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Canada

Toy Designing and Art Education

Ann Szeto

A Thesis

in

The Department

of Art Education and Art Therapy
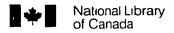
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ABSTRACT

Toy Designing and Art Education

Ann Szeto

A participant observation study was carried out to examine how a 5-year-old child played with objects. The findings were represented by five categories: objects that were not intended for transformation and were not transformed; objects that were not intended for transformation and were not transformed but were handled in a manner different than its intended one; objects that were intended for a single transformation and were transformed as intended; objects that were intended for multiple transformations and were transformed as intended; and objects that were not intended to be transformed but were transformed in multiple ways. The findings were then compared with the process of how an artist working in the tradition of the ready--made transformed ready-made objects into works. Characteristics drawn from the child's and the artist's processes formed the basis for suggesting criteria and prototype of a ready-made toy.

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(1) INTRODUCTION

For several years, I have been interested in designing toys that could possibly expand children's experiences and learing in art - toys that can be called art educational. I have had the conviction that some manufactured toys, such as construction toys, can be an ideal means to encourage art making and learning through play. I have thus hitherto considered them as my models for inspiration and guidance. However, as the findings of some of my previous research projects reveal, construction toys are pre-cut, pre-set, and often frustrating to children, a disillusioning fact that presents a difficulty in my present approach: that manufactured toys do have their strengths and weaknesses, and that my designs would never be complete and my products futile if I continued to follow only one established trend of design. I am beginning to realize that I need to look at the design of toys with fresh eyes and address the issue of children's play differently, that is, stripped of all preconceived ideas of my concepts in design.

Charles Crandall, a successful American toy manufacturer in the late 19th century, realized the potential of turning strips of wood with tongues and grooves into toys when he observed his sons, who were sick with scarlet fever, build houses and bridges. Frank Hornby, later lit on the idea of Meccano when playing with his sons (Hillier, 1974, p. 55). As Schwartz (1973) remarked, "understanding children and their play would seem to offer the most appropriate criteria in the design and selection

of their toys" (p. 7). Stephenson (1977), on the other hand, told us, "all the best ideas for toy designs come from the children themselves, from watching how they play and understanding their stages of development and abilities" (p. 530).

Roger Limbrick, a British toy designer, said, "the toy designer's job is to search out those areas which there is a need, to fill that need and not to design purely decorative products for which a market may have to be created" (Grey, 1975, p. 51). The particular questions that I am examining in this thesis project, therefore, are:

1) How do children play with objects, including materials and fabricated toys?

2) What is the process that an artist goes through in transforming ready-made objects into works?

3) How can one design a ready-made toy that would enable the child to experience a parallel process?

(2) REVIEW OF LITERATURE

The Tradition of the Ready-made in the Art Field

The origins of transforming ready-made objects into works can be traced back through the centuries. More than a thousand years ago, the Japanese had the tradition of copying poems onto sheets which were pasted up from pre-torn assembled pieces of delicately tinted paper (Wolfram, 1975, p. 7). As early as the 16th century, Dutch and Flemish artists produced a number of still-life paintings by incorporating ready-made objects such as lottery tickets, cards, and torn pieces of paper (Laliberté, Mogelon, 1971, p. 7). At around the same time, Mexican feather work was brought back to the West by the New World explorers, while works made out of butterfly wings were first chronicled in Europe in the 18th century (Wolfram, p. 7). By the 19th century, mass-production and the technologies of the machine age further produced a wide range of factory-made objects to be used.

It was the Dadaists who first turned their attention to factory-made objects (Kirk, 1976, p. 160), and it was Marcel Duchamp who early in the 20th century introduced "ready-mades (found-objects)" into modern art (Basalla, 1982, p. 188). While Duchamp called his medium ready-mades, it was Switters who coined the term "merz", a name he gave to his new universal medium (Seitz, 1961, p. 50). Adrian (1985) attributed the most significant roots of the idea of the object as an artistic form

to the attitudes and ideas formulated by the Italian Futurists, especially Marinetti and Boccioni, who in *The Technical Manifesto of Futurist Sculpture*, published in 1912, advocate the use of synthetic and modern materials (p. 347). Duchamp ؛ ˙eady-- mades, for example, are ordinary objects that anyone could have purchased at a hardware store (Seitz, 1961, p. 46). The Futurist ideas, together with the Cubist formal and technical developments in collage and construction, constitute a range of expressive and material possibilities that make up what we understand as the Dada object (Adrian, p. 347). As Kirk remarked, many of today's artists who utilize the object as an artistic form are inheritors of the Dadaist tradition (p. 160).

