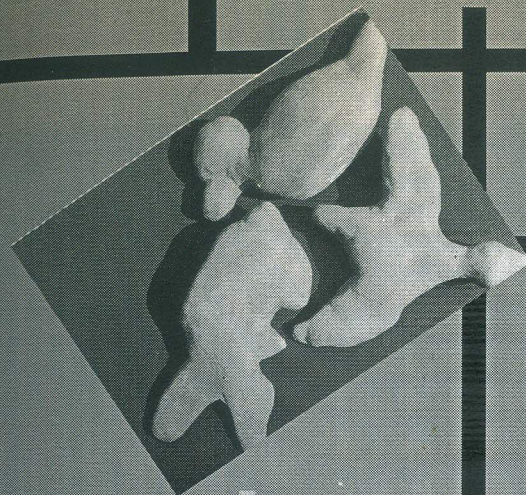


✓ Suparna Dandi

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Bird and Animal Forms Ceramic Mobiles



Bird and Animal Forms In Ceramic Mobiles

Suparna Dani

Guide - Ms. Vanmala Jain

INDUSTRIAL DESIGN CENTRE IIT Bombay

March 1998



1. Introducing Ceramic Mobiles.
2. Bird And Animal Forms.
3. Use of Bird and Animal Forms in Ceramic Mobiles.
4. Materials for the Mobiles.
5. Components of Mobiles.
6. The Making of ceramic Mobiles.
7. Use of clay for other applications.
8. Domestic Pottery.
9. Ceramic Industry.
10. Raw Materials for Ceramics.
11. Origin of Glazes.
12. Firing of Onglaze Decoration.
13. Important Design Desicions.
14. Applications suggested .
15. The mobiles offered as a new Product.
16. References

APPROVAL SHEET

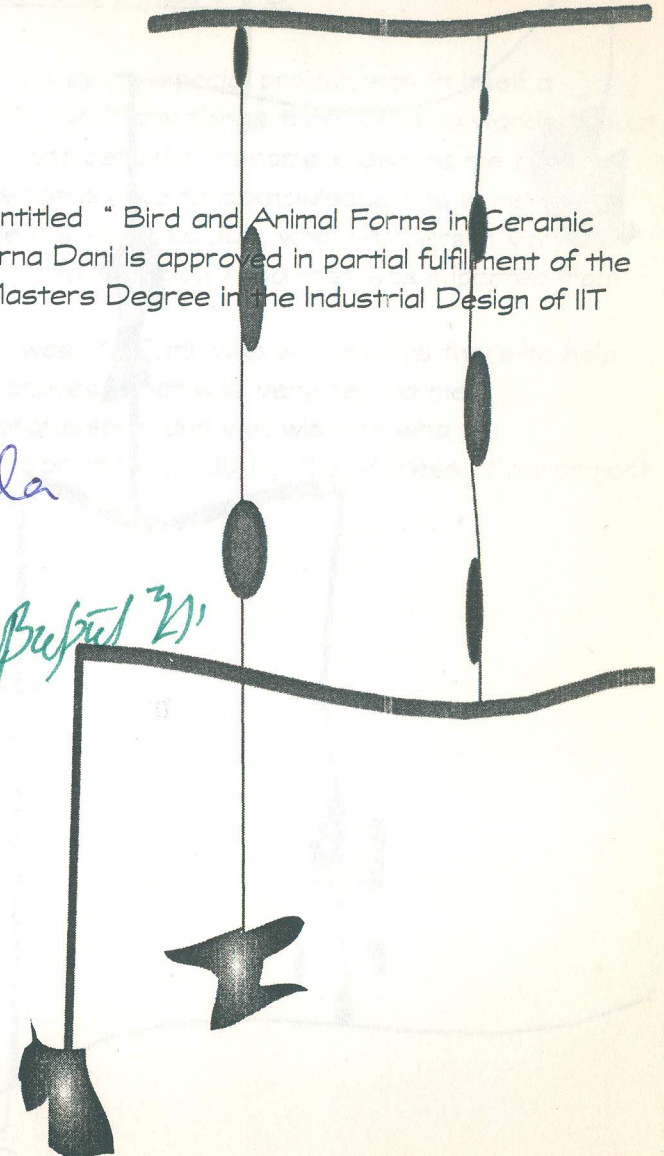
The Special Project entitled " Bird and Animal Forms in Ceramic Mobiles" by Ms. Suparna Dani is approved in partial fulfillment of the requirement for the Masters Degree in the Industrial Design of IIT Bombay.

Guide *Vannala*

Internal Examiner

Bupul N.

Chairperson



ACKNOWLEDGEMENTS

The selection of this topic as my special project was in itself a wonderful experience for me. Many things that I used to wonder about in the field of clay work and ceramics became known to me as a result of this. I would sincerely like to acknowledge this wonderful opportunity to my guide Ms. Varshala Jain, who was herself very involved with my project and the knowledge that was imparted from time to time.

Another great adviser was Mr. Patil, who was always there to help me through the entire process, that was very new to me.

I thank all my friends, professors, and well wishers who co-operated with a number of things during the process of my project.

Yours sincerely
Suparna Dani.



INTRODUCING CERAMIC MOBILES

An investigation into the absence of ceramic mobiles- On conducting a general survey of the existing mobiles it became very evident as to the complete absence of ceramic mobiles, both in the Eastern and western cultures. It becomes a part of the special project to investigate the lack of ceramic mobiles. These will be dealt with in the latter parts of the report.

Ceramic mobiles would be a very revolutionary concept both on the 'type of mobiles' scene and also industry due to the following reasons -

NEW TO THE AREA OF MOBILES

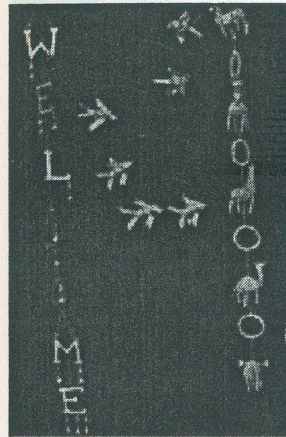
- 1.) Total lack of ceramic mobiles.
- 2.) The advantages of the properties of ceramics could contribute to the creation of new mobile types.

NEW TO THE CERAMIC ARTS AND CRAFTS INDUSTRY

The ceramic industry has largely branched into the field of pottery and sculpture. There are small icons and figurines that are very prominent. A total absence of the mobiles in ceramic industry may be due to the doubts in the minds of the people about the weight, provision for hanging, ability to balance, suspend and integrate the various components that form a part of the mobile sculpture.

