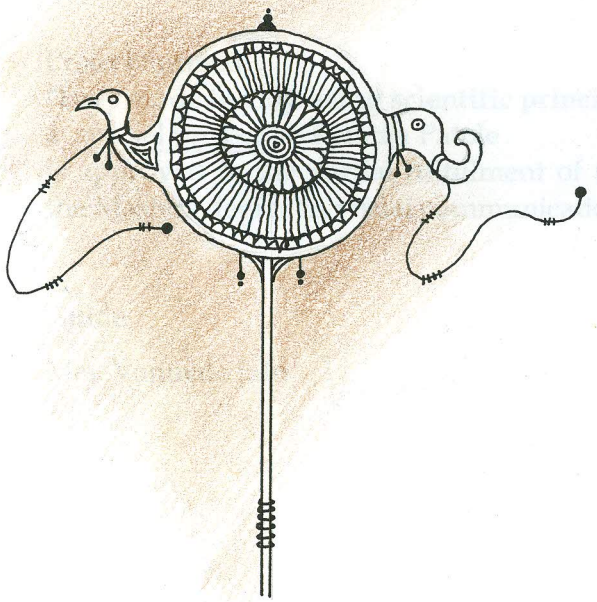

Approval Sheet.....

Project entitled
'Toys made in clay using scientific principles'
a special project by Kshitija Patole
is approved in the partial fulfillment of the requirement for the Masters degree in visual communication.

Guide

Mrs. Vanmala Jain Vanmala Jain

Chairman

.....

Internal examiner

.....

A

PROJECT REPORT

ON

'Toys made in clay using scientific principles'

Submitted in partial-fulfillment of requirements of :

Industrial design centre (Visual Communication),

Indian Institute of Technology, Bombay

for :

The special project, 1998

Submitted by :

Kshitija Vilas Patole

Senior Visual Communication

Approved by :

Guided by :

INDUSTRIAL DESIGN CENTRE

INDIAN INSTITUTE OF TECHNOLOGY, BOMBAY.

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ACKNOWLEDGEMENT

Through this column I wish to express my sincere thanks for the guidance rendered by Mrs. Vanmala Jain, Faculty of the Industrial Design Centre of Indian Institute of Technology, Bombay. Her constant guidance, invaluable help, encouragement and good wished were of immense help. I wish to express my sincere gratitude to her .

Above all I am deeply indebted to Professor. Munshi, Head of the Department of IDC, for providing appropriate facilities whenever required, for the satisfactory completion of the project.

I am also grateful to all staff members for their help and assistance during the course of the project and also to all of them who directly or indirectly helped me from time to time and made this work a success.

Place : Bombay Kshitija Patole

Date :

ABSTRACT

This project named, "Toys made in Clay, using scientific theories", is an extension of my interest, of working in clay and my interest and fascination for design, science and technology.

This project mainly involved :

- A study of simple scientific theories that can be implemented when making a toy in clay,
- Studying rural potter, their work and working conditions, their problems and their role as a potter in the society today.
- Understanding and differentiating 'clay' and knowing its qualities as compared to other materials used toys.
- Experimenting with clay to make toys based on some scientific principles.

1 INTRODUCTION

Every society and its people have simple, practical and useful knowledge, this is often seen expressed most creativity and effectively by the people of that society through their tales and toys. Thus each region has a different and unique character to it, that is reflected through these sources. These craftsmen have unique ideas on playthings that become popular in their areas. Many a times the basic principle behind the toy in may regions might be the same, but they reflect the look of the society from which it belongs to.

Today in the markets you do get to see low cost toys which are everyday playthings of millions of Indian children, past and present. But as compared to the past toys made in clay are rarely seen. Most are factory made toys using materials like, plastics, metals, wood etc.

To get back into the past it is interesting to find that the folk toys of India particularly those found at the excavated sites of ancient centres of culture, show very striking similarities to those discovered in Crete, ancient Egypt. As for as India is concerned, the most ancient toys of which we have any record belong to the period of the Indus valley civilization, dating from 2500 to 1700 BC toys that bear a suprising affinity to the handmade folk toys of a much later date. At the ancient sites of Mahenjodaro and Harappa have been found terracotta toys representing human figures, farm carts, cows, sheep, pigs, oxen, birds and animals, rattles, whistles, balls and kitchen utensils all pointing to a settled rural existence. It is worth noting that some of these toys, like bulls with nodding heads, were apparently worked by string, indicating

that the toy makers of even such remote times had a mechanical bend of time.

These terracotta figures may not have been meant to be used as playthings. They may have been cult objects, with a minor part to play in ancient magical or religious rites. Some of the toys show remarkable skill, others are very crude. Could it be presumed that the former were the output of professional craftsmen, the latter attempts of the children to provide them play things. After all, even children today will often make rough toys of modelling clay, that they will treasure more highly than the beautifully finished factory products.

The picture that emerges from the wealth of material that archeologists have recovered from the few excavated sites in this vast country is indeed, instructive. It shows that in the manufacture of toys the ancient craftsmen of India spared no pains. They provided the children with models of almost all the domestic and the important wild animals and the duties of the Hindu pantheon so that in playing with these toys they might unconsciously wider their knowledge of and interest in animal life and imbibe the traditional culture of the country.

Later Sanskrit literature literally abounds in references to toys and children's games, and we are forced to the conclusion that the children of ancient India must have had a variety of toys to play with, toys which were not merely for amusement but instructive as well, and often decorated though simply, indicating that the aesthetic aspect was not neglected by the toy makers of old.

2 TOYS

Toys are very familiar objects to us. Everyone of us knows what makes certain objects toys. These toys can be classified on the basis of the material used, like wooden toys, clay toys, cloth toys and so on, or on the kind of theory or technique they use, like pulling toys, rattles, mechanical toys. They can also be grouped on their learning and teaching values, or the age group that play with them.

Static toys are those that are basically representational, like dolls, figures of animals and birds and models representing themes and subjects of everyday life. Many static toys become just decorative objects while others take on ritual associations. Dynamic toys are action based play items. They, too, represent aspects of everyday life, but they also create movement and sound. Dynamic toys are ingenious playthings presenting a wide range of ideas and design. Dynamic folk toys provide a sensory experience through their actions ; they create movement, change form and make sounds. Such sensory stimuli are direct and clearly understood - which is the object of the toy. They illustrate simple themes derived from our physical environment. The variety of these toys provides ample entertainment and amusement for young children. The design of these toys is based on the basic principles of physics.