There are several characteristics in the tradition of the ready-made in the art field. Firstly, the ready-made objects are turned into works by a process of transformation, which includes simple manipulations in material, size, colour, and/or ornamentation (Basalla, 1982, p. 193). They are predominantly assembled or constructed rather than painted, drawn, modelled, or carved (Seitz, 1961, p. 6). Alexander Calder, for example, created numerous works by assembling materials such as wood, wire, sheet metal, cut tin cans, or any scraps that were handy and suited his purpose (Lipman, Conrads, 1985, p. 6). And for example, *Bottle Dryer*, executed in 1914 by Duchamp was altered only by the addition of an inscription. The first ready-made, *Bicycle Wheel*, on the other hand, was "assisted" by Duchamp in 1913 by fastening a bicycle wheel to a stool (Seitz, p. 46). A passage from the notebook of Jasper Johns could provide a concise summary of this process of

transformation: "Take an object. Do something to it. Do something else to it" (Basalla, p. 192). Wolfram (1975) also provided some insights into this process. He stated that by "sticking together bits and pieces of random and miscellaneous bric-à-brac, it might take one's fancy and stir the imagination to release hidden associations" (p. 7).

Another characteristic is that many of these works are not usually fabricated out of some neutral materials such as bronze or marble, but rather, as Adrian (1985) stated, are often composed of some "non-art" materials, which still "retain some distinct sense of their previous identities and functions" (p. 345). Laliberté and Mogelon (1971) further suggested the reservoir of such materials available to the contemporary artist, like glass, plastic, rubber, cloth, neon, bone, leather, birchbark, nylon, or even bread and cookies (p. 17). Although the form of these objects remains essentially unchanged, the objects themselves are altered in such a way that their primary useful functions are severely impaired if not entirely lost (Basalla, 1982, p. 183). However, Basalla believed that in the process of transformation, these objects could take on a new function that is "symbolic, aesthetic, or educational" (p. 183).

It is essential to acknowledge that these works may have major differences from sculpture. For example, Adrian (1985) stated that while sculptors are traditionally concerned with the creation and disposition of vol- mes and masses, many of these works, such as Duchamp's *Bicycle Wheel* and *Bottle Dryer*, manage to

occupy a good deal of space but with a minimum of actual volume and mass (p. 345). He also suggested that while sculpture is traditionally centered on the figure, works made of objects often deal with different subject matter such as architecture or the house image.

As a conclusion, one must point out that the exact status of these works is still not determined. While some critics recognized some of these works as art, on the grounds, for example, that they had exerted a profound influence on modern art (Basalla, 1982, p. 188), others ranked them in the realm of Kitsch. For example, if and when art is expected to arouse admiration for any technical excellence, there are some pieces made in the tradition of the ready-made that cannot be called art at all. It is essential to acknowledge that these works may have major differences from sculpture as traditionally defined (Seitz, 1961, p.7). Perhaps this question will still remain to be challenged and discussed in the years to come.

The Tradition of Designers' Toys

To briefly introduce the history of designers' toys in the last two centuries, Hewitt and Roomet (1979) stated that these toys ranged from didactic toys in the turn of the 19th century, to construction toys, optical and scientific toys towards the middle of the 19th century, and finally to the early 20th century, when the kindergarten movement had become well established, the emergence of a whole new range of playthings from beads to large blocks (p. 1).

The manufactured toys in recent history can in turn be classified into three groups: toys designed by educators, toys designed by designers, and toys designed by artists.

Firstly, toys designed by educators were many. For example, other than Froebel's building blocks, Weber (1979) also told us that there were Hill Blocks, which were manufactured by Schoenhut Company of Philadelphia in 1910 and later by Creative Playthings in the 1950s (p.85). They were large-scale blocks which could be climbed on and into. Then there were Pratt Unit Blocks, designed by Caroline Pratt in the early 20th century. They were more versatile than Hill Blocks, and were manufactured by the Educational Equipment Company in the 1930s, later by Playskool, Creative Playthings, and Community Playthings, whose basic philosophy was in sympathy with the Progressive educational movement (Weber, p. 86). Perhaps

the most influential of all educators' toys were designed by Montessori, who held an early educational and a multi-sensory approach to learning in the 1950s and 1960s. Some of her products were Cuisenaire Rods, Stern Structural Arithmatic Apparatus, Dienes Multi-base Blocks, Lowenfeld Poleideblocs, Unifix Blocks and Attributes Blocks. As Weber said, they all "involve children in actively manipulating concrete materials, thus leading to the discovery of mathematical concepts" (p. 86).