BIRD AND ANIMAL FORMS IN CERAMIC MOBILES

INTRODUCTION



Cane Hangings

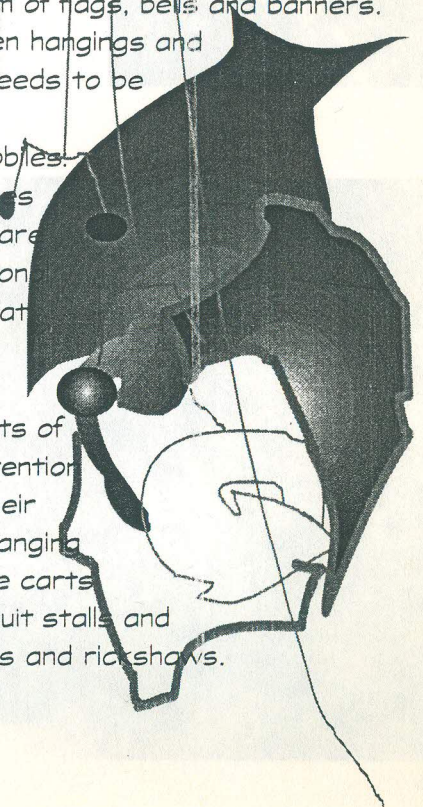
1. Reproduction of a mobile
2. Partition
3. Puppets
4. Wooden Bells

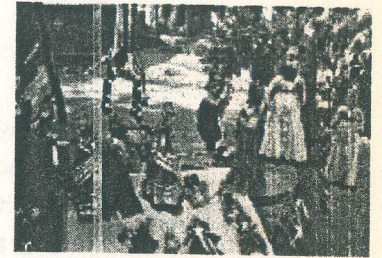
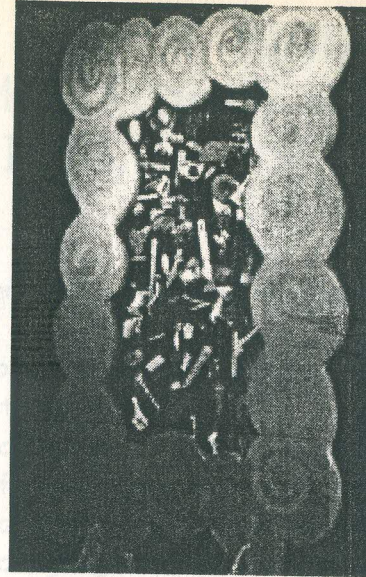
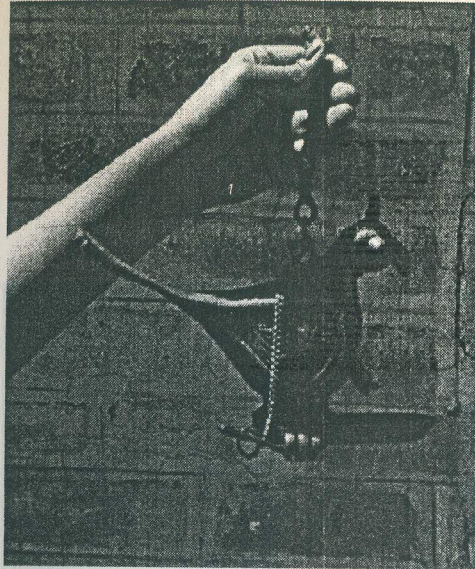
The dictionary meaning of 'Mobiles' describe them as 'Artistic hanging structures whose parts move with currents of air. They are used for various purposes such as decoration, amusement, advertising etc. Research indicates that the concept of mobiles are more evident in the eastern cultures where they are used in festive decorations, for religious purposes and in the form of flags, bells and banners. There is a distinct difference between hangings and mobiles and the distinct character needs to be studied for demarcating the two.

Difference between hangings and mobiles:

We see many mobiles i.e., not the ones that are purposefully made but that are generated as a result of many functional requirements. These are the toys that are kept hanging for advertisement purposes on front of toy shops.

They are suspended from single points of suspension and they attract the attention of small children in the process of their movement by the breeze. Clothes hanging from stores and the hangings on the carts of hawkers, the hangings from the fruit stalls and finally the decorative hangings in cars and rickshaws.



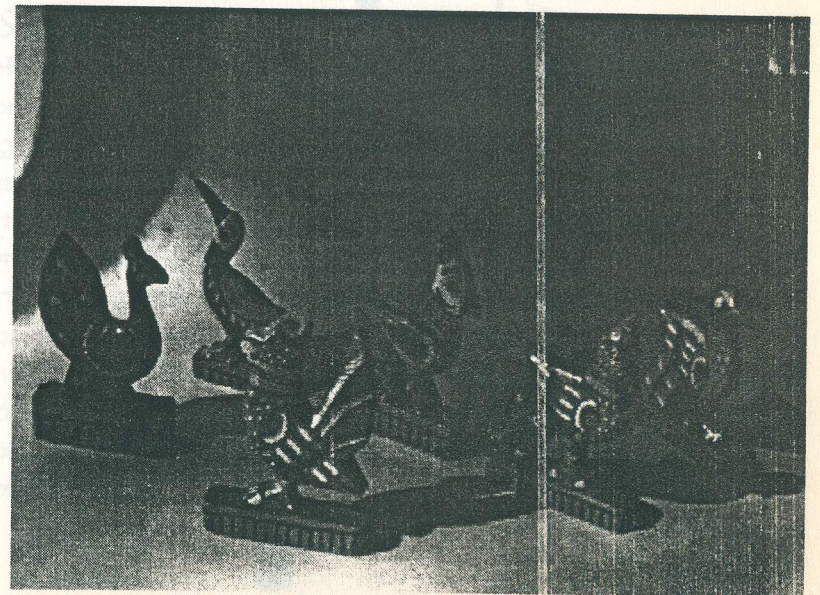


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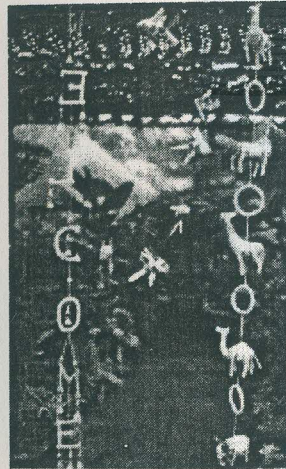
3.

1. Rajasthani metallic Bird Hanging.
2. Partition.
3. Puppets.
4. Wooden Birds and animals.



4.

3.



Birds and Animals in
Cane Hanging
and Mobiles

THE USE OF BIRD AND ANIMAL FORMS FOR THE MOBILES.

1. An experiment with forms that we can easily relate to.
2. The prominence of bird and animal forms in the arts and sculptures in India.
3. The bird and animal mobiles can be employed for a number of applications such as in lamps to be hung in houses, for the explanation of certain scientific principles, and signage systems at certain zoos and exhibitions and in museums.

FORM SELECTION

1. A listing of various birds and animals, shortlisting the typical Indian species.
2. Sketching various specimens in a number of poses.
3. Refinement of the above forms.
4. Revising the forms as per two criteria, position of the slip inlet and the hole for hanging the form. A slight alteration in the placement of the slip inlet will make a difference on the appearance of the form. The hanging can be in the form of hooks that are integrated into the basic form. The hooks and the overall suspension system should be able to bear the weight of the entire structure of the mobile.

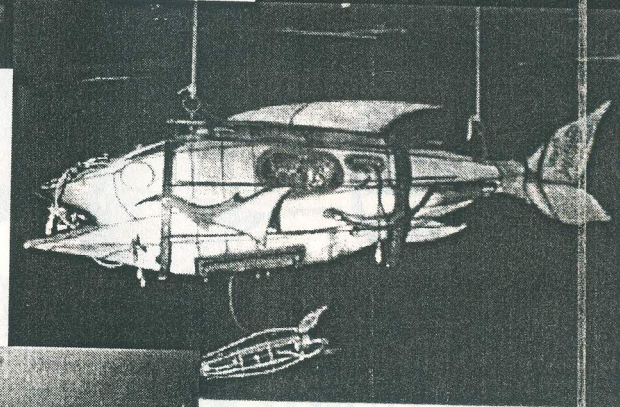


1.

