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ABSTRACT

A study of young children's art and representational thought investigated the order in which representational concepts emerge in children's modeling in clay. It was predicted that children's three-dimensional representations of simple, symmetrical, and balanced familiar objects would be superior to their representations of complex, asymmetrical, unbalanced, and unfamiliar objects. Eight modeling tasks, including the modeling of objects, animals, and humans, were administered to 109 children between 4 and 13 years of age and to 18 college students. Subjects' actions and verbalizations were recorded, and their sculptures were scored. Findings indicated that a restructuring is likely to occur in the way children approach a modeling task as they develop greater cognitive maturity. Young children first make use of three-dimensional representational concepts in the modeling task. They later develop seemingly two-dimensional strategies when their ambition to create closer likenesses and more complex figures conflicts with the technical difficulties they encounter in manipulating the clay medium. Cognitive maturity in itself does not automatically result in competence; practice and motivation are crucial. Findings also highlighted preschoolers' sensitivity to the demands of a task and their capacity to experiment with diverse solutions. Implications for the teaching of art are discussed. A list of 27 references and pictures of 14 clay sculptures of the children and college students are included. (SLD)

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Art and the Young Child: Another Look at the Developmental Question

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ART AND THE YOUNG CHILD: ANOTHER LOOK AT THE DEVELOPMENTAL QUESTION

Claire Golomb

Art making in young children has been the subject of much innovative research that has focused on drawing as a representational activity. One might link the onset of this representational activity with the child's discovery that shapes made on paper, sand or a slate leave marks that "look like something." Representation, unlike the early scribble patterns, is a symbolic activity were marks, be they dots, lines or contours point beyond themselves to another realm of meaning. Although infants and toddlers can recognize pictures fairly early on (Bower, 1974; DeLoache et al., 1979; Hochberg & Brooks, 1962), and thus are able to establish an equivalence between a three-dimensional object and its photographic or drawing reproduction, they cannot as yet create shapes and figures as representations. It is with the advent of graphic and other forms of representation during the child's fourth or fifth year that a new level of awareness emerges that truly transforms the human being. From this time on, the child becomes an active participant in his or her cultural community, a being that has some awareness of her own inner world of thought and feeling.

In recent years, developmental psychologists have begun to pay closer attention to the emergence of representational thought in young children and to their knowledge about mental states, for example, their understanding of thoughts and feelings in

themselves and others. The transition from a seemingly effortless perception of concrete objects that exist out there in the real world to their representation in the mind presents something of a puzzle, especially, when we consider the child's emerging capacity to engage in the kind of imaginative behavior that transforms the originally perceived scene (Leslie, 1987). Studies on the child's distinction between fantasy and reality and the creation of an imaginary world in story telling, pretense play, and fantasy suggest that these symbolic capacities emerge in rough synchrony across diverse domains (Applebee, 1978; Flavell et al.,1987; Golomb & Kuersten, 1992; Paley, 1981; Sutton-Smith, 1981; Wellman, 1990; Woolley, 1992). There appears to be some unity across domains in which this newly emerging representational capacity finds expression. There are, however, also significant differences that distinguish the domains and we need to understand their uniqueness if we want to formulate educational goals and try to achieve them.

Differences that characterize diverse domains can be quite striking. In pretense play, for example, imitative behavior plays a significant role as children often enact scenarios observed in their every day life and imitate the action and speech of adults. But make believe play is not merely imitative in nature, it also transforms the pretense world by substituting what look like inappropriate objects for missing ones, as is the case when a banana substitutes for a telephone and a building block stands for a piece of cheese. Clearly, these actions performed on

substitute objects are not derived from real world practices and violate them to some extent.

Unlike pretense play and story telling for which the culture provides some useful models, drawing does not lend itself to simple acts of imitation. Given the three-dimensional character of all objects, and in the case of the human, an object made of organic stuff, the child's drawn version does not stand in a simple relation to its model. We note that a child's first drawings of humans and animals consist of global units that encompass the facial features (see illustration 1). These figures are original productions in the sense that they are not derived from an existing model. Clearly, humans are not made of circles, dots and lines, and the child's rendition is purely his own invention. Indeed, from its early beginnings representation rests on the invention of forms that are structurally or dynamically equivalent to the object. Artists do not aim for one-to-one correspondence, nor do they aspire to "copy" the original, which is altogether impossible given the intrinsic differences between the properties of a two-dimensional and a three-dimensional medium. Simply stated. the flat surface of the paper lacks the conditions necessary for imitation proper. By its very nature, the drawing medium with its specific tools tends to encourage shapes made of lines and contours which constitute the language of graphic concepts.

Perhaps, analogous to the distinction between fantasy and reality in play, the child who draws an oblong, equips it with

facial features and calls it "a man" does not mistake it for a human of flesh and blood; she merely views her figure as an acceptable equivalent. She evolves a rule system that holds that a unit on paper, for example, the circle with facial features, is equivalent to another unit, a human or an animal. This conception of equivalence does not reflect an inaccurate percept or a faulty concept of the object. On the contrary, it indicates the symbolizing propensity of the human mind to establish correspondences on the basis of general qualities. From our observation of child and adult art we learn that representation does not rest on an identity of elements, but on prototypical or abstract properties (Arnheim, 1974; Golomb, 1992; Rosch, 1973, 1975). The ability to abstract out of the myriad details that comprise a human some general characteristics that define its animate nature is a true hallmark of a symbolizing intelligence. Thus, the invention of a meaningful graphic language rests on an understanding that symbols "represent", and that they are not to be mistaken for the actual object they refer to, that is, that symbol and referent are to be distinguished.