Our traditional Indian toys display a wonderful grasp of science by artisans many of whom are illiterate and who have had no access to formal training. Their impressive command of physical laws and their ability to translate this into inexpensive play material capable of endless hours of fascination for the child is astonishing. Their work opens a

new dimension on the vast possibilities that exist in our craft tradition for creating play materials and toys for children who cannot afford expensive toys, and live in poor conditions.

This valuable and relatively unnoticed sector of India's craft community needs upliftment.

Many of our old traditional toys are excellent examples of intelligent and imaginative use of materials.

They provide young children hours of fun and amusement. The joy and wonder generated by these simple toys are due to the ingenious use of some simple scientific principles and laws. Many of these toys and their design concepts use laws of motion and sound. The `design 'of these toys is largely based on the application of one or more of the basic principles of physics. The laws of mass and gravity, centrifugal force, simple mechanics, sound and magnetism are extensively applied.

Most of these playthings are ephemeral in nature, lasting only for a few days. But in relation to their prices and the amount of material used to make them, they provide a lot of fun and excitement. These toys can be called a blend of art & technology.

Although a wide variety of folk toys are still made, clay toys have nearly disappeared. The culture of clay toys has undergone a major decline. Instead, many of the ideas and designs of traditional toys are being reproduced in plastics and other material. These have replaced the folk toys too. One reason for the success in selling plastic toys is its durability and its association with modernism.

There is very little effort an conscious design development by the makers of traditional toys and potters. Many of the potters have turned to other professions due to economic necessity. Poverty and lack of appreciation for their work

may be responsible for this situation. Many have talent, ideas and the inclination, but are discouraged due to lack of resources and lack of want (for their toys).

If these toys in clay are revived they can serve as the main source of plaything for many young children in India, who are unable to afford expensive plastic toys sold in the market. These purposeful, meaningful and vital products can be sold by the potters who can earn their living or supplement their income through this activity. This can be done by encouraging them to revive the tradition and open up a new market.

Many of these toys were a result of a high level of innovative thinking. These designs and ideas are not lost and need to be revived and redeveloped to bring back the cultural wealth of Indian toys back.

These clay toys will be much safer than the toys made today which use rusted metal, tonic paints and sharp edges. These artisans have precious talents and skills that need to be nurtured and encouraged to protect and bring back our cultural wealth.

The great craft tradition of India is not a thing apart it is woven into the fabric of everyday life. The making of an object and living with it are the two interconnecting elements that have governed the craft tradition for hundreds of years . Earlier , there was a very definite relation ship between the craftsman and the customer. This still exists in many parts of the country. But in a fast changing world there is a steady erosion of the system.

On the surface, what the creator and the customer have to offer might not be readily apparent. But study affords insights not only into methodology but also into the values that accompany the making. The same is true of usage, which

we might feel is a negligible aspect. The fault, it would seem, lies in our way of seeing.

Regarding the technique, I feel that there is definitely a scientific approach to the making of an object this has evolved over the centuries through a process of trial and error, through a deep understanding of medium and tools. Through a deep understanding of the use to which the object will ultimately be put.

Technique reflects, scientific knowledge, speech reflects social attitudes, usage reflects the religious approach to an object, and myths and legends throw light on the whole shadowy world of hopes and dreams and faith.

India has been a "Clay culture" for millennia. Images, vessels, architecture, toys, boundary markers, walls, hookahs and well rings are among the diverse objects made in India of dried mud and terracotta. Clay has been essential to the people of India for survival. They respond to it as a manifestation of "Mother Earth" which governs their livelihood and spiritual convictions. Therefore, clay and objects made of it innately suggest spiritual symbolism and the abstraction of nature.

Clay objects remain implicitly sacred regardless of their varied uses. The potter, conscious of the reverence required in his craft, makes every effort to create shapes that are most utilitarian. A pot or a clay object can have a profane function. A clay toy may amuse a child as well as serve as a sacred image.

Design is to basic importance in any human expression and material production, because it is the design that gives identity to an object it is the outer projection of the outer projection of the inward urge of man. As man evolved so did his creations, and wealth of shapes, forms, motifs kept moving like a never ending Panorama. Whatever object men

and women used is their daily life, in ceremonials, rituals, festivities and special celebrations, they endured it with a particular pattern which their imagination guided them to believe as appropriate and fitting for the purpose.

In early human society every individual, adult or child, was a craftsman who made the things needed for daily use. But as society grew more complex and function more specialized a division of labour got formulated. A section of the society became expert in craftsmanship, design and manufactured them while the rest of the society merely continued to use the products.

So long as the society remained vitally craft oriented depending for its supplies wholly on handicrafts, the creative stream was continuously stimulated and fed and the master craftsman with rich imagination and fine skill kept on creating new designs and objects. But when this pattern broke by the invasion of the machine for manufacturing, the handicraft sector weakened, the craftsmen lost their stimulation.

It is natural that in this revival the role of designs should take on new innovations. The many changes that are rapidly taking place in our way of living, customs and habits, call for reorientation in several of the traditional items, to adapt them for current use.

3 TOYS OF INDIA

The most wonderful part of Indian handicrafts lies in its child world, the toys and dolls. Their range is so wide one can but touch the fringe of it as one swings from realism to abstract. An amazing quality they possess is freshness, they are never stale. Each time you view them they stir you with a newness that makes them ageless.

There was an ancient tradition, and it probably only lingers in remote areas, which believes there is no dividing line between art and craft, for both possess individuality, variety and artistic merit ; need security and deserve respect. This seems appropriately applicable to toys and dolls.

India has a truly glorious tradition in toys. The excavations starting from Harappa and Mohenjodaro have thrown up a magnificent profusion of clay toys of considerable ingenuity, animals with moveable heads, monkeys that slide around stick and the most skillful toy carts. These same shapes have come down to us as folk toys.

The use of moulds is actually very ancient and clay items of the Mauryan period are considered as turned out of clay moulds which takes us back to the 3rd century B.C. Even through the moulds the folk tradition has continued and most of the clay play things are in the main abstract.

Traditional Assam clay toys and dolls are mostly abstract in form. In fact the dolls hardly have any limbs. Assam has large variety of abstract animals. Exquisite dance figures are also made in clay. There are special anthropomorphic figures which stand out distinctly as Assamese like the female figure with a bird like beaky face, then there are charming palanquins, sets of toy cooking vessels, little animal heads on

wheels perfectly adorable to look at, horses with long legs and long necks on which a rider squats looking puny and lost, complete set of miniature articles of worship etc.