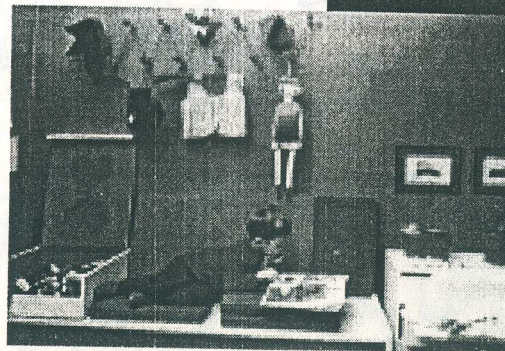


2.

1. Kathakali Puppets.
2. Ladder with Puppets.
3. Fish hanging,
metal,glass.
4. Hand- on knobs.

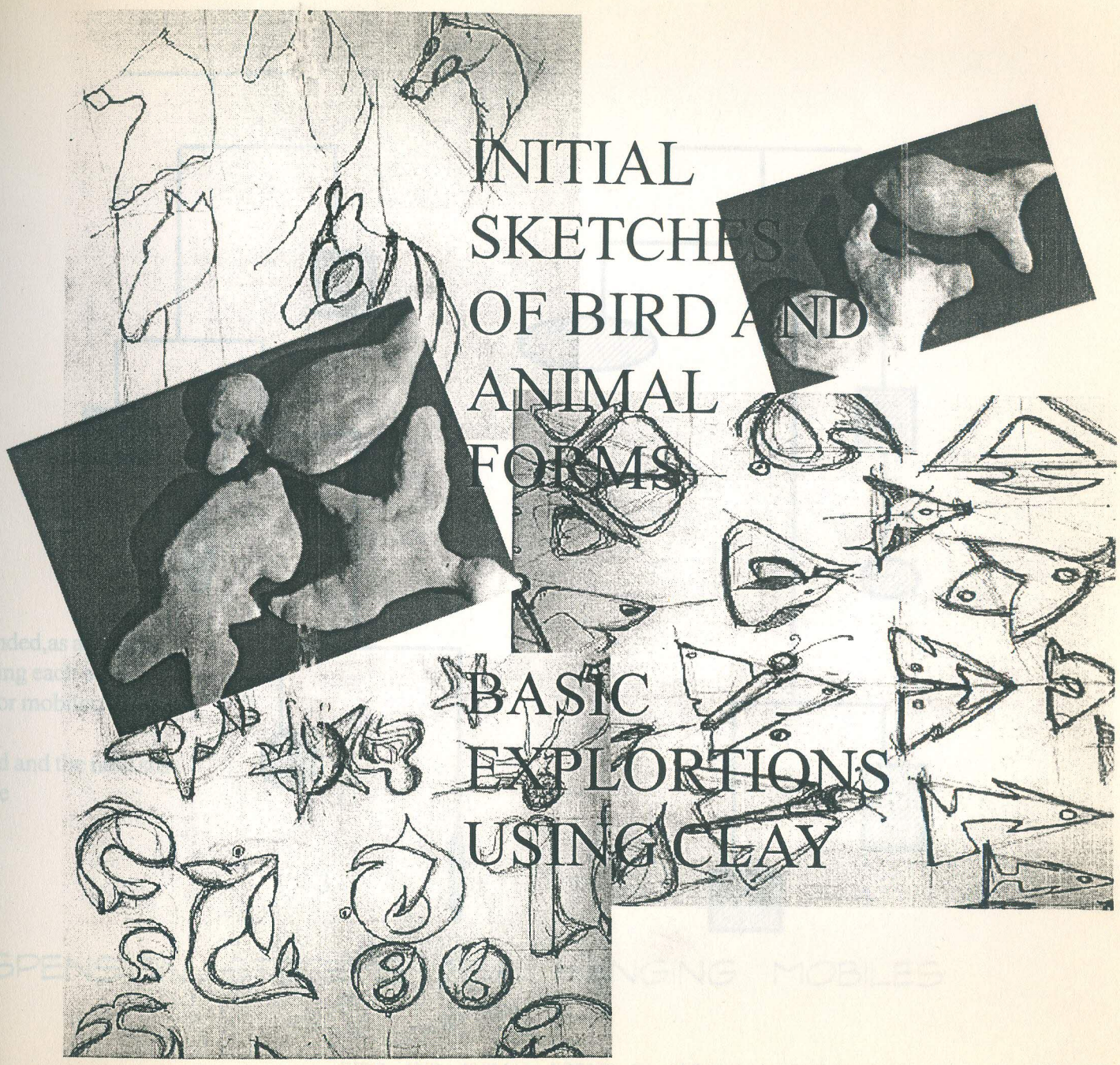


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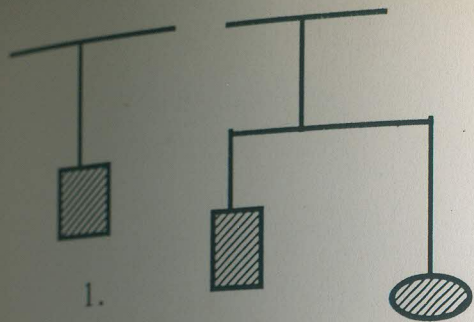
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CERTAIN HANGING DECORATIONS



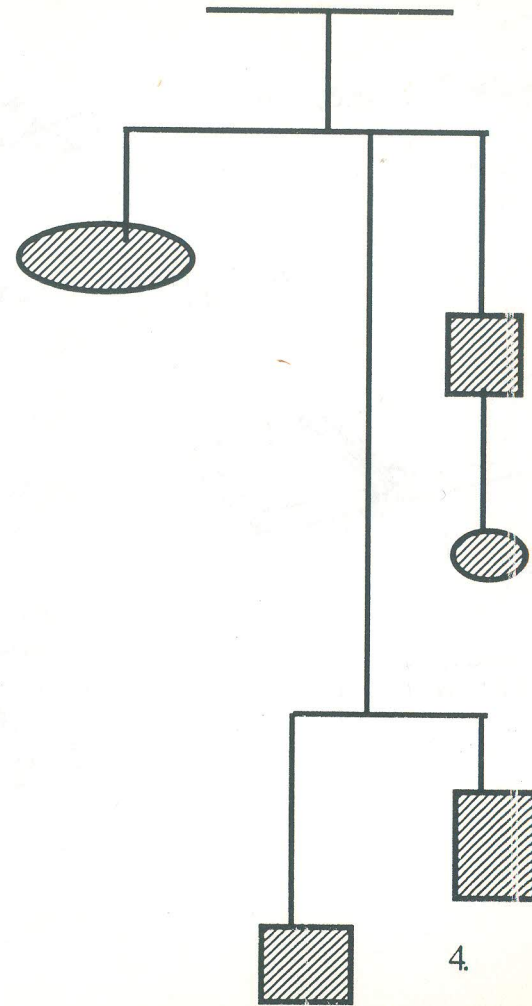
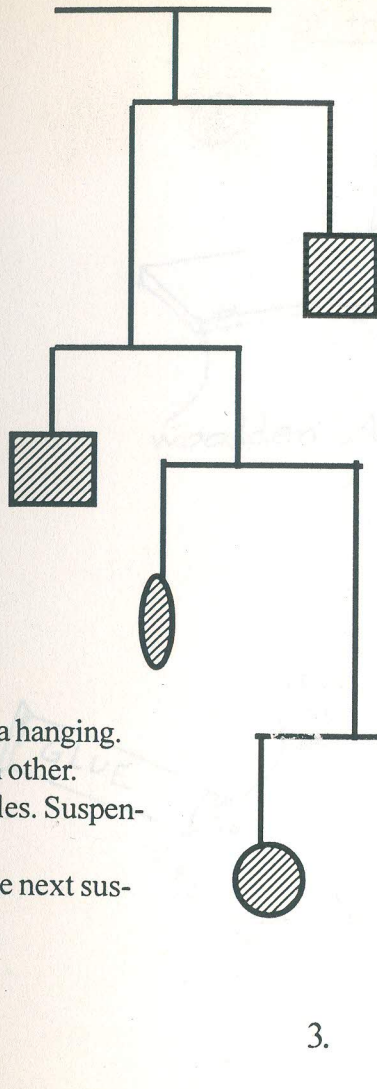
INITIAL SKETCHES OF BIRD AND ANIMAL FORMS