Unlike spoken language, which presents the child with a ready-made and perhaps arbitrary symbol system essential to his survival as a social being, early drawing requires an individual act of creative invention of a graphic language that, unlike the spoken language, has an intrinsic relation to the referent. This view of child art stresses the symbolic capacities of the young child who actively engages in creating a pictorial statement and

in this process discovers the possibilities and constraints that are unique to the drawing domain (Golomb, 1992). However, drawing is also a socially sanctioned activity and in order to fully understand the significance of this creative process for the three-, four-, and five-year old, we ought to study the making of drawings within the broader context of the child's milieu, and pay equal attention to cognitive, affective, and social factors in development (Tarr, 1992).

In the domain of drawing, the early representational achievements have been fairly well documented. Seen from a structural or formal point of view, they might be considered as universals that apply across different cultures (Golomb, 1992, ch. 10). The apparently stepwise progression observed in drawing has led to the formulation of "stage" theories that attempt to capture the qualitative differences that characterize the drawing of younger from older children. While the stage concept may be useful as a descriptive device, and calls attention to unique achievements, its explanatory status is somewhat problematical if one considers the time-frame within which changes in representational models can occur. Often significant changes in a child's graphic conceptions are demonstrated in a single session and with little practice (Golomb, 1973; 1974; Golomb & McCormick, 1992) (see illustration 2).

Most stage theories stress the young child's cognitive limitations and base their interpretation on so-called childlike characteristics of a drawing, for example, mixed views, the

flatness of figures, the juxtaposition of sides, transparencies, and lack of three-dimensional skill in the portrayal of a scene (Piaget & Inhelder, 1956). These theories focus on cognitive immaturity as the major factor underlying the childish representations, and tend to ignore the nature of the two-dimensional medium and its intrinsic difficulty for three-dimensional depiction. Implicit in this position is the notion that "realism," is the mature endpoint of artistic development, and as such ought to serve as the standard by which the child's drawings are to be judged. This orientation to graphic production seems oblivious of the limited graphic skills of many educated adults, and ignores the diversity of cultural models, of which realism in art presents but one of many modes of representation.

In order to tease apart what are medium specific problems that confront inexperienced children and naive adults alike, and what are conceptual limitations unique to children, we need to probe more deeply into the nature of representation by examining the materials provided, the instructions given, the demands of the task and the child's conception of what is expected or required. Some of these questions I explored in my earlier work (Golomb, 1969, 1973, 1974, 1981, 1983) and more recently in a study devoted to the development of modeling in clay (Golomb & McCormick, 1992).

Unlike drawing development which has been the subject of numerous investigations, three-dimensional representation in clay has been largely neglected. The reasons for this neglect are not

difficult to discern: it is a technically difficult and somewhat messy medium to work with, and clay figures handled by inexperienced children tend to fall apart. The collection of clay figures, their transport, preservation, and storage present considerable problems and require much time and effort on the part of the investigator. Nonetheless, to fully understand artistic development and the meaning of the early stages in drawing, we need to study performance in a related, though different medium that does not entail the same problems in the representation of dimensionality, but poses its own domain specific challenges and questions to be addressed. Among the range of potentially fruitful questions, I would like to raise the following ones:

What is the general course of differentiation in the plastic medium? Does representation proceed from an early undifferentiated state to the use of at first one, then two, and lastly three dimensions, or are three-dimensional concepts used from the very beginning, albeit in a primitive form? If children bring a basic notion of three-dimensionality to clay, what does it consist of? Are they more likely to "imitate" the volumetric properties of the object when working with clay? Do children have an awareness of the possibilities this medium can afford them to represent quite directly the "inside" and the "outside," the "front" and the "back" view of an object? Are children more likely to represent the different sides of an object in clay than in drawing, or are they content with what has been called the

"canonical" orientation of objects? Such an orientation is quite typical of children's drawings and it represents the single view that best captures the essential characteristics of the object. Since modeling with clay lends itself to the making of "real" objects, and a sculpture can also function as a symbolic play object, do children think of their sculpture as a miniature copy or as a representation of the real object? If it is the latter, what requirements does the representation have to meet, and how do the criteria for such a representation change with experience and practice? Finally, unlike the apparent permanence or fixity of a drawn figure, the child who models a figure in clay can quite easily change his creation. Given the revisability of this medium, and the latitude for ongoing experimentation, does the child avail herself of the opportunity to shape the material until it meets her expectations? To most of these questions we do not find an answer in the published literature.

In the limited number of publications, mostly devoted to representation with blocks (Reifel, 1984; Wolf, 1988), the assumption has been that development would proceed in a somewhat linear fashion, beginning with one- and then two-dimensional equivalents of lines, and progressing gradually to a three-dimensional representation of objects. For example, the sticks or snakelike shapes children roll with playdough or clay are seen as one-dimensional equivalents of lines, the pounding or flattening of clay is taken as an indication of a two-dimensional conception, while modeling in the round is considered a late

achievement. In part these assumptions rest on the notion that a developmental progression should proceed from simple to more complex conceptions and strategies; in part they are influenced by investigators' notions about drawing development.