Secondly, there were toys designed by designers. As Hillier (1974) pointed out, perhaps the emergence of this category was "less from a conscious educational motive than the existence of an industrious and workaday society who from necessity demanded practical toys for its children" (p. 55). Two such toys that gained popularity in the 1860s and 1870s were Log Cabin and Crandall's Acrobats. In fact, it was Charles Crandall who invented the original idea of tongues and grooves, an idea which was much plagiarized ever since. In later years, there were designers who dedicated much of their time on devising new ideas. One such designer was Ikuo Sakurai. For example, he designed Paper Balloons of Various Forms, which were simple forms with ends of pieces cut at certain calculated angles to produce various forms. The joints could be rotated until the jointed form changed into the original stick (Fakuda, 1977, p. 38). Another toy that recently hit the toy market with promise was Zaks. It was designed with a uniquely flexible modular system of interlocking triangles and squares that possessed an ability to move. It was this ability to move that made Zaks different from other construction toys. As Tousley

(1987) remarked, "Buckminster Fuller's theories of triangulated geometry led Calgary designer Jim Ziegler to Zaks" (p. 22).

Thirdly, there were toys designed by artists. Two exhibitions which featured toys designed by artists were Play Orbit, held in 1969, and a benefit holiday exhibition to raise funds for the New York's Children Aid held in 1983. In the case of Play Orbit, Reichardt (1969) told us, "100 artists were invited to participate by making a toy, according to their own definition of what the term 'toy' means to them" (p. 2). Four main categories emerged as a result. Firstly, it must involve participation in its construction. Secondly, it must be an object of pleasure and fun, nice to have around. Thirdly, it is an environment which enables a child to create his or her own situations within it. And fourthly, it is an object with the aid of which we can simulate real life situations. On the other hand, in reference to the benefit exhibition held in New York, 1983, Klein (1984) told us that there were "amusing objects and personal expressions... that reveal artists' vocabulary, wit and imagination, also his humanity and connectedness to the universe" (p. 20).

The Relationship between Art and Play

In discussing the relationship between art and play, it is essential to highlight three areas: firstly, Hans-Georg Gadamer's ontology of the work of art and its hermeneutical significance; secondly, J. Huizinga's study of the play-element in culture; and thirdly, the influence of Froebel's building block curriculum on one of America's most gifted architects, Frank Lloyd Wright.

There are several key ideas in Gadamer's philosophy. First of all, he claimed that play had a paradoxical kind of seriousness. He said:

> It can be said that for the player play is not serious, that is why he plays. We can try to define the concept of play from this point of view. What is merely play is not serious....It is more important that play itself contains its own, even sacred, seriousness....But he (the player) does not know this in such a way that, as a player, he actually intends this relation to seriousness. Play fulfills its purpose only if the player loses himself in his play. (Gadamer, 1975, p. 91)

Gadamer also believed that there was no goal in play. The process of play was merely a process of constant repetition. Moreover, since there was no goal in the process, the solution of the task also became irrelevant. He said, "the purpose of the game is not really the solution of the task, but the ordering and shaping of the

movement of the game itself" (Gadamer, 1975, p. 96).

Another key idea that Gadamer brought up was the nature of make-believe in play. He elaborated it as follows:

> The self-representation of the game involves the player's achieving, as it were, his own self-representation by playing, ie. representing something. Only because play is always representation is human play able to find the task of the game in representation itself. (Gadamer, 1975, p. 97)

Gadamer (1975) also stated the relationship between art and play directly. He said, "I call this development, in which human play finds its true perfection in being art, 'the transformation into structure'. Only through this development does play acquire its identity, so that it can be intended and understood as play" (p. 99). Hence, an element of transformation, to Gadamer, was essential in play.