Bihar has a wealth of clay toys, all in abstract folk style. Some of these are astonishingly reminiscent of the ancient Mauryan pieces. There is a whole array of various kinds of elephants. In Bihar and Rajasthan the making of toys is closely connected with seasonal and religious festivals and special toys are made for each occasion.

There is a charming festival in Bihar called 'Shyama Chak' in which the entire story of the festival is related through clay images made by the girls of the household, which are built up around Shyama (Krishna).

Darbhanga has special clay toys. One may say that each is a piece of a creative art.

Lucknow clay toys attained great renown once. The tradition of this craft is lost in the efflorescence of the epic times, for these potters trace their ancestory back to the Ramayan Period.

The toys in Bengal are known for their old folk form. Amongst clay dolls, those from Krishnanagar in Nadia district are a class apart.

Amongst laquered toys Chennapatna, Karnataka products are rated high. One of the their very popular toy is the balancing doll.

Pondicherry has traditional toy industry. Originally the toys were in clay, now are in paper mache and plaster of paris.

4 CHANGING VILLAGES

The rural pattern in India was well known from the days of Mohenjodaro and Harappa, well baked red clay pottery was found in the excavations as back as 5000 years from generation after generation in the country. Almost all the villages in India had potters in a colony producing pots, pans, toys, pitches for the use of the society.

The traditional potters were living on their products in somewhat contented way, till the introduction of technological improved industrial products like aluminum, glass, chinaware and plastics. These products have ruined the market of the potters. Even the poorer class of people are attracted to factory made products as they are durable, attractive and sometime cheaper, compared to pottery produced by rural potters. Day after day, the traditional potters are losing their wares. They are becoming unskilled labourers who were once considered to be the skilled craftsman of our society.

Now the issue before the society is how is how to improve the present conditions of the potters. There are social, economic and technical problems that the potters are facing.

Today due to technological advancement many letter products like aluminium, plastic, glass, stainless steel have come in the market which have created heavy competition. These have attracted the persons with purchasing power as they are cheaper, attractive and stronger. In this way almost all the potters families are suffering from very acute problem of market for their age-old product. Many have left the trade and many more are on the verge of leaving the same.

5
THE PROJECT

The Subject :

'Toys in clay based on scientific principles.'

The purpose : It seems as if clay toys never existed. Nowadays we just get to see toys made in either plastics, wood, cloth, metals etc. You don't even get to see a toy that is made in clay. This is majorly because a large number of potters have left this ancestorial profession to take up other professions which might pay better. This situation also exists in the rural parts of India. It is majorly seen in Saurashtra where the males in the family have given up this profession completely and only the women in the family make pots, but unfortunately, this talent of theirs is only used for making pots. This in turn gives them meagre returns. This place and other such places, a few years ago were known for their enovative toy making (clay toys).

Seeing the present situation it can be said that this professional of toy making needs an upliftment before it disappears and dies out. Encouragement, help, ideas, methods etc are factors which can bring, this art of toy making , (in clay) back to life. This is possible if such experiments (similar to the one I have tried conducting) are working upon which give new alternatives, ideas, creative solutions. These experiments if implemented will help a potter create toys which can get him a decent income with the added advantage of his creative skill.

This is possible because, there are buyers in the market, but due to the extinction of this form of art we are unable to trace such toys anymore, and are forced into purchasing factory made toys.

Though the project title talks about creating toys using scientific theories, a very important factor had to be considered when making these toys: the design and the scientific principle that each toy uses should be simple enough to be reproduced by the potter.

Thus the basic purpose of this project is to create creative alternatives, for the skilled potter and revive back the tradition of India clay toys that existed once upon a time.

The Study / Research :

The studies that involved when doing this project are :

- Studying existing toys in the market : Studying existing toys was important so as to know what kind of toys exist today that use scientific principles. This was mainly to find out in what different mediums are toys made, today.

  Through this study I discovered that clay toys are not as easily available as toys made in other materials like, plastics, metals, cloth, wood etc. Some toys made in clay are available, but these are static and decorative toys.

  It is seen that many plastic and wooden toys use scientific principles to make a toy movable or more fun to play with. Studying these toys helped me in implementing some of these when making toys in clay.

  Many of these toys that I obtained (which used scientific theories) are collected from the Nehru Science centre.
- Studying Sudarshan Khanna's books on India toys also helped to a great extent. This is because, the toys shown in these books use very simple principles that can be implemented when making a clay toy.

  Other books that I studied were based on ancient Indian toys, importance of clay object since ancient times, ancient toys made in other mediums etc. These books helped me make the toys more creative and Indian looking. These

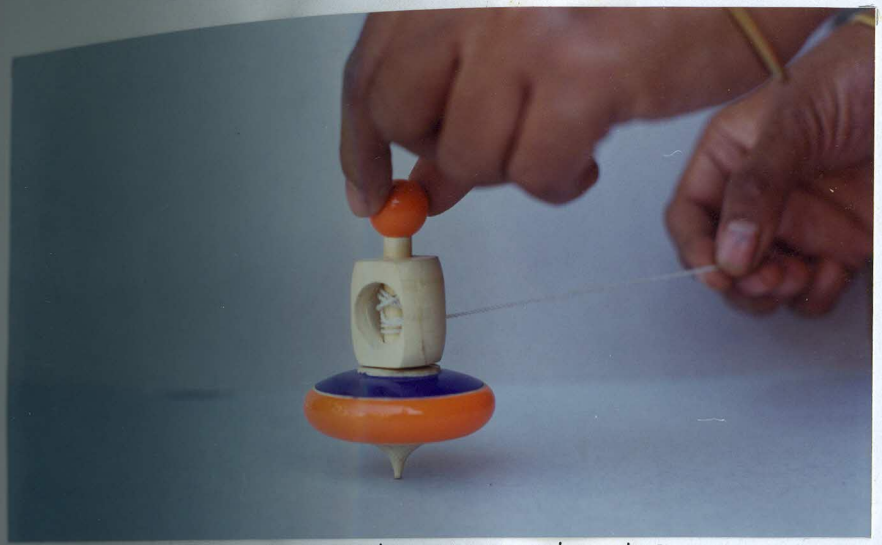
books helped me discover the various advantages and different ways of using clay as a medium when making toys.