BASIC EXPLORATIONS USING CLAY



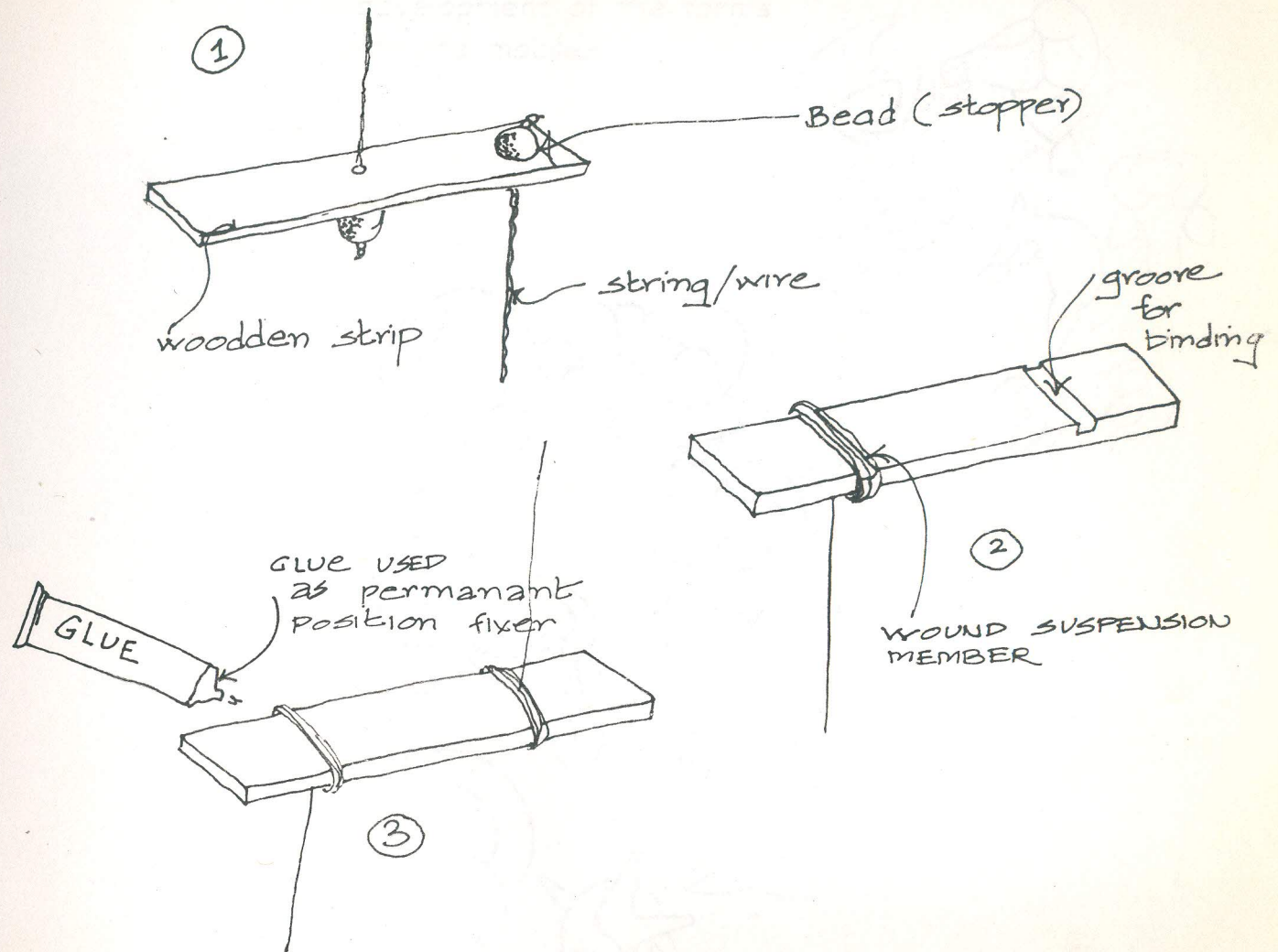
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1. Single piece suspended, as a hanging.
2. Two pieces balancing each other.
3. Typical structure for mobiles. Suspension at one level of object on one hand and the next suspension system on the other.

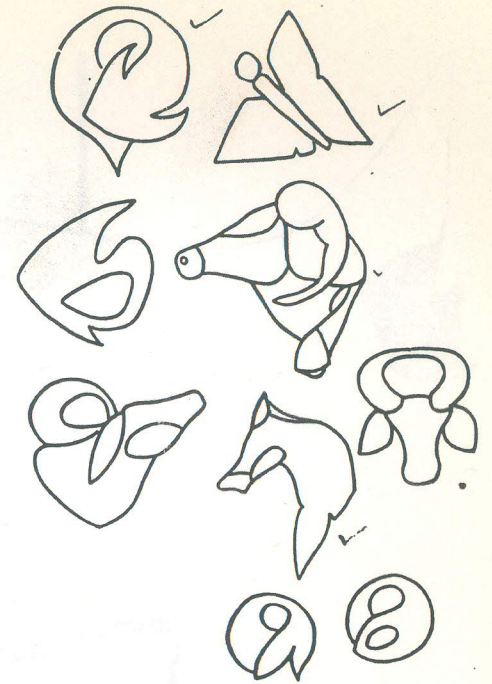


TYPICAL SUSPENSION SYSTEMS FOR HANGING MOBILES

Basic Joinery Details for the Suspension systems
of the Mobile structure.