Perhaps the most important point in Gadamer's discussion regarding art and play can be summarized as follows:

> My thesis, then, is that the being of art cannot be determined as an object of an aesthetic awareness because, on the contrary, the aesthetic attitude is more than it knows itself. It is a part of the essential process of representation and is an essential part of play as play. (Gadamer, 1975, p. 104)

Huizinga, on the other hand, in his discussion on the nature and significance of play as a cultural phenomenon also emphasized the importance of the aesthetic quality in play. In reference to the assumption that play must have some kind of biological purpose, Huizinga (1950) debated, "They attack play directly with the quantitative methods of experimental science without first paying attention to its profoundly aesthetic quality" (p. 2). In another occasion, he reiterated this point beautifully. He claimed that there was one very positive feature of play:

It creates order....The profound affinity between play and order is perhaps the reason why play seems to lie to such a large extent in the field of aesthetics. Play has a tendency to be beautiful. It may be that this aesthetic factor is identical with the impulse to create orderly form....Play casts a spell over us, it is "enchanting", "captivating". It is invested with the noblest qualities we are capable of perceiving in things: rhythm and harmony. (p. 10)

Like Gadamer, Huizinga also appreciated the relationship between play and seriousness. He remarked, "The inferiority of play is continually being offset by the corresponding superiority of its seriousness. Play turns to seriousness and seriousness to play. Play may rise to heights of beauty and sublimity that leave seriousness far beneath" (Huizinga, 1950, p. 8)

Two characteristics of play that Huizinga recognized were firstly, that it was in fact freedom, and secondly, that it was only for fun (Huizinga, 1950, p. 8).

Hence, playing should induce happiness. He explained, "True play knows no propaganda; its aim is in itself, and its familiar spirit is happy inspiration" (Huizinga, p. 211).

Last but not least, Huizinga stressed the value of play in the process itself and not so much in the product. As he expressed, "It plays itself to an end....Once played, it endures as a new-found creation of the mind, a treasure to be retained by the memory" (Huizinga, 1950, p.9).

The third area in the relationship between art and play that I believe is very relevant in this study is the impact of educational toys on American architect, Frank Lloyd Wright. As Clements (1981) claimed, "The creative and mental development of America's most gifted architect, Frank Lloyd Wright, was molded by extremely intensive childhood creativity training, carried out by his mother's use of F. Froebel's building block curriculum" (p. 119).

To briefly introduce Froebel's building block curriculum, it was made up of 11 Gifts, each consisting of either two-dimensional or three-dimensional blocks in different sizes and shapes, as well as a series of Occupations, which consisted of some arts and crafts activities like paper weaving, paper folding, sewing, drawing, wood carving, and sand and clay construction. His method was to have the children use the blocks daily in three ways: firstly, in structured exercises with both thought

and play directed; secondly, in semi-structured tasks with thought directed and play

free; and thirdly, in unstructured free play (Clements, 1981, p. 119).

Clements (1981) attempted to base her hypothesis that Wright's achievements

owed much to Froebel's system on one illustration. She stated:

> According to a Museum of Modern Art publication, modern architecture has
>
> five principles. Wright led all of these principles and their roots can be seen
>
> in his early creativity education with the Froebel blocks and philosophy.
>
> (Museum of Modern Art, 1946) (p. 121)

The principles can be summarized as Inner-Outer Connection, Form-Function

Connection, Unity of All Parts, Structure as Ornament, and Geometrical modules.

Evidently Wright himself believed in the merits of Froebel's curriculum for

Clements (1981) also told us, "For the last 30 years of his life, Wright conducted in

his home, with his wife and groups of about 23 apprentices a lifestyle and learning

situation modelled on the Froebel kindergarten ideals" (p. 120). Thus one may

conjecture that the impact of well-designed toys on children's development may be

much more far-reaching than the enjoyment of the moment.

(3) METHODOLOGY

A participant observation study was conducted with a 5-year-old child, Alan Leong, who was chosen at random. Since the study was conducted in the summer season, the parents of four out of five children whom I contacted declined my request because of other pre-arranged plans such as summer camps or travelling abroad. Alan was the only child who conveniently fitted in my schedules and who lived in my area.

The study was conducted in the informant's natural setting (i.e. at home), for three times a week, 3 to 4 hours a day, for 3 weeks totalling 30 hours. The objects which Alan played with in this study had been part of his environment before the research was undertaken. My role was that of a participant observer and thus his playmate.