- A study was done on rural potters as well to know how they work, their present condition, their problems etc. This study proved out to be very important during the stage when toys were actually being made. It was essential to know their surrounding, their environment, their working conditions, their resources, their draw backs, their skills, their financial problems, their ways of handling the material, their tools and equipments, their expectations etc.
- To make a toy appropriate for these potters this study was necessary, cause if the process of making these toys does not suit them and benefit them this experiment will be a failure. Thus deciding on the scientific principles to be used and its design was mainly based on this study, cause these are people who are going to implement this design and earn a living from it. The extinction of clay toys and the reasons for the potters to give up this form of art was studied so as to understand their needs so as to revive them.
- Studying simple scientific principles to make toys in clay. This study had to be done so as to implement some simple principles when making a clay toy, so that a potter can easily mass produce them. When selecting a certain principle, I had to take into consideration, the medium, its restrictions, the potters tools, his problems, his abilities, the cost factor etc. simple theories associated with water and air, proved out to be the most effective. Other principles using light, density, buoyancy, weight, friction, pressure etc. were also studied and considered.

- Last but not the least, a brief study on the properties of clay was done too, so as to make the maximum use of its qualities. For example :

  1. Clay is a medium that is air, water, fire resistant and is not harmful like some other material, like plastic etc. This is very important because a child is going to come in direct contact with the toy.
  2. Clay has another possible character to it, and that is that it can be shaped or moulded into any creative from without machines. Thus they can prove out to be more creative than factory made toys.
  3. The disadvantage of using clay was its danger of breaking. Thus the toys had to be made stable example : A toy based on `balance' cannot last too long and might tend to break easily.

Some existing toys made in different mediums



▲ Energy storage and conversion – Rotational motion...

▲ Sound through impact...

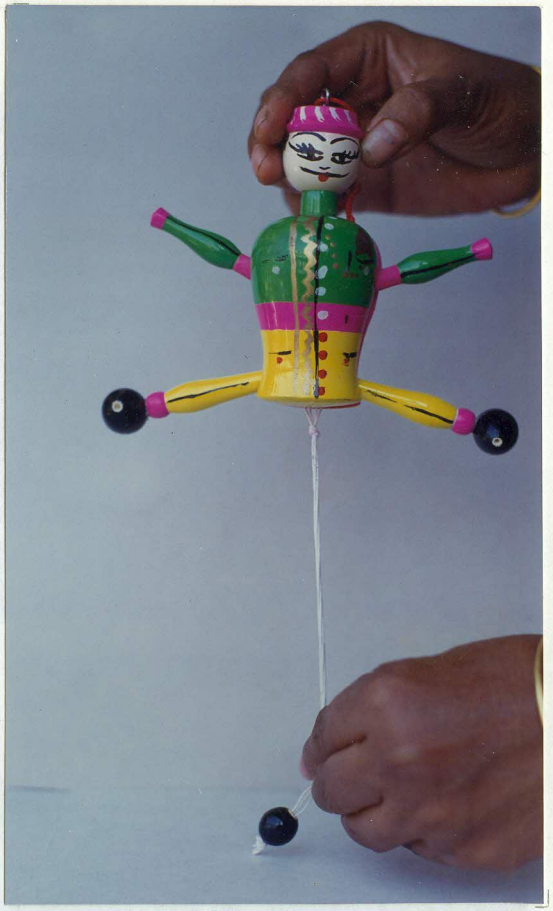
▲ Principle of Wind Energy...

▲ Based on the principle of spring...

▼ Principle of Mass under Gravity...

▼ centre of Gravity...

▼ principle of Lever...



▼ sound through impact...

▼ Principle of constructional toys...

▲ Principle of constructional toys...

...

▲ Static toys...

▲ Decorative toys...

6 SCIENTIFIC PRINCIPLES OF TOYS

In the process of playing with toys based on some scientific principles, a child is exposed to a number of scientific principles, particularly those related to physics. Most toys would have more have more than one principles applied to their design. Taking the most prominent principles used, the toys can be grouped as follows :

- Sound produced through :

1. Vibration
2. Resonance of air column
3. Quick displacement of air / air pocket.
4. Vibration transfer through material
5. Friction

- Energy Storage and Conversion

1. Transfer of stored Mechanical / energy into motion.
2. Conversion.
3. Rotational motion due to air flow.

- Applied Mechanics

1. Angular momentum
2. Mechanical Advantage
3. Linear to circular motion due to torque.
4. Moments
5. Pulley
6. Wheel
7. Pendulum
8. Transmission of Mechanical energy through lever line.
9. Cam Principal
10. Frictional Force

- Aerodynamics :

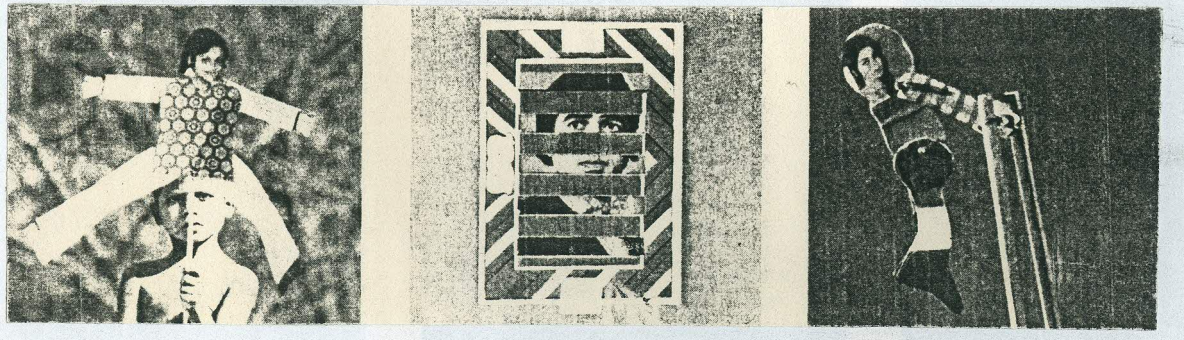
1. Bernoulli principle
2. Propeller action
3. Air drag
4. Propeller action due to torque
5. Sail effect
6. Air Pressure balancing weight.