Certain sketches for the
development of the forms
for the mobiles



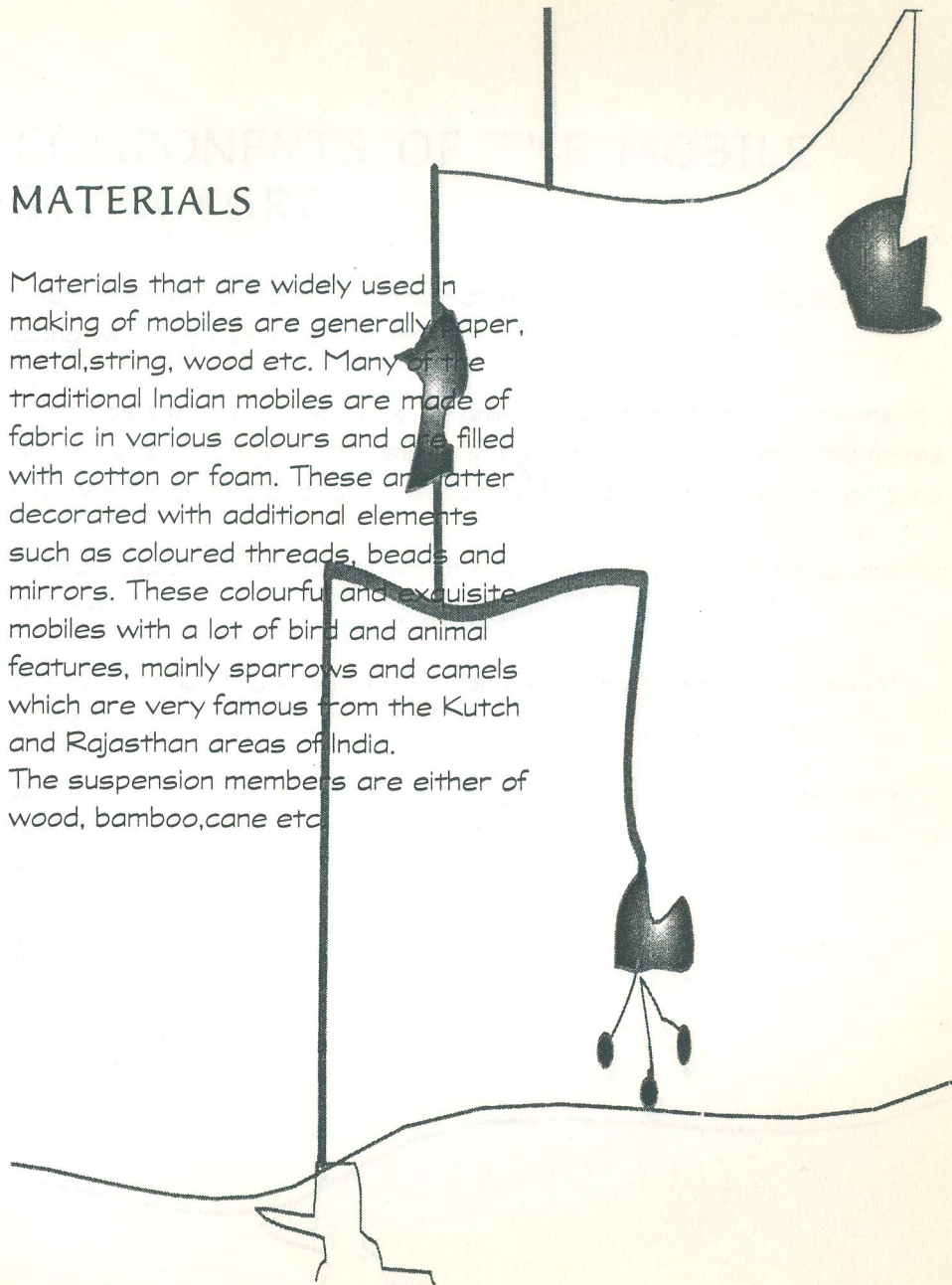


Stuffed fabric Mobiles

MATERIALS

Materials that are widely used in making of mobiles are generally paper, metal, string, wood etc. Many of the traditional Indian mobiles are made of fabric in various colours and are filled with cotton or foam. These are further decorated with additional elements such as coloured threads, beads and mirrors. These colourful and exquisite mobiles with a lot of bird and animal features, mainly sparrows and camels which are very famous from the Kutch and Rajasthan areas of India.

The suspension members are either of wood, bamboo, cane etc.

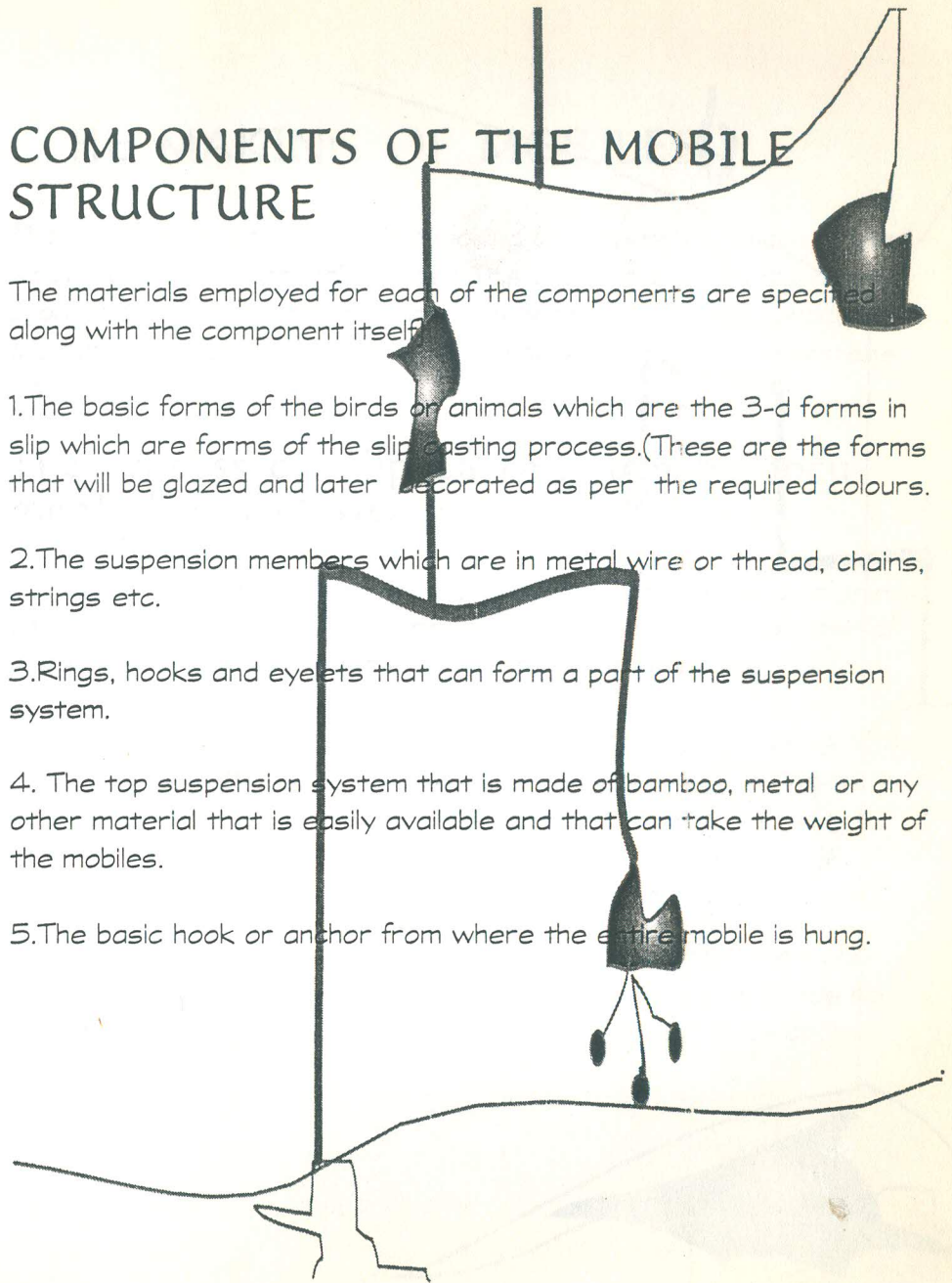




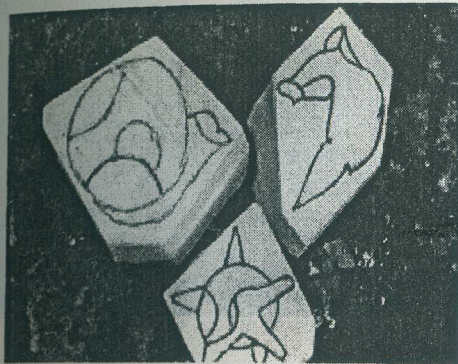
COMPONENTS OF THE MOBILE STRUCTURE

The materials employed for each of the components are specified along with the component itself.

