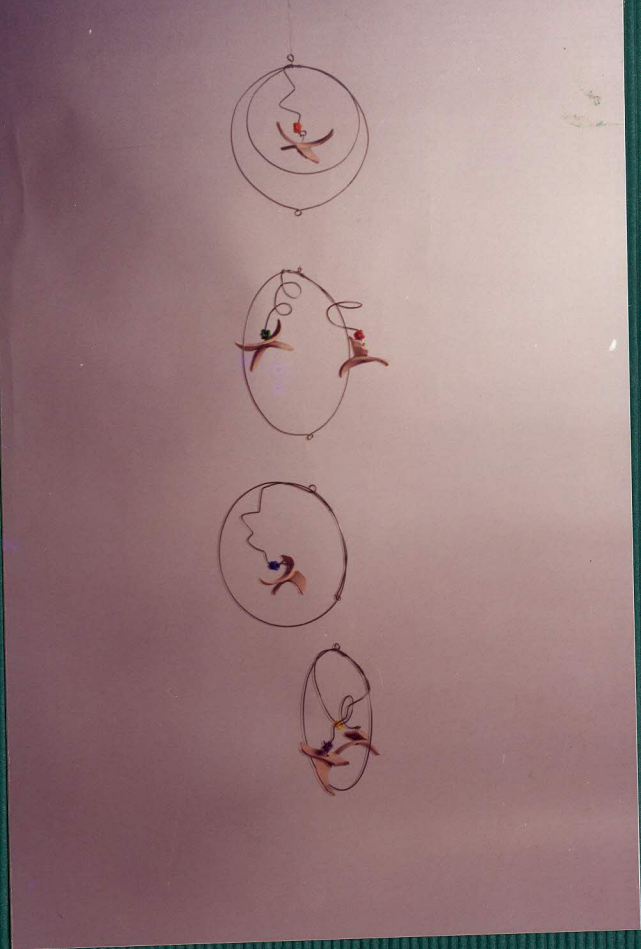
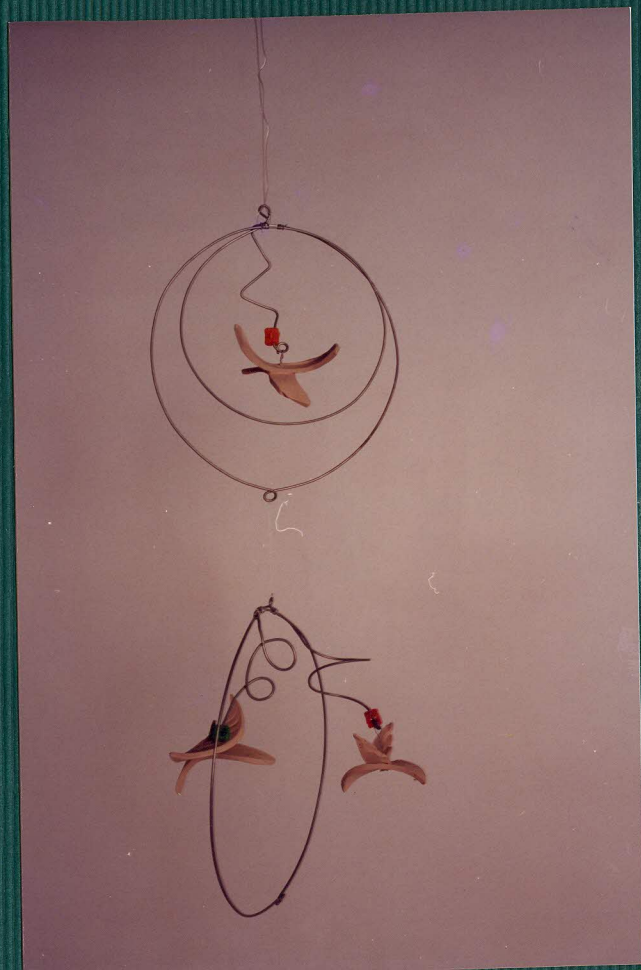
Visual dynamism through path drawn by wire and physical dynamism by springing ceramic elements at end of each path.

CEILING MOBILE
Interplay of bamboo sticks
and ceramic rings.



• SWINGING BIRDS

Movement of ceramic birds is depicted by bonding wire.





* THEME BASED. MOBILE

Mobile for children's room
showing children jumped out
of their cast to dance.



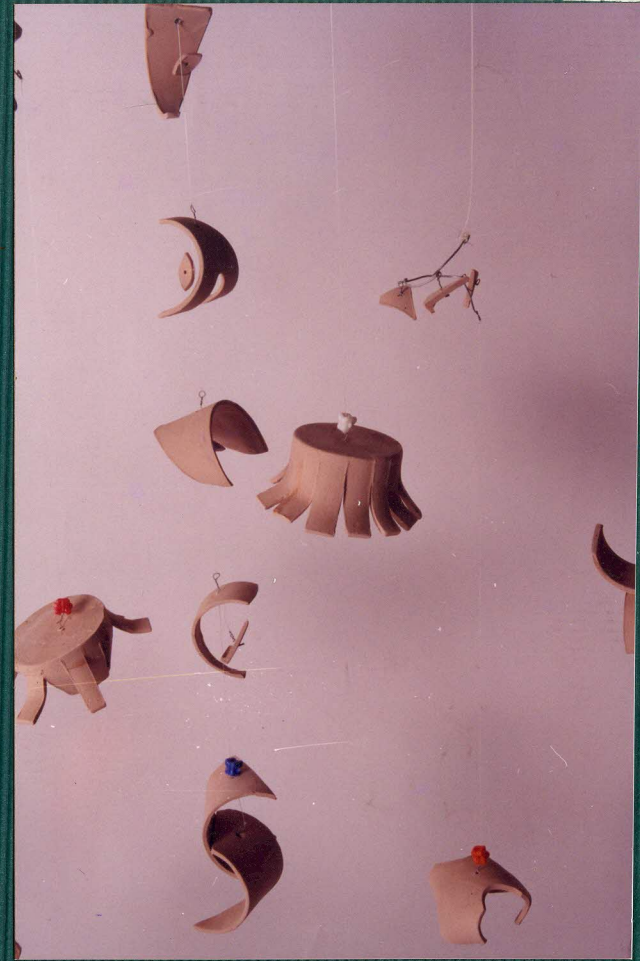
MODULAR MOBILE

Links and ceramic elements
combine in endless compositions.



▼ CURTAIN MOBILE

lots of individual ceramic elements combined together with complimentary wire pieces to form a mobile screen.



MOBILE

elements made by
at cylinders in different