This model of development, while plausible, is somewhat at odds with findings from a previous study of modeling the human figure (Golomb, 1972, 1974). This study revealed that young children can make upright standing figures and that their models are often of a global and volumetric kind. On the basis of this earlier finding, it appeared likely that the hypothesized progression from one- to two- to three-dimensional representation might be based on a mistaken application of the principle that holds that development proceeds from simple to complex structures (Arnheim, 1974; Werner, 1957). Perhaps, the principle of simplicity has different implications for different media and tasks. In the two-dimensional medium of drawing, the third dimension is missing and cannot be represented in a direct way, which presents the pictorial medium with its unique problem. However, the restrictions that apply to drawing need not affect the medium of clay. On a priori grounds, one might find good reasons for both positions. Ultimately, this issue needs to be addressed empirically by examining the variables that affect representation in a three-dimensional medium.

With these questions in mind, I turned to the study of representation in clay, a project jointly conducted with Maureen McCormick. We wanted to study the effects of the following

variables: complexity, symmetry, balance and familiarity. Some of these variables are specific to the medium (balance), and some are of a more general nature (familiarity, complexity, symmetry), although their interaction tends to be quite specific in the three-dimensional medium. We were particularly interested in the order in which representational concepts emerge in clay, whether development proceeds in a somewhat linear fashion or begins with early, albeit primitive three-dimensional conceptions. We decided to study these issues in terms of the figure's posture, whether upright standing or placed horizontally on the table top, and the child's attention to the multiple sides of the object. Overall, we predicted that the child's three-dimensional representation of simple, symmetrical, balanced and familiar objects would be superior to his performance on complex, asymmetrical, imbalanced and unfamiliar objects. (To the extent that we can find some predictions in the literature, they are based on sculptures of the human figure, a complex, partially asymmetrical, and difficult to balance object.)

We selected eight modeling tasks and administered them in a semi-fixed order: Cup, Table, Man, Woman, Person Bending Down to Pick up a Ball, Dog, Cow, Turtle. These tasks refer to common objects familiar to the child either by direct contact (Cup, Table, Humans, Dog) or at the very least from stories and illustrations (Cow, Turtle). The first two tasks served a "warm up" function to familarize younger children with clay and to facilitate the discovery of what can be done with this medium.

The Cup and the Table are familiar and symmetrically constructed objects; they vary in terms of complexity and balance, with the Cup simpler in its structure and easier to balance than the Table. Following the "warm up" tasks, children were asked to model humans and animals, in that order, counterbalancing the items within each of the two groupings.

Our participants were 109 children ranging in age from four to thirteen years, and a group of 18 liberal arts college students. The children were drawn from preschool centers and elementary-junior high schools, and represented a broad middle class sample. The college students were enrolled in Art and/ or Psychology classes at an urban university. They came from diverse socio-cultural milieus and their ages ranged widely. All participants were seen individually over one to two sessions. For each task they were provided with a ball of clay, approximately 3 1/2 inches in diameter; no time limit was imposed. A detailed record was made of each subject's actions and verbalizations. The clay sculptures were carefully collected, transported and preserved for scoring purposes.

On the first set of tasks, nearly all the subjects modeled the Cup and the Table three-dimensionally and demonstrated effective use of the spatial concepts of "in," "under," "top," and "side." Although the younger children modeled their object more crudely, they succeeded in portraying the essential three-dimensional character of the Cup. On the second task, the majority of the participants, including the four year olds,

constructed the table in a three-dimensional manner. Faced with the problem of collapsing legs, many children invented a strategy of inverting the object so that its flattened slab rested on the table top with its legs extending upwards, explaining "when it is dry and sturdy you can turn it upside down." Thus, on the first two tasks that were relatively simple in structure, familiar, symmetrical and balanced, almost all of the children created three-dimensional representations, with upright intention one of the defining attributes (96% for the Cup and 81% for the table). This finding concurs with our overall prediction.

A comprehensive set of analyses on scales designed to detect the emergence of three-dimensional concepts in clay yielded significant task and age effects.

Task Effects

Our analysis focused on the six human and animal tasks for which we developed quantitative measures. As predicted, we found significant task effects for each of our age groups, with higher dimensionality scores for Person Bending than for the Man and Woman tasks, mostly due the figure's upright posture and the modeling of multiple sides. Animals also scored consistently higher than humans, including the Person Bending, an indication that children are sensitive to task demands, and model their figure accordingly. Even the youngest children in this study were inclined to consider more than a single side of the human, but above all of animals.

In terms of upright intention we see clear task effects. For

the total sample of children, 59% attempted to model the Man or Woman in an upright standing posture (adults 56%). This number increased to 73% for Person Bending (adults 100%), and peaked at 82% for the animal tasks (adults 100%).

In general the tendency was to create an upright standing animal, its head and body orientation clearly differentiated (frontal orientation for head, side orientation for body), with some attention to the underside of the body and the modeling of front and hind legs. We found few so called "mixed views" that align head and body on a single side or plane, which is a common occurrence in drawing.

Age Effects

As was to be expected, dimensionality scores increased with age but leveled off from, approximately, age eight or nine years on. However, no such age effect was found regarding the figure's posture, that is, the intention to create an upright standing figure. Such an intention was already apparent among our youngest children (see illustrations 3, 4, 5). Interestingly, on the human figure tasks, upright intention decreased with age: preschoolers had the highest upright intention (71%), followed by the kindergarteners (68%), with all other ages trailing behind. For the adult group the percentage of upright humans once again increased (56%). These data suggest that the representation of uprightness for human figures might follow a U shaped curve. On Person Bending and the Animal tasks, however, upright intention increased with age.