- Miscellaneous Principle

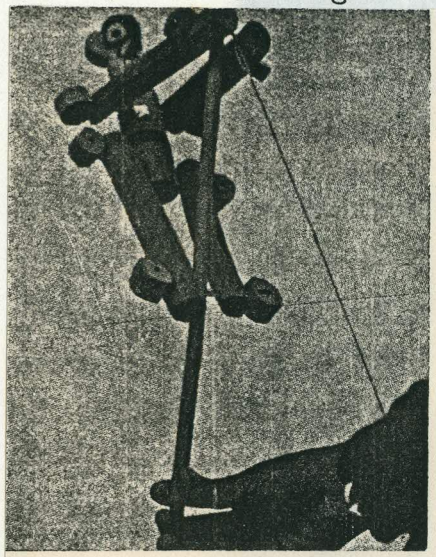
1. Center of gravity
2. Centrifugal and centripetal force
3. Thermal conductivity
4. Heat due to friction
5. Electrostatic induction
6. Elastic properties of material
7. Hydraulic pressure
8. Surface tension
9. Atmospheric pressure
10. Persistence of vision

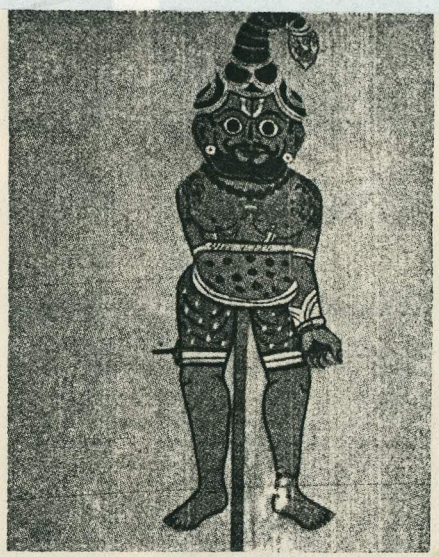
▲ Elastic properties of material (Elasticity Motion)...

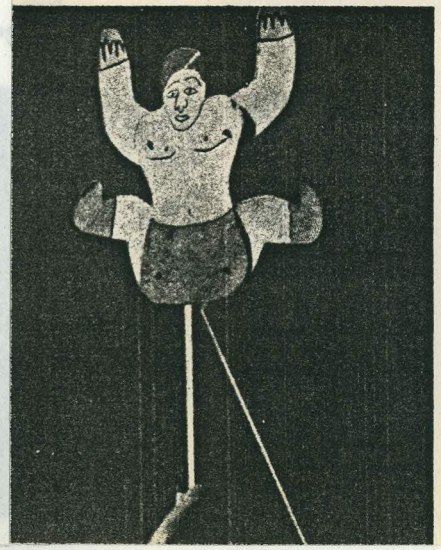
Toys using scientific principles:



▼ Examples of Toys using Scientific principles...

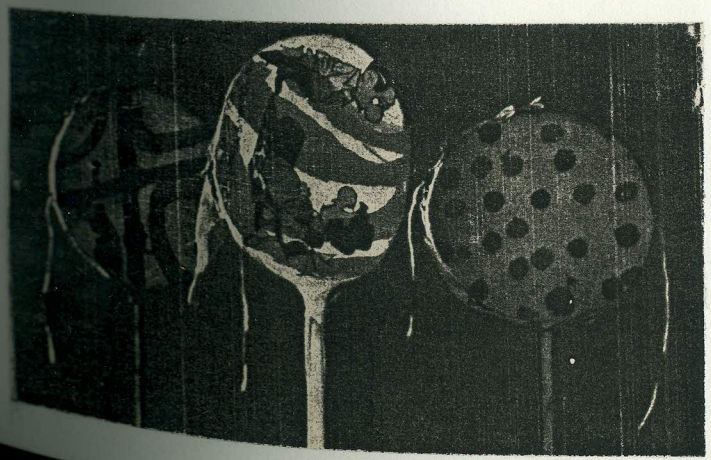


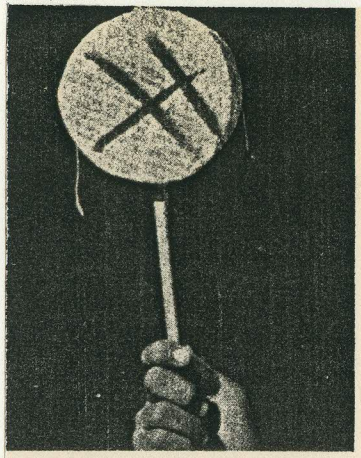


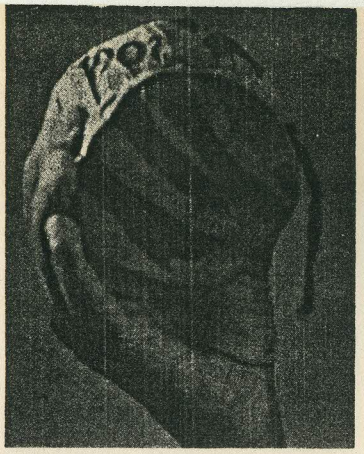


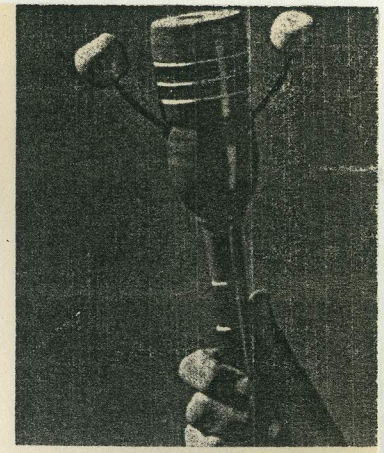
▼ Rattle and Drum Toys...

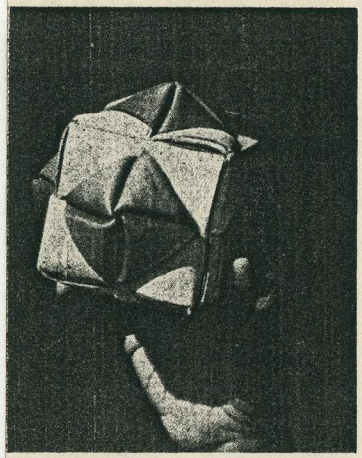
...based on the principle of sound through impact...