The whole process of the study was documented by a video camera, which was set up in a corner to capture as much of the activity area as possible. At times the camera was focused and/or zoomed in on some subjects of interest, of which the viewer might require visual clarification. It was fortunate that Alan did not act differently or pay much attention when I had to adjust the camera occasionally. This could very well have been because of his calm and independent personality, and the fact that he had seen me with a camera and/or operating a camera from the first day

we met. The tapes were then edited at the end of the study to collect a selection of significant events (see Appendix 2).

Information including the events, my responses, and Alan's responses, was gathered from the video as well as from memory, and the description was kept in a journal. Together with the video, this journal forms the basis for analysing the data and drawing conclusions in order to answer the question: How do children play with objects, including materials and fabricated toys?

By closely examining the data and by comparing it with the process that an artist goes through in transforming ready-made objects into works, in which case the artist of my choice is Alexander Calder, an attempt is made to suggest criteria for designing ready-made toys that would enable the child to experience a parallel process to the artist's.

(4) DATA

My informant, Alan Matthew Leong, was born on April 28, 1983, and had just turned five a few weeks before the study began. His father worked at Bell Canada and his mother was a part-time nurse who stayed home to look after him and his younger sister, who was 3 1/2 years his junior.

Alan was described by his mother and some friends of the family as calm, unsociable and intellectual. He had just completed junior kindergarten at People's Christian Schori and was found to have excellent verbal skills. Even at his young age, Alan was able to read maps, street signs, and headlines of newspapers. According to Alan's mother, he enjoyed playing by himself and simply hated playing with other children. For example the little girl across the street had invited him to play with her every day, but 9 out of 10 times he said no. After a while, the girl just gave up altogether. Even with boys his own age, Alan tended to avoid having to play with them. Playing in solitude, therefore, seemed to be Alan's usual playing habit.

After spending 30 hours in 9 days with Alan and eventually consulting my journal and the videotapes documenting the study, I find that there are five categories as to how Alan played with the objects in his environment, as follows:

1)   The objects were not intended to be transformed and were designed for one functional purpose. Alan handled them strictly for that purpose and did not

attempt to transform them in any way.

2) The objects were not intended to be transformed and were designed for one functional purpose. Alan did not transform them but attempted to handle them in ways not originally planned.

3) The objects were intended to be transformed and were designed to enable one means of transformation to attain one end product, that is, one means to one end. Alan handled them in the intended way.

4) The objects were intended to be transformed and were designed to enable various means of transformation to attain various end products, that is, various means to various ends. Alan handled them in the intended way.

5) The objects were not intended to be transformed and were designed for one functional purpose but happened to have designs that allowed numerous means of transformation to attain numerous end products, that is, numerous means to numerous ends. Alan transformed them into numerous products not originally planned.

Before elaborating on the above, there are two things that need to be clarified. First of all, transformation used in this context is to be defined as the actual physical transformation of an object and/or its components that result in a different appearance. It is not to be defined in a metaphysical or philosophical sense. In this respect, it is essential to point out that transformation is not the same as make-believe, for in a make-believe world things are transformed in a metaphysical

way. Secondly, Magna-Doodle or Etch-a-Sketch, a kind of drawing board which Alan did play with, is not included in this discussion due to its nature as a tool for drawing, a discipline not relevant to this thesis.

To briefly introduce the reservoir of objects in Alan's environment, there are a total of 28 objects recorded in my journal that Alan had played with; 21 of which are manufactured toys and 7 of which are ready-made objects not intended as toys. The manufactured toys, in order of appearance, are Transformers, yoyo, computer games, balloon, Popoids, map of Canada puzzles, balls, Zaks, doll-house, book-school, Construx, helicopter, Lite-Brite, Don't Break the ice, Chutes and Ladders, speedcar, sandbox, playhouse, Disneyland Amusement Park, rocket ship, and Alphabet Robot. The ready-made objects not intended as toys are exercise bike, sofabed, cushions, music box, air-pump, book, construction paper, and coins.

The objects that were not intended to be transformed and that Alan did not attempt to transform, that is, the objects in the first category include yoyo, balloon, map of Canada puzzles, balls, doll-house, helicopter, Don't Break the Ice, speedcar, playhouse, rocket ship, and music box.