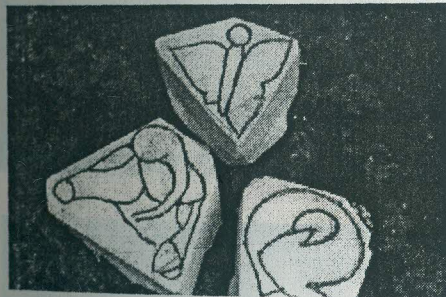
1. The basic forms of the birds or animals which are the 3-d forms in slip which are forms of the slip casting process. (These are the forms that will be glazed and later decorated as per the required colours.)
2. The suspension members which are in metal wire or thread, chains, strings etc.
3. Rings, hooks and eyelets that can form a part of the suspension system.
4. The top suspension system that is made of bamboo, metal or any other material that is easily available and that can take the weight of the mobiles.
5. The basic hook or anchor from where the entire mobile is hung.



6.



Basic Drawings on Plaster blocks.

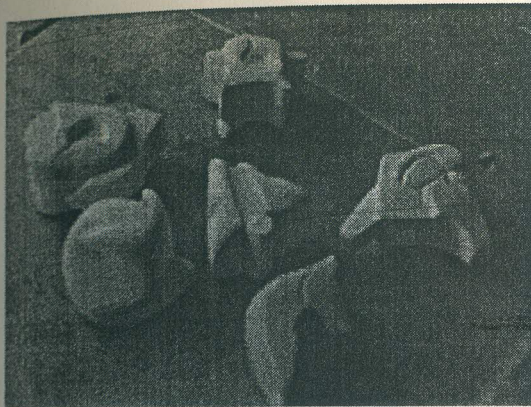


THE MAKING OF MOBILES

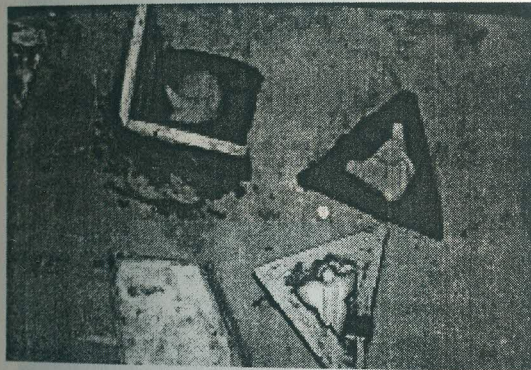
The process employed. For the making of mobiles, the process used would be the 'slip casting' process. This process enables the mass production of the object and can thus become industrially produced product that can be introduced to artisans of the ceramic cottage industry.

The process of 'Slip Casting' can be documented as follows:

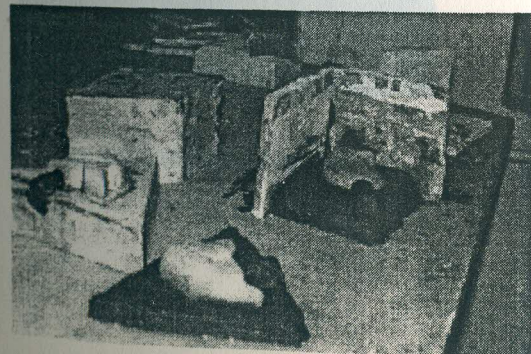
1. Creation of the basic form (in this case the form of a bird or animal as the project entitles. This form can either be in wood, plaster of Paris, clay or any other material that can be formed easily.
2. Once this form has been made it can be used for the making of the POP mold. Depending on the basic form the mold is either a one, two or three piece mold. During the casting of the plaster the 'Locator pins' are also cast in the body of the mold itself.
3. In the case of a two or three piece mold the parts of the mold have to be held together. This is held together by rubberbands so that when the slip is poured into the mold it does not fall apart.



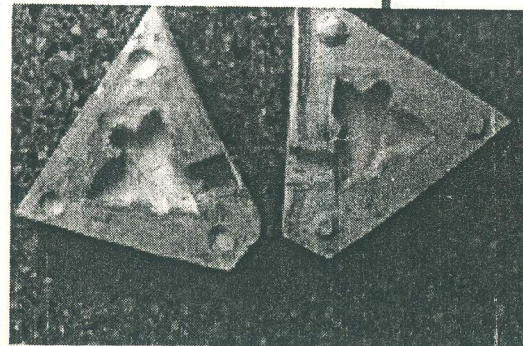
1



2



3



4

4. A casting hole has to be left in the body of the mold so that the slip can be poured in. For example , in the case of a pot , the casting hole can become the mouth of the pot , but in the case of a form such as the bird or the animal forms the casting hole will have to be manipulated as a part of the body of the animal form in order to maintain the aesthetic qualities of the basic form.

5. The slip has to be made with great care so that a proper consistency of the slip is kept so as to form a part of the desired wall thickness. The wall thickness is decided as per the time for which the slip is kept in the mold. A thickness of 3mm can be achieved by keeping the slip for about 20 to 25 minutes.

6. The extra slip is removed after 15 minutes of initial pouring .The form can then be removed free from the mold with proper care to be taken as it is very moist and fragile.

7. The cast forms are allowed to dry properly before they can be fired and later be glazed.

SLIP CONSTITUENTS

China Clay - 3.5 %

Ball Clay - 5 %

Feldspar - 2 %

Quartz - 1.25 %

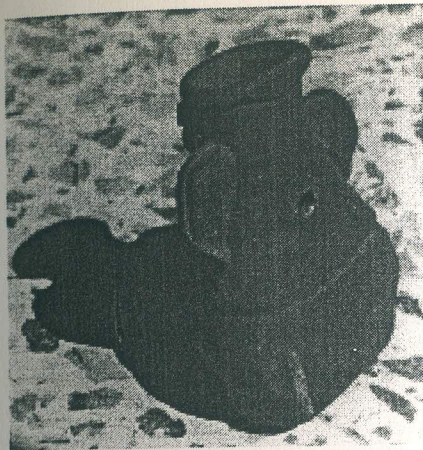
Mixed with sufficient amount of water.

Ground in the Ball mill for 36 hrs.

1. Plaster forms.

2,3. Making of two piece mold.