These findings suggest that young children, at an early age in modeling, employ a primitive three-dimensional conception which leads to crudely modeled upright humans. When children attempt to differentiate their figures and begin to model more diverse parts, they discover the technical problem of constructing a complex and difficult to balance human figure. Hence, horizontality is a compromise solution: the figure is more detailed and complex in its construction but is resting on the table top. In the Person Bending task, the inclination to place the figure lying horizontally on the table top is countered by the strong demand for verticality implied by the instruction. On the Animal tasks, the child's upright intention can find an easier expression: these figures can be balanced on four legs that provide a stable base for the body.

Representational Models and Construction Style. A survey of the kinds of representational models children evolved confirms the findings reported so far. One-dimensional models were rare; we did not find a single example of unattached snakes or pieces of clay, and very few stick figures. With few exceptions, stick figures, which one might view as one-dimensional representations, were modeled by somewhat older children, from the third grade on. "Outline" or graphic models which seem to rely on two-dimensional strategies, appeared infrequently and were mostly limited to preschoolers and kindergarteners. The solid but flattened figure was a more commonly employed model (between 10-26%), but no clear age trends could be discerned. The majority of our participants

created three-dimensional models that were held upright, free standing, or standing with some support (59% humans, 73% figure bending, 82% animals). Illustrations 6, 7, and 8 are examples of some of the models that represent the human figure.

Construction styles, that is the manner in which the figure was composed, involved two essentially different strategies: (a) internal subdivision of the lump of clay by pinching, pulling, and subtraction and (b) addition of separately modeled parts. Once again, no clear age trend emerged in terms of preferred construction style. The majority of the figures were constructed by a process of addition.

Figural complexity increased with age and was independent of the construction style. Figural differentiation scores, like the dimensionality scores, tended to level off from the third grade on. Overall, development in this medium shows a progression that begins with global, one unit figures that undergo differentiation as the child gains experience with the medium and aims for a more detailed and informative representation (see illustrations 9, 10, 11, 12).

From the middle childhood years on, differences in the performance of children and adults tended not to be significant. With few exceptions (the art students of the adult sample) the sculptures of the adults bear a strong resemblance to those of our younger subjects, ages nine through thirteen (see illustrations 13, 14).

We had predicted that young children's clay models of

familiar objects that are simple in structure, symmetrical, and easily balanced would reveal an early three-dimensional conception and competence. We expected to find evidence for the child's intention to model her figures in an upright fashion, and some attention to the multiple sides of the object. Indeed, the Cup and the Table met all these conditions; both were modeled three-dimensionally, with the representation of the Cup superior to that of the Table. The animal tasks which involved familiar objects, symmetrical in structure, and potentially balanced came next in terms of upright posture and attention to sides. Finally, the human figure which, though familiar, is complex in structure, asymmetrical in terms of sides (front and back), difficult to balance on its disproportionately long and spindly legs was less likely modeled in an upright fashion, and attention was mostly, though not exclusively, focused on its frontal aspect.

These findings provide us with answers to questions posed earlier regarding the order of the developmental progression, models employed, the variables likely to affect representation of side and posture, and the conceptions which underlie the child's representational efforts in the tasks we selected. We found very little support for the view that considers the early and primitive representations as expressions of cognitive immaturity, and much evidence that the young artist struggles with problems older children must also confront: how to create a satisfying representation that is not meant to be a copy but can stand for the object in some essential way; how to represent the three-

dimensional character of objects in a medium that puts a premium on balance, uprightness, and modeling the multiple sides of an object, all of which require great skill and practice. Thus, there are similarities in the difficulties faced by younger and older subjects. We also find evidence for age differences in attitude, attention span, and self-monitoring. Above all, the attitude toward the task at hand changes as a function of greater maturity and generalized learning experiences. The older children, especially the seventh graders, spent much time and effort in "revising" their sculptures, in reconstructing a figure several times, usually without achieving significantly better results! Thus, investment of time and energy, heightened motivation to meet the expectations of the adult experimenter, critical assessment of the demands of the task, and self doubt increase with age.

These results do not suggest that "development" is a fiction or merely a form of enrichment. Despite some of the similartities in the sculptures of younger and older children, these findings indicate that with greater cognitive maturity a restructuring is likely to occur in the way the task is conceived and approached. However, cognitive maturity by itself does not automatically lead to competence in a specific domain, and consistent practice and the motivation to master a task in a specific medium are crucial for bringing to fruition the growing potential of children and adolescents.

In summary, our predictions concerning task effects were

supported. It appears that children start with three-dimensional representational conceptions of the modeling task and only later develop seemingly two-dimensional strategies and models when their ambition to create a greater likeness and complexity militates against the upright posture of imbalanced figures. Thus, our analysis of the developmental progression runs counter to the earlier published accounts; so-called two-dimensional or graphic models in clay are later developmental achievements affected by the technical difficulties of the medium and the child's experience with drawing. Thus, four year olds who make the transition to representation in clay start with a basic three-dimensional conception: their figures, though crudely shaped, tend to be upright, and children may represent up to six sides of the object.