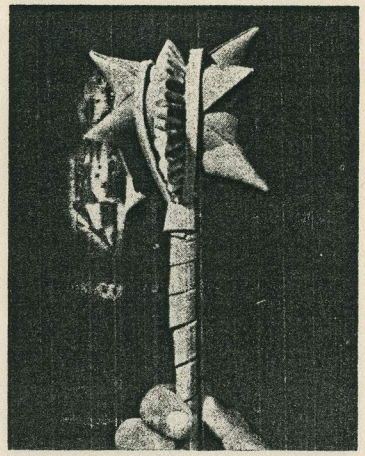


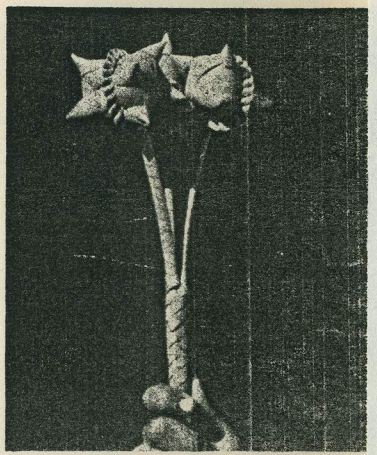


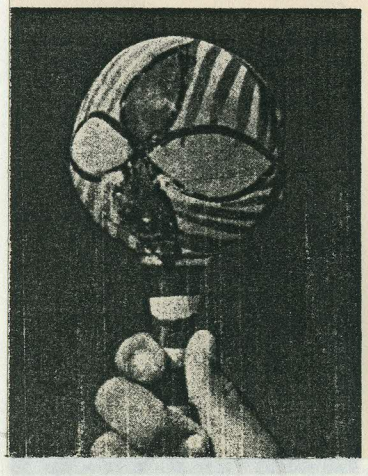


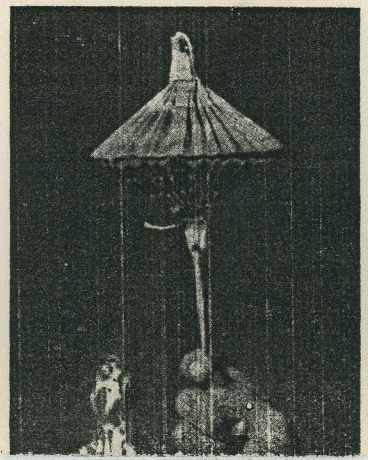


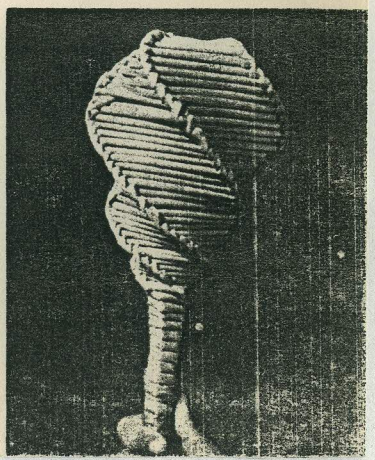




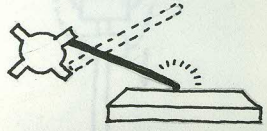


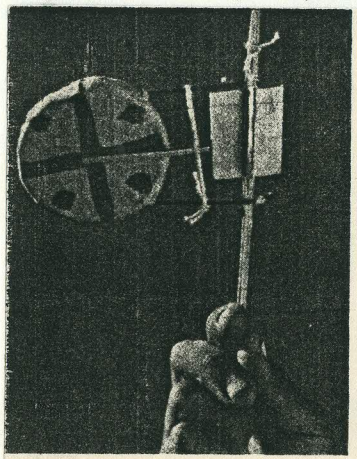


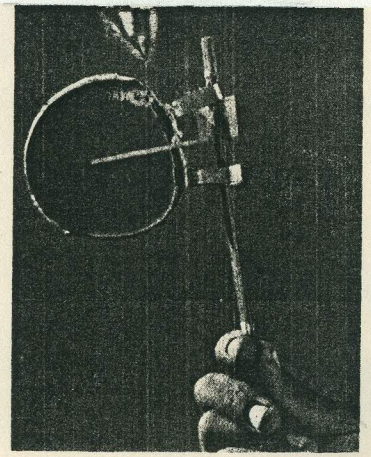


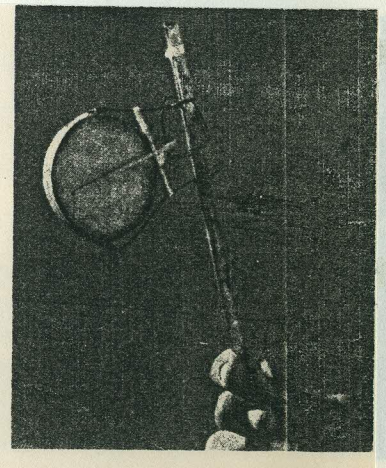


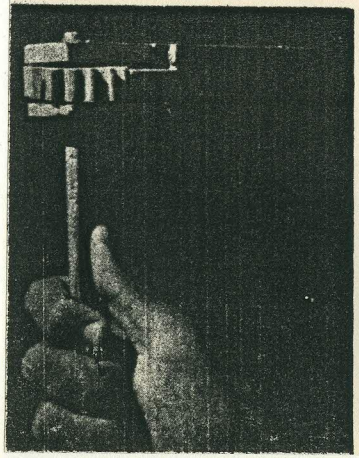
▼ Based on the principle of Sound through impact....