4. Finished Mold.



Clay Pot Hanging

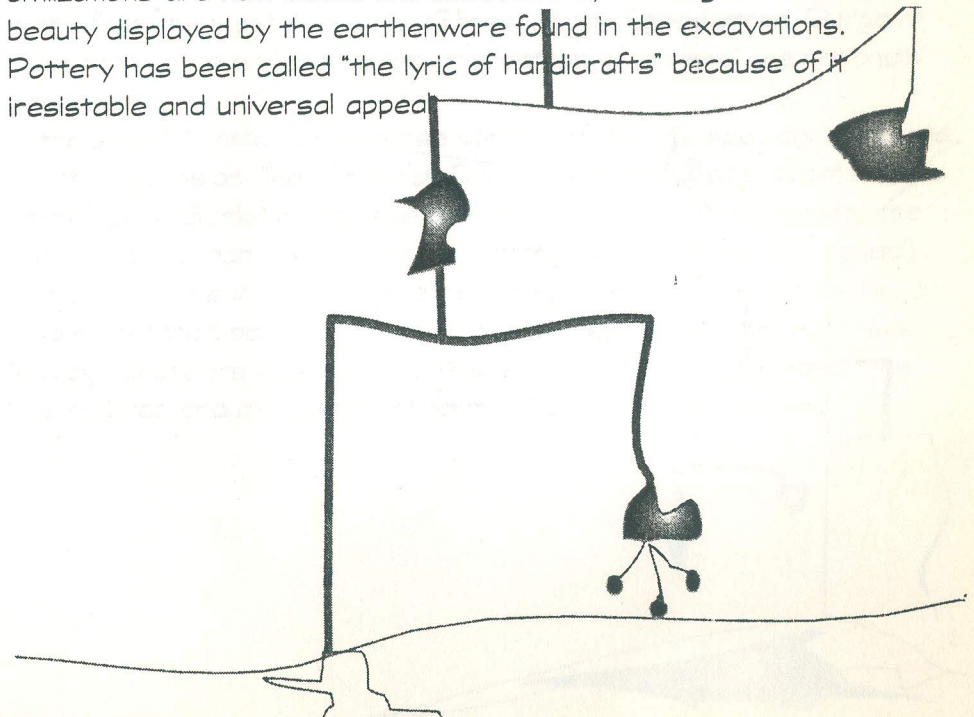


Clay bird used as hanging.



THE USE OF CLAY FOR POTTERY AND FOR OTHER APPLICATIONS -

Clay craft is probably the earliest of man's creations and kind of marks his coming of age. It was as though man was faced by nature he was faced by its challenge. Moulded out of earth it was as though he wanted to extend the boundaries of his own existence to give expression to his creative spirit, so he took the earth in his hands and began to create a whole new world of infinite shapes and grace and elegance. It thus symbolizes man's first craftsmanship, and civilizations are now dated and assessed by the degree of skill and beauty displayed by the earthenware found in the excavations. Pottery has been called "the lyric of handicrafts" because of its irresistible and universal appeal.





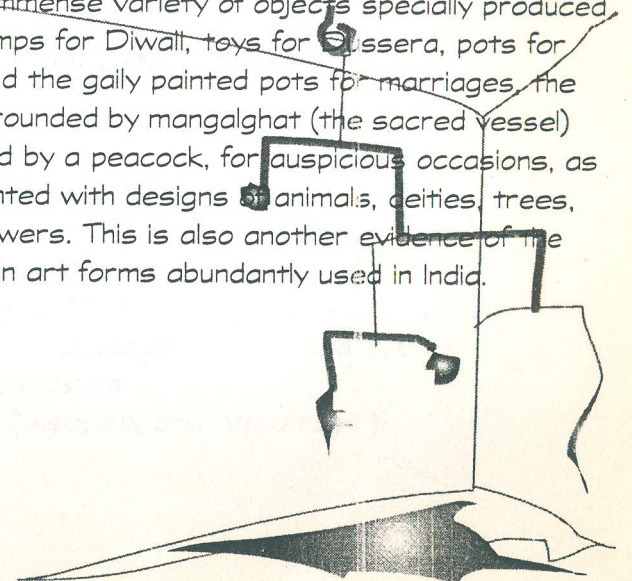
Domestic pottery is in profusion and is found in innumerable shapes and sizes and is inseparable from the Indian scene. The common earthenware is unsophisticated and is free of eccentricity and artifice. The shapes are organic, simple and attractive, and true to the material. In India the emphasis has been on the chastity of the line to lend dignity to the form with no attempt to cover it up with colour and ornamentation.

Clay being at hand and comparatively inexpensive, it is not surprising that such a vast amount of religious earthenware get religious proliferation in this field.

This may be classified into three fields namely, figurines of divinities, ceremonial pottery and votive offerings.

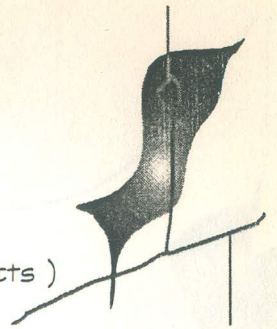
In the first the most popular is Ganesh, god of good omen. Durga at Dusshhera time and Sarasvati the patron of learning are nationally worshiped.

In the second come an immense variety of objects specially produced for the occasion, like lamps for Diwali, toys for Dussera, pots for seedlings at Sankranti, and the gaily painted pots for marriages, the sumptuous elephants surrounded by mangalghat (the sacred vessel) and the whole surrounded by a peacock, for auspicious occasions, as also perforated pots painted with designs of animals, deities, trees, leaves, creepers and flowers. This is also another evidence of the use of birds and animals in art forms abundantly used in India.



CERAMIC INDUSTRY

9.1 PLASTIC- Earthenware table ware products
CASTING SLIP- (Earthen ware for special products)
DRY MIXES
(Mechanical Pressing -Damp bodies for shaping).



Approximate percentage on dry body weight

Casting slip - 38 Economic drying costs (As compared to pressed shapes)

Plastic Body -25

Dust Bodies - 10

ECONOMICS OF CASTING SLIP PREPARATION

1. Cost of dry body in casting slip form.
2. Casting time.
3. Number of pulls per mould and mould cost.
4. Quality of casts delivered. Elimination of cracked loss due to poor mould relaxation or subsequent water loss due to latent strain from the same cause.
5. Control of slip quality (Viscosity and thixotropy).

10.

RAW MATERIALS FOR CERAMICS -

Clays, micas, silicas in the form of quartz.

Water

Fuels (carbon in combination with hydrogen and oxygen, with nitrogen, vanadium, iron sulphur in minor proportions).

Ball clay or China clay.

Biscuit Firing

Development in the body of goods of mechanical strength, colour texture and thermal expansion characteristics.

The overall cost of the operation must be kept to the minimum. The losses as low as possible and all the costs as low as possible.

PHYSICAL, CHEMICAL AND MINERALOGICAL FACTORS WHICH PLAY AN IMPORTANT ROLE in the PROLONGED COOLING TIMES

PROCESSES INVOLVED -

Dehydration, oxidation, decomposition of the carbonates, crystal modification which include losses of crystallinity and reappearance of different crystal forms.

The sintering leads to a more advanced degree of vitrification which leads to a permanent and more or less glassy surface.

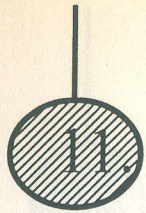
MECHANICAL STRENGTH

FACTORS_ Crushing, tensile cross breaking and impact strength at all temperatures (the effect of time and lead on compressive , torsional and cross bending yielding).

Various Properties to be considered -

CHEMICAL- Weight, reaction with reagents.

PHYSICAL- Density , Volume and porosity and permeability changes, thermal expansion and contraction, thermal conductivity and specific heat , endothermic and exothermic changes.



ORIGIN OF GLAZES

The use of coloured glazed tiles as a form of architectural decoration, in profusion of design and in the magnificence the use of colour, is obviously of very ancient origin but flowered from the 13th onwards.

Glasses reverted again in the Kushan period, 2nd century A.D. but were not sustained because of the brief span of the use of clay objects. Decoration in numerous ways however went by paint, glaze or spray before or after firing. Glasses came back in a big way and took root with the arrival of the Muslim influence.