Does the development of modeling in clay enrich our understanding of the child's representation in drawing? At the very least, these findings highlight the preschooler's unsuspected sensitivity to the demands of a task and his capacity to experiment with diverse solutions. The findings from the medium of clay suggest that we need to rethink the meaning we have assigned to such terms as "canonicality," "transparency," "mixed views," "fold out" model, and "flatness." Simplicity of representational model, lack of skill and practice, indifference to the demands of realism in art and to the cultural expectations of making accurate copies of reality need not by themselves indicate that the artist's conception of the object is limited or

distorted, or that she is locked in a primitive stage of conceptual development. The simple work of naive adults is a reminder that art-making occurs in a cultural context, that it is always the product of effort, of training, of cultural norms valued and aspired to. To bring the eye of the sophisticated adult to the work of young children without understanding the long route education and development take is likely to distort our vision.

What can we learn from this study with its striking task effects and its somewhat less pronounced age effects? The most important lesson to be drawn concerns our use of the concept of "cognitive immaturity" as a blanket term to be applied, almost reflexively, to the work of the young and inexperienced ones. A more fine-grained analysis reveals more clearly the effects of multiple variables; it opens new avenues for understanding representational processes in art-making and for devising educational strategies that support its development.

How to foster the child's inquiry, his enjoyment of art-making, his passion for discovery and competence, without imposing our adult vision of "realism" prematurely, is the challenge for art educators. Children, no doubt, are flexible creatures, capable of much learning and experimentation if given the opportunity to do so, with guidance that respects their own inclinations and needs. To foster this goal, we need to engage in a productive dialogue between art educators and developmental psychologists interested in the arts. A developmentally based

conceptual framework can be helpful in designing appropriate educational strategies, and questions the educator grapples with can encourage innovative research in our shared discipline.

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Legends

1. Global human. Girl, 2;10.

   One of the earliest representational models in drawing.

2. First representations of the human figure. Girl, 3;8.

   Within the short time-span of a single session, Sarah progressed from a relatively undifferentiated closed shape to a clearly recognizable human figure.

3, 4, 5. Early upright standing humans and animals. Preschoolers, ages 4;2, 4;5, 4;8.

6. Outline model. Girl, 4;8.

   The outline model is a graphic model transposed to the medium of clay.

7. Stick figure with outlined face. Boy, 9;6.

   The stick figure is a relatively infrequently employed representational model in clay.

8. Man constructed of solid parts. Boy, 4;7.

   A commonly employed model in clay.

9. Global clay figures. Boy 6;2.

   Minimally differentiated representations of the human figure.

10. The human figure becomes differentiated. Girl, 7;1.

    Man, woman, person bending: parts are differentiated and separately modeled.

11. Seated cow with bell. Girl, 8;11.

    Body parts ~~of the animal~~ are distinctly modeled.

12. Well differentiated figures. Girl, 10;10.

From left to right: woman, man, person bending with ball. Figures are placed horizontally in a lying down position. Close attention is payed to facial features, hair, gender-related clothing, and body parts.

13, 14. Humans. College students, ages 19 and 29.

Striking similarity to the productions of elementary school children.