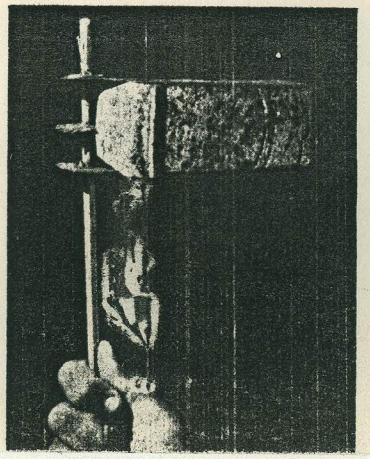


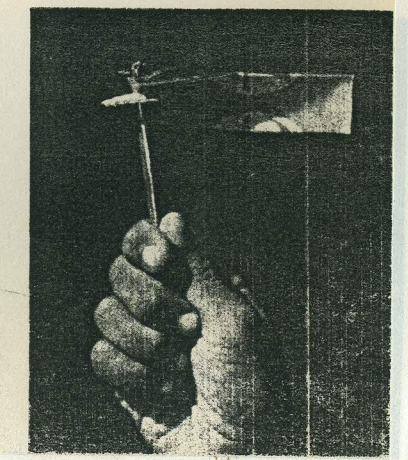


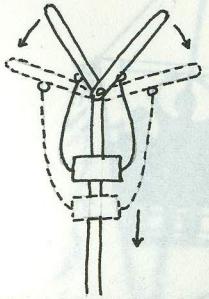




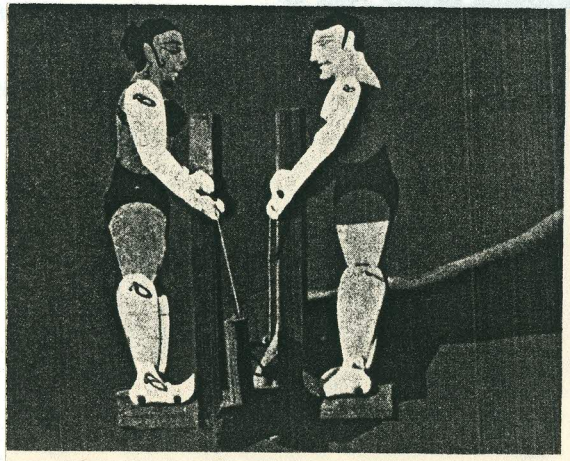


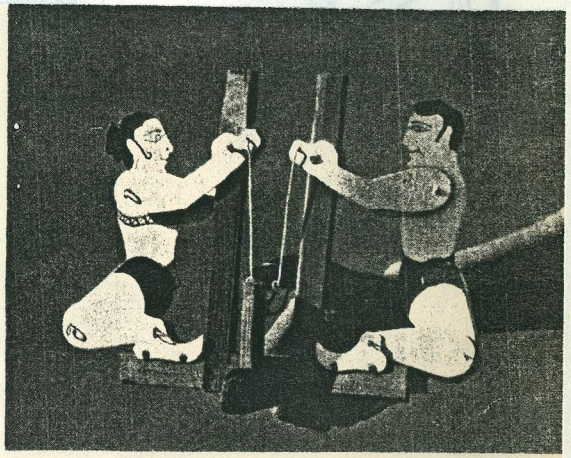


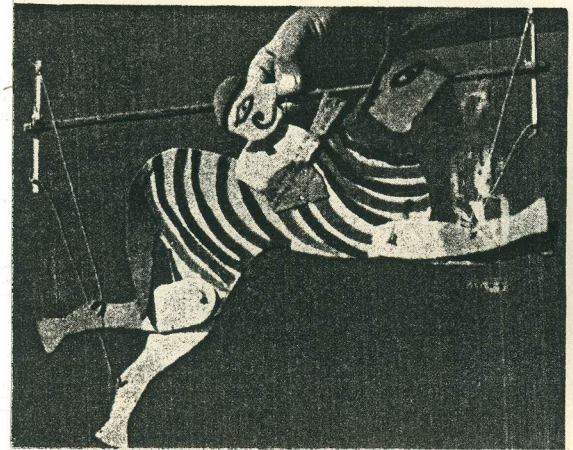


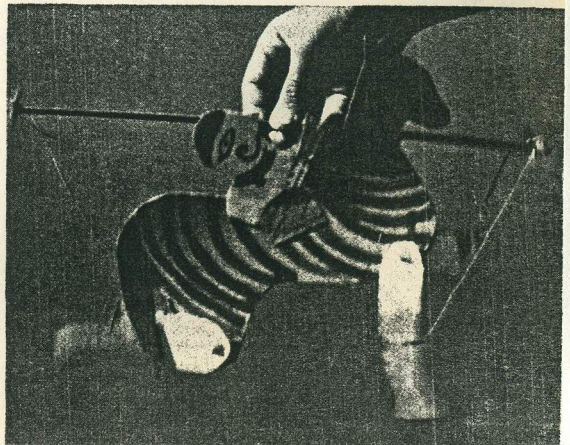


▼ Link motion Toys – Based on the principle of lever...









A clay whistle is like a closed pipe in which the air column is caused to vibrate (figure 14.) by the movement of air against an edge. The stream of air issuing from a narrow slit is caused to impinge on a sharp edge. Small aerial vortices will be formed on both sides of the wedge and these eddies will give rise to a faint sound known as the edge tone. The pitch of the edge tone depends on the velocity of the air stream. If the frequency of the eddy formation chances to correspond approximately to the natural frequency of the air column, resonance will occur and a relatively loud sound will result.

The pitch of the sound produced in a closed pipe is inversely proportional to the lineal dimensions. The term 'scale' designates the ratio between the diameter and the length of the pipe. The scale of the pipe has a marked effect on the tonal quality. A slender pipe (small scale) will yield a tone rich in overtones.

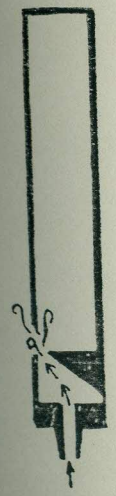
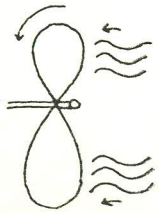
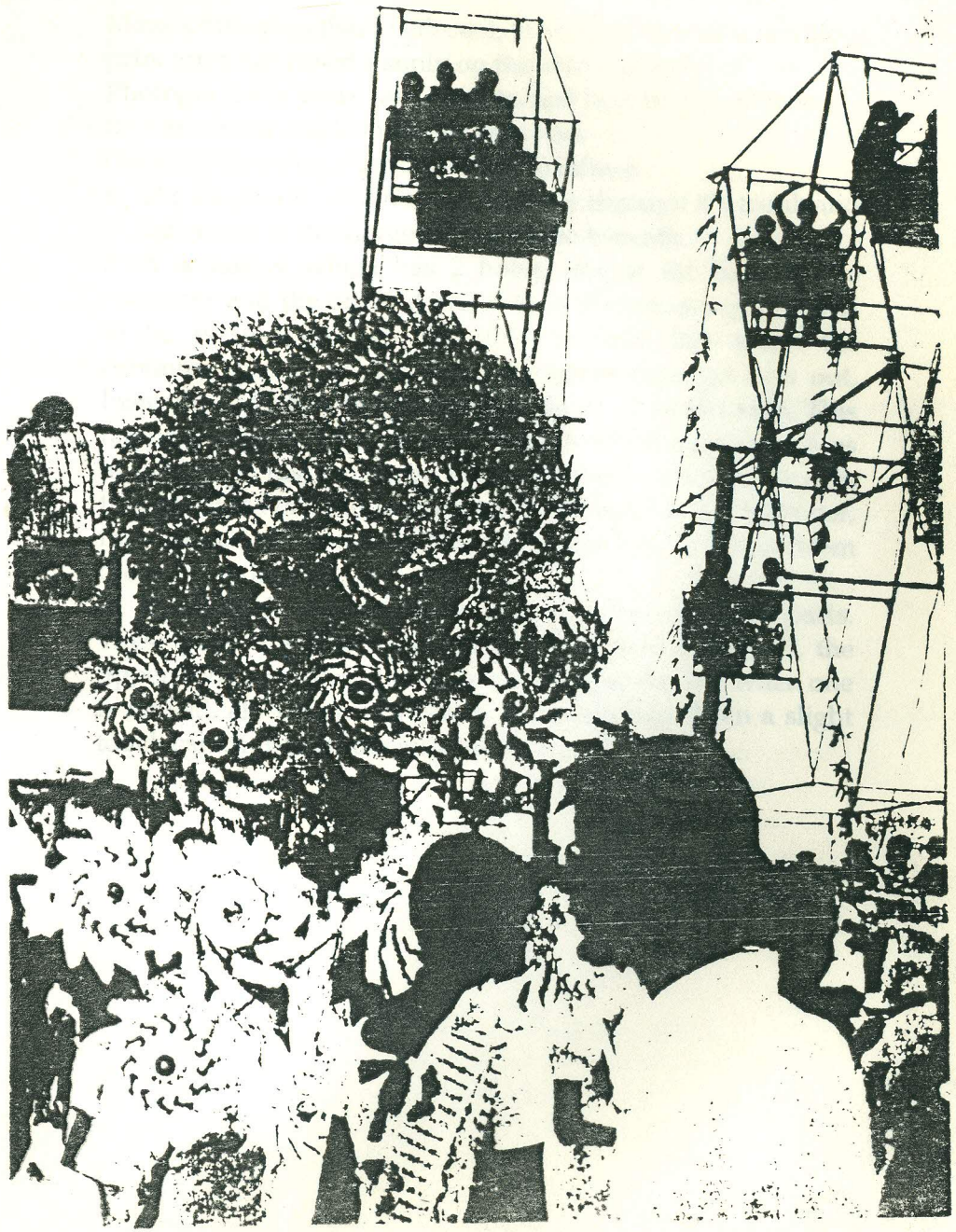