The Jaipur blue pottery is very famous for the glazes that were used. It is rather surprising that the slip casting process was employed for the making of these pots. No clay was used. It is perhaps the only pottery produced without the use of clay - a couple of factors rather simplify the procedure. One, all the materials that go into the composition, quartz, raw glaze, sodium sulphate, fullers earth known as Mukltani clay, all require the same temperature and the pottery needs to be fired only once unlike other pottery. The other is that the slip does not develop any cracks. It is also more impervious and hence more hygienic for daily use.

FIRING OF ON GLAZE DECORATION

Fix firmly and faultlessly of any form of decoration on the surface. Decoration with the best chemical and physical durability.

Colour matured to the desired tint, brilliance and gloss. Resists deterioration by abrasion and banging, scratching and weather resistance.

Selection of fluxes and pigments, the metal mixtures applied by controlled techniques and by maintaining the aesthetic appeal.

ON GLAZE DECORATION

HAND PAINTED DESIGN- Pigment in dispersed medium, application in different thicknesses to obtain the desired thicknesses.

STAMPED DESIGNS- Single colour, Rubber or other flexible stamp patterns- transfer patterns.

LINING OR NARROW BAND- Varying in thickness, applied with pencil.

WASH BANDED COLOUR- Two fires may be required (brushing or spraying work bands applied partially or over the entire surface.)

Above that the other decoration is applied in the form of lithographic patterns, metal lines and stamped metal patterns.

LITHOGRAPHS- Traditional on sized glazes.

Self attaching, Wooden cover coats or lithos used.

LINEs or bands of colour and gold or other metal is applied by mechanical means.

APPLICATION OF GLAZES

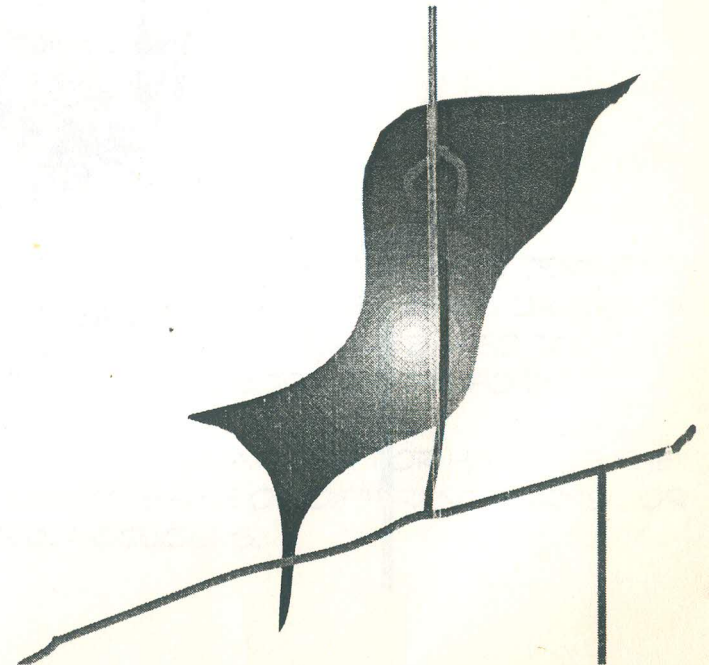
Hand dipping for table or stone ware.

Mechanical dipping for Flat tableware.

Fully mechanical spraying (Schweitzer type of Mechanism)

Mechanical spraying followed by accelerated drying.

Water fall method that is peculiar to wall tiles.



13.

IMPORTANT DESIGN DECISIONS

SIZE - That of each form will have to be considered as they are supposed to be in motion that makes them light i.e. the lightness as an important criterion.

THICKNESS - The minimum wall thickness required to maintain the overall strength of the object when in suspension (the thickness and the weight of the object must not exceed the fact that it should move or rotate freely and be 'mobile' in the truest sense.

FORM - variations on the size
- variations in colour

SELECTION OF THE FORM FOR MAKING MOLD

SELECTION OF THE PROPER TYPE OF SURFACE TEXTURE AND FINISHES THAT CAN BE USED - GLASSES OR PAINTS THAT CAN BE LATER ON VARNISHED OR BAKED TO FORM AN INTEGRAL COLOUR IN THE BODY OF THE FORM.

DESIGNING VARIOUS COMBINATIONS FOR HANGING THE MOBILES - IN TERMS OF SAME OR DIFFERENT FORMS , OR SAME OR DIFFERENT COLOURS.

14.

APPLICATIONS SUGGESTED B ME AS A PART OF THE DEDUCTIONS FROM SPECIAL PROJECT WORK.

1. Used as conventional hanging decorations in homes, offices, lounges etc. to enhance the beauty of the internal overhead volume of space.
2. Used to explain certain conceptual principles ; either scientific, cultural, religious etc.
3. As they are bird or animal forms, they can be very well used in places where special signage is required such as exhibitions and zoos. They can also beautify the space.



OFFERED AS A NEW PRODUCT THAT CAN BE DEVELOPED BY ARTISANS AND CRAFTS PERSONS.

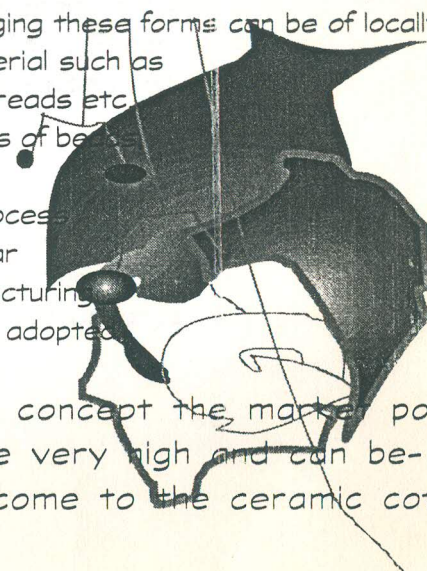
Background -The process of making mobiles is a very interesting one. Once the basic form has been finalized the molds can be prepared very easily in good quality plaster of Paris. These molds can be repeatedly used for a number of times. The slip that is prepared by grinding or in a ball mill, the materials as specified earlier, can be stored very well and the consistency can be maintained by the addition of the proper quantity of water.

After a certain stage the entire process becomes very mechanical. A number of forms can be made from the same mold. These are then removed very carefully and then allowed to dry. The surface when leather-hard can be finished in order to smoothen the parting lines to make it look as an uniform surface.

After complete drying the forms are kept in the kiln for baking. After the initial firing they can either be glazed or can be left as they are. The structure that is used for hanging these forms can be of locally available and traditionally used material such as bamboo, wooden strips, strings, threads etc. They can be enhanced by the means of beads, bells etc.

Thus from the above mentioned process it is very well evident that it is similar to any of the other ceramic manufacturing processes and is such that can be adopted by a great deal of artisans.

Since it is a revolutionary concept the market potential for the same will be very high and can become a good source of income to the ceramic cottage industry.



16. REFERENCES

CENTRE FOR CONTEMPORARY ARTS AND CRAFTS -Bombay.

COTTAGE INDUSTRIES - Bombay

DILI HAAT -Delhi.

SHILPAGRAM -Rajasthan (Udaipur).

BOOKS

1. Indian Style - Suzanne Slesin and Stafford Cliff.
2. Understanding Pottery Glazes. - David Green.
3. Rural Craftsmen and their Work - Eberhard, Fischer and Haku Shah.
4. Symbols and manifestations of Indian Art.
(Marg publications).
5. Making Mobiles.
6. Environmental Ceramics - Stan Bitters.
7. Handicrafts of India - Kamadevi Chattopadhyia.