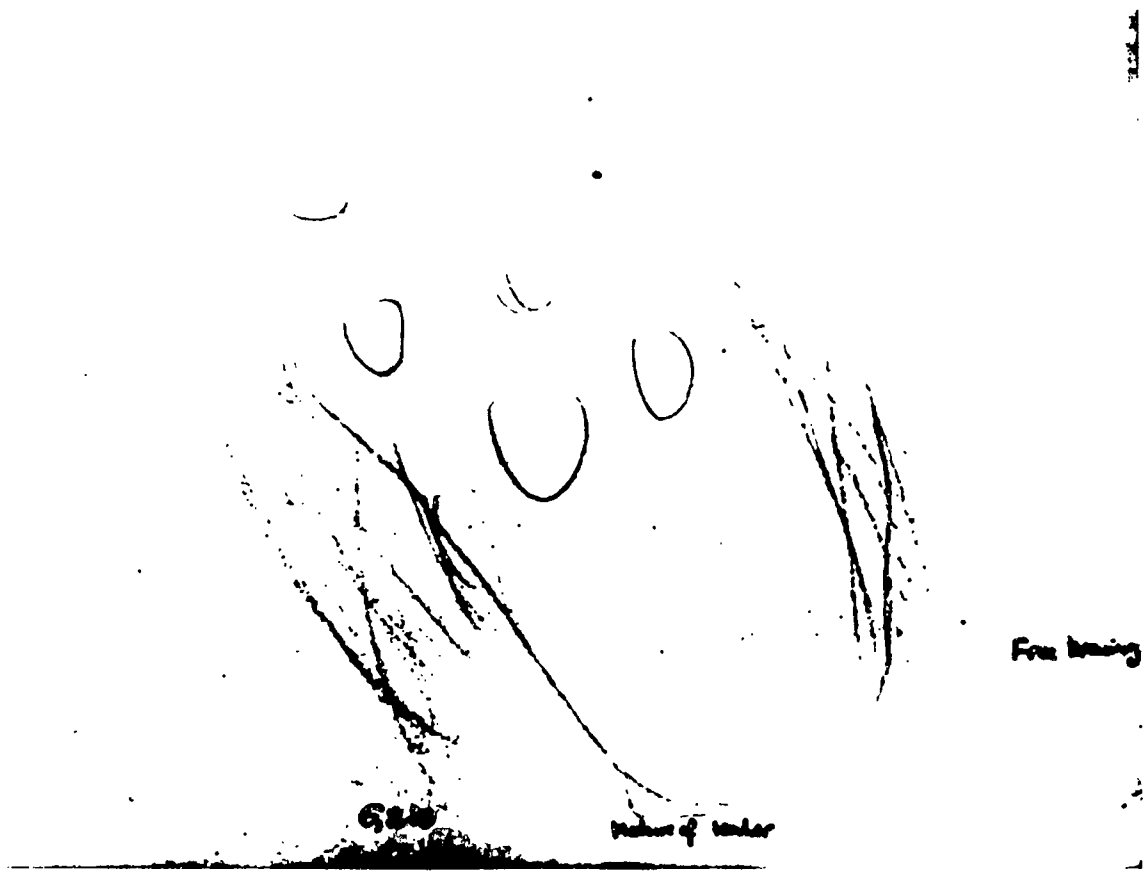

Fig. 1.

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Ill. 2

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Ill. 4

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Fig. 6

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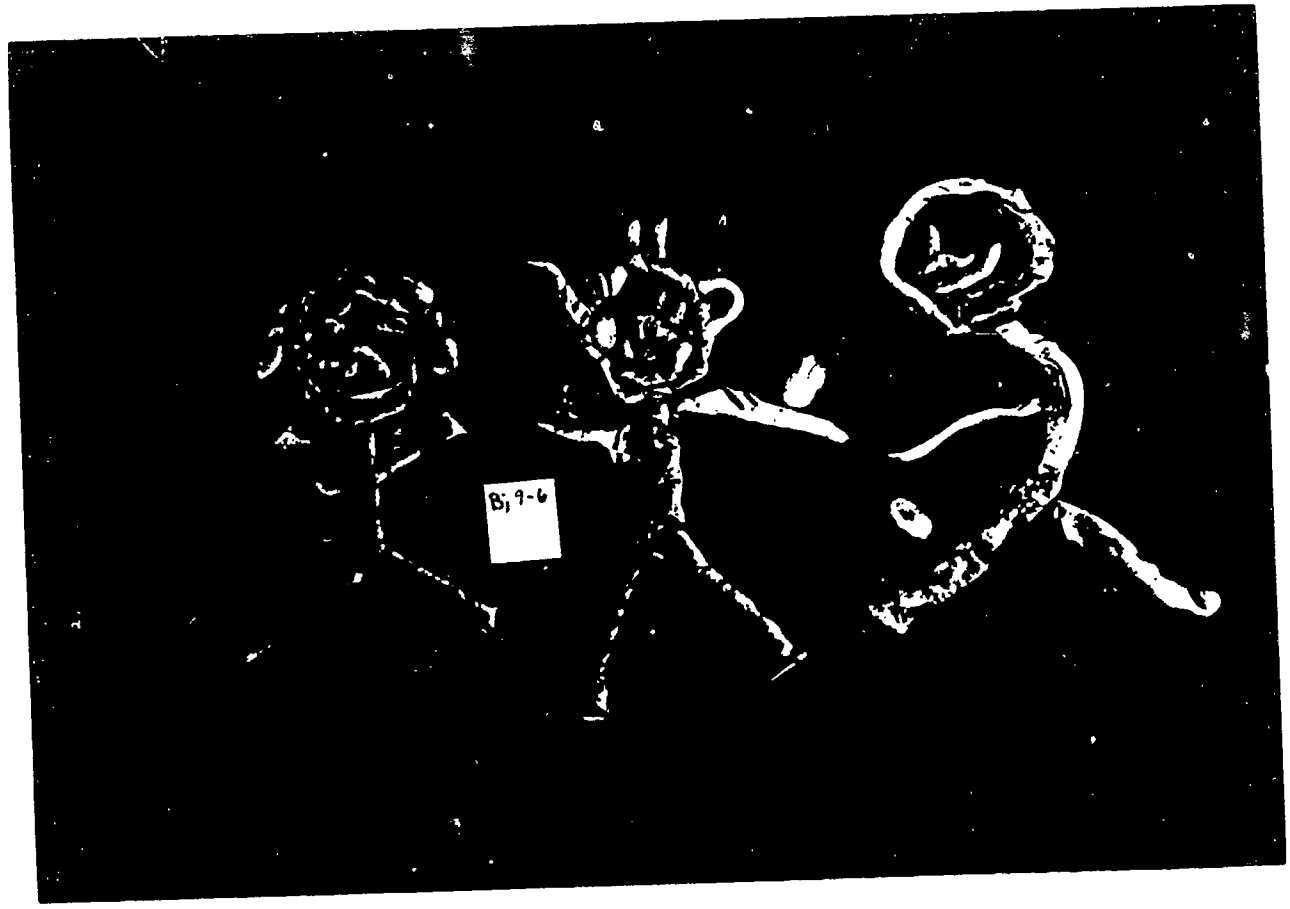