FIG 14
Diagram of a closed pipe



▼ Wind and whistle toys - based on the principle of wind energy...



Many of the toys that I collected, to study different scientific principles, are based mainly on the above principles.
Photographs of these toys are attached here in. All of these toys are either made in plastic or wood.
Only 3 of these toys use clay as the medium :

1. The Elephant : which sucks in water through it's trunk and that water is discharged from a hole beneath.
2. A container which has 2 holes, one at the base of the container and the other at one side of the container. Water is to be poured through the hole beneath. But when the container is to be held straight, the water does not flow out. Instead, it can be poured through the hole on the side. This happens because, the passage through which the water goes in through is just a passage in a conical form. The water runs through this hole and falls out onto the base of the container, from the sides of the cone. Now the water can be poured from the hole on the side.
3. A doll made in clay, which is made up of 4 separate parts. These parts are placed on top of each other. The head, the upper body, the skirt, the base, are all separate, but when one is moved, all others move, very gracefully too. Even a slight touch can trigger off the movement.

The project study did not end with the study of toys, studying scientific principles, understanding clay as the right medium, or knowing the problems potters are facing today. But, I concluded with the project, by actually experimenting with clay and making some simple toys based on scientific principles. These toys do not use any complicated principles, but are mainly based on very simple principles that make the toys interesting as well as fun to play with. They are as follows :

- The elephant (based on the principle of a lever) :

This elephant's trunk and tail move when the string below the base is pulled downwards. The movements are generated by applying the principle of lever when the strings are pulled, that are attached to each individual part. They move against gravity, and on release, return to their original position.
A doll based on the same principle, has been made, whose hands and legs move up and down, due to the pull of the strings.

- A kettle :

You pour water from the base of the kettle and when it is put straight again, the water does not flow out through the same hole, but instead, it can be poured out from it's spout. This happens because the hole at the base extends into a cone on the inside. When water is poured through it, the water falls on either sides of the cone and fills up at the base. Now it can be poured from the spout.

- A horse (based on the principle of air pressure):

When water is poured into this horse, with the top hole closed, the water does not flow out. But when this hole is

released, the water flows out through a hole beneath it. When shut, again the water flow stops. This happens due to the lack of air pressure, when the lid is shut. When released, the air pushes the water down. Similar toys made are, the pig, the owl, the elephant.

- The rattle (based on the principle of sound through impact)

This rattle has a different rattling sound to it because it contains small clay balls inside, that hit against each other and the walls of the rattle. The space inside helps to give a better sound impact.

- Whistles (based on the principle of wind energy)

These whistles have a unique sound quality to them, because they are made in clay. When air is blown through the hollow body of the whistle, it hits the surface made parallel to it, due to which the whistling sound is created. The 2 other holes are made to create extra notes when playing it.

- The pulling cart (based on the principle of sound through impact)

The drum cart when pulled along by the attached string, is tapped by 1 spring loaded sticks. The tapping is guided by the 'ratchet and hammer' device of the toy. This toy makes loud and rhythmic sounds.

- The elephant's trunk (based on the principle of air pressure)

This is a toy in the shape of an elephant's head with a trunk. There is a stick with it, which goes inside its trunk. When this stick is pulled out with the trunk dipped in water , the water

is sucked into its trunk. When pushed back into the trunck, the water gushes out.

The above toys were just a few experiments to discover the advantages and qualities of clay. To prove that clay can be the right material to use for making toys. They can be as good as the factory made toys that are seen in the market. If successfully implemented, this could be a good start to bring back the ancient Indian tradition of making toys in clay and revive the clay culture through the Indian skilled potters.

CONCLUSION

Seeing the present situation it can be said that this professional of toy making needs an upliftment before it disappears and dies out. Encouragement, help, ideas, methods etc are factors which can bring, this art of toy making , (in clay) back to life. This is possible if such experiments (similar to the one I have tried conducting) are working upon which give new alternatives, ideas, creative solutions. These experiments if implemented will help a potter create toys which can get him a decent income with the added advantage of his creative skill.

This is possible because, there are buyers in the market, but due to the extinction of this form of art we are unable to trace such toys anymore, and are forced into purchasing factory made toys.

Though the project title talks about creating toys using scientific theories, a very important factor had to be considered when making these toys: the design and the scientific principle that each toy uses should be simple enough to be reproduced by the potter.

Thus the basic purpose of this project is to create creative alternatives, for the skilled potter and revive back the tradition of India clay toys that existed once upon a time.

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