Illustr. 7

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Illustr 8

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Illus. 10

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Illustration 11

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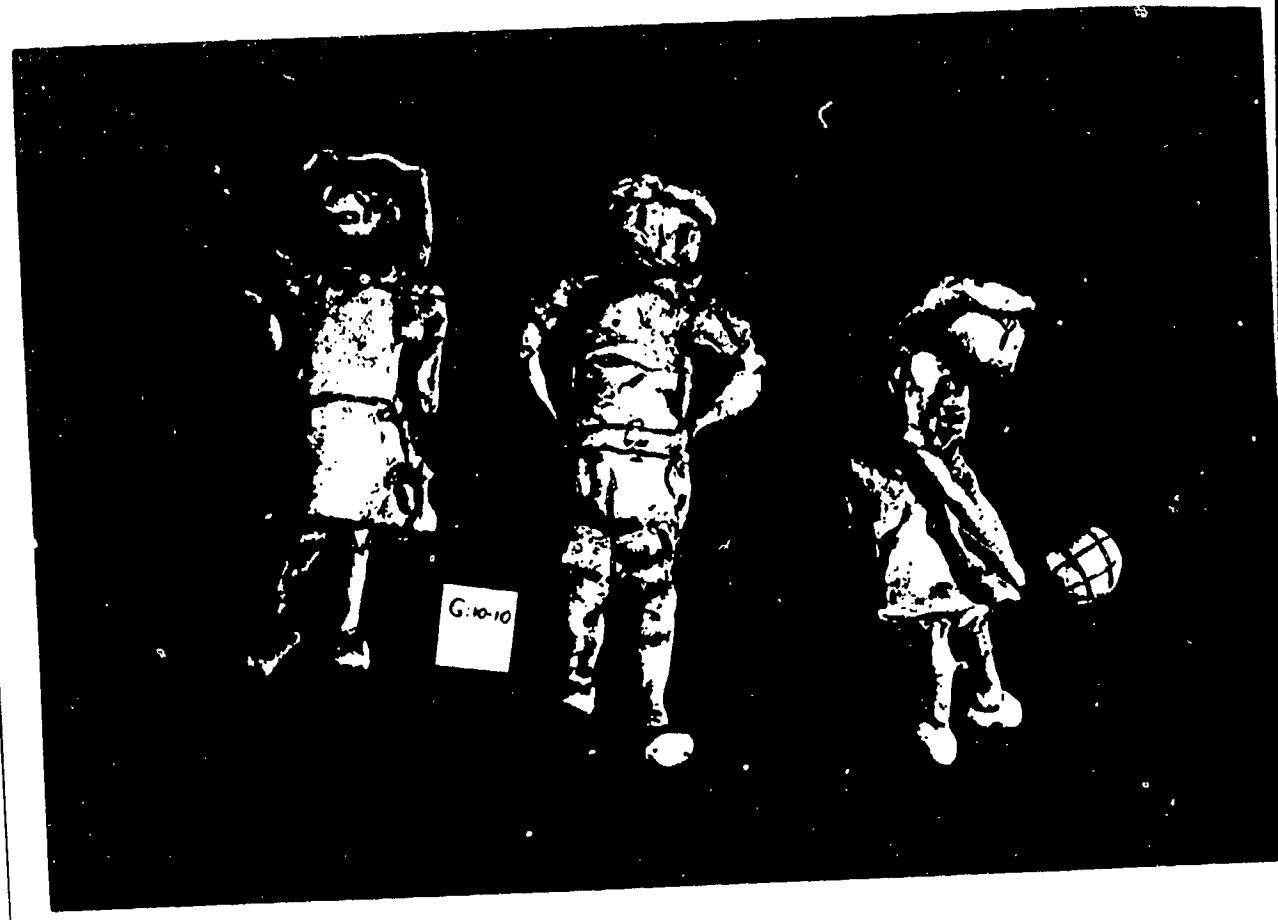

Exhibit 12

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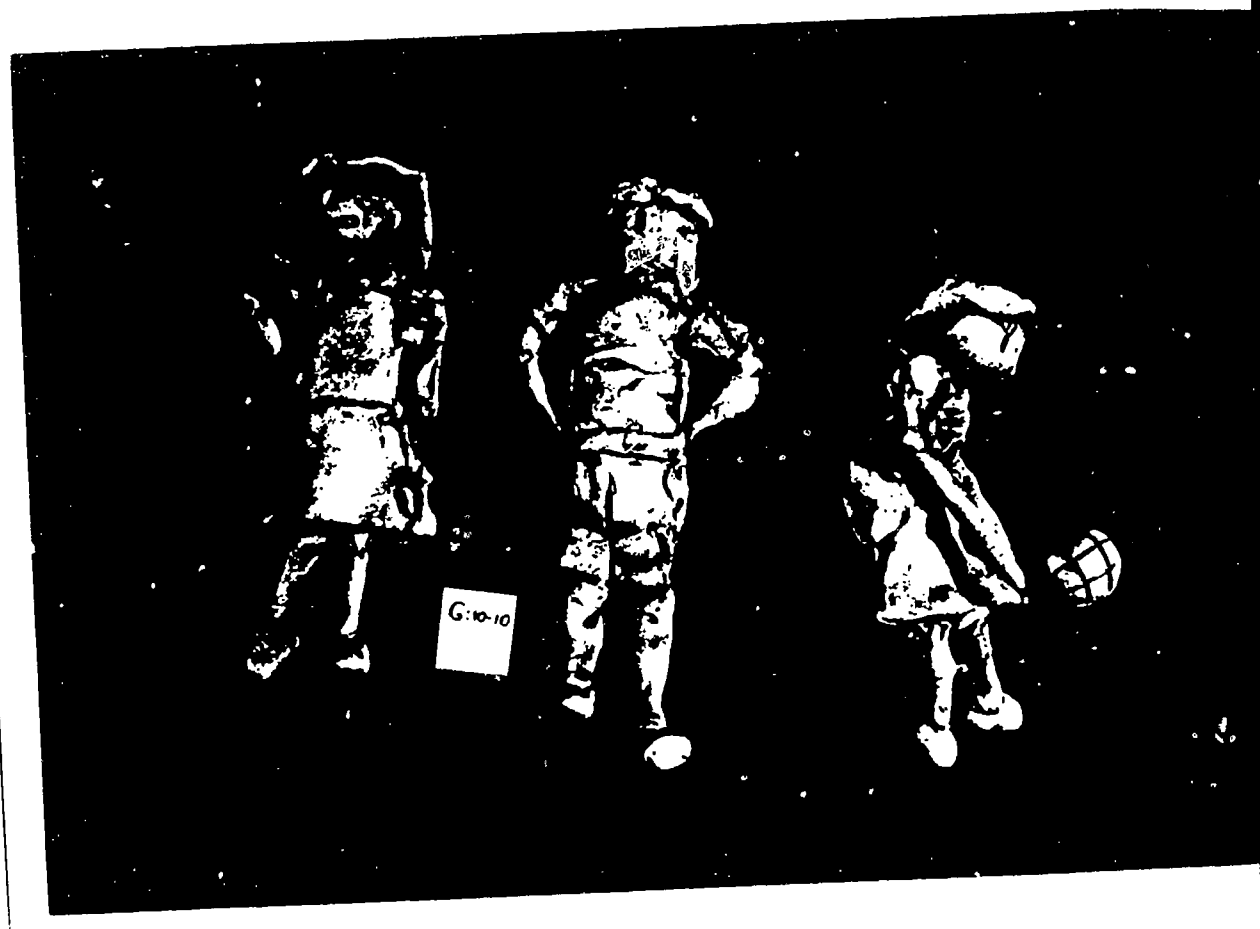
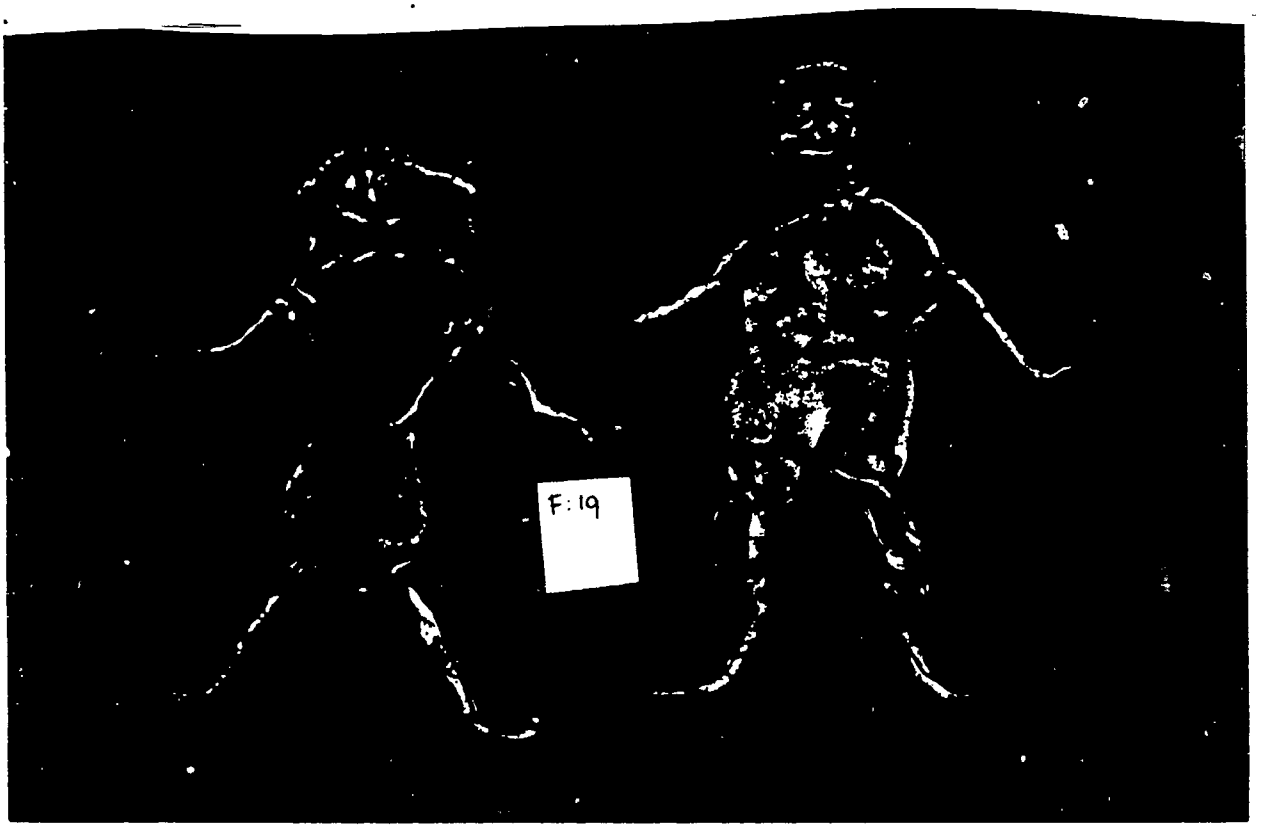


III-17-12



Ills 13

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