I notice that among these objects, there are six: yoyo, balloon, balls, helicopter, speedcar, and rocket ship, that Alan handled in a similar manner. In all instances, he was fascinated by the motion and speed generated by his manipulation of

these objects. By throwing a balloon or a ball into the air, rolling or sliding it down a surface, he created motion and speed. In another occasion, he put some tiny balls on the keyboard of the computer and by lifting the ends of the keyboard alternately, made the balls roll between the keys. While the helicopter could actually take off at a great speed for "it was motorized", as Alan proudly informed me, the rocketship, although it could not ascend into space, possessed a protruding top section that could be twirled around rapidly by hand, which Alan worked on faithfully. Last but not least, the yoyo displayed its own unique undulating movement and appeal that Alan simply could not resist.

While the yoyo, balloon, balls, helicopter, speedcar, and rocket ship were designed for one functional purpose, that is, to allow motion and speed to be generated, the rest of the objects in the first category were also designed with one purpose in mind. In all cases, Alan played with them as originally intended. The map of Canada puzzles, for example, were designed to facilitate the learning of Canadian geography. Although Alan owned two different versions, both versions, if played correctly, that is, as intended, would lead to the same results. Since Alan was interested in geography, he found these puzzles challenging and had invited me to do them with him. However, in both instances, he did not bother to finish them. He said, "This takes long, eh?"

The doll-house and playhouse, both inherent of the theme of architecture,

r.quired minimal assembly. In the case of the doll-house, the house was pre-set with an upper storey and a lower storey, with rooms on both floors, and a set of furniture including a computer to go with it. When playing with it, Alan simply showed me what furniture he had, put them where they belonged and put away the kit. The playhouse, on the other hand, was a little grander in scale and consisted of a steel frame and a plastic cover with decorations on it that were indicative of a house, such as roof tiles, doors, windows, and flower pots. Alan took a little time to put the steel frame upright and then took care to straighten the plastic cover on it. However, he only went in briefly afterwards and then came out to play with other things.

The last two objects in this category are Don't Break the Ice and music box. Don't Break the Ice was played as a game of strategy and consisted of an elevated plastic frame, plastic cubes resembling ice cubes, one of which had a person on it, and two hammers. Before the game began the plastic cubes were to be assembled snugly within the elevated frame with the person in the middle. The object of the game was for the two players to take turns in knocking down the cubes, one by one, until the cube with the person on it fell. Whoever made the person fall lost the game. Alan and I both found it rather fun to play, hence we played it serveral times in a row. The music box, on the other hand, was opened only once and then put away.

Several observations can be made regarding this first category. First of all, other than the fact that the objects were designed for one purpose and/or intended to

be played with in one way, Alan also happened to have only played with each object once during the whole study. Secondly, all these objects were played with for a relatively short period of time. That is to say, these objects were designed or packaged in such a way that encouraged only one means of manipulation; once this means was dealt with, Alan did not show any other intentions of playing with them further. Nevertheless, these objects offered a certain amount of fascination for Alan or he would not have played with them at all.

The second category differs from the first one in that although the objects were not intended to be transformed and were designed for one functional purpose, Alan attempted to handle them in ways not originally planned. In this category, he still did not transform the objects in any way. These objects are coins, exercise bike, air-- pump, and Chutes and Ladders.

Alan's fascination for motion and speed was again displayed while playing with two of these objects. They are coins and exercise bike. Perhaps encouraged by the roundness of the coins, Alan tried to make them roll like wheels in one occasion and in another, tried to make them move by banging hard on the surface beneath them. On the other hand, he played on/with the exercise bike for six times, each time manipulating it in a slightly different manner. For example, he tried to ride it as people normally do, but since his legs were not long enough, he could only manage to push the pedals down alternately. He also tried pedalling backwards, spinning the

wheels by reeling a pedal with his hand, spinning a wheel with his foot, and even just twirling the foothold of a pedal with his fingers. Not only did he try generating motion at different places on the bicycle in different ways, he also experimented with speed. For instance, he would first reel the pedal slowly, pause, and then gradually increase its speed until at one point the wheels were spinning so vehemently that the whole bicycle shook. Alan was also fascinated by the sensation associated with the motion and speed. For example, after reeling the pedal rapidly, he would quickly move over by the front wheel and gently put his hand against the rubber tire. The exercise bike, therefore, provided a great source of activity and exploration for him. The mere structure of the bicycle, for example, served as a mini-gym since Alan would just climb on it for fun. The exercise bike was one of the objects that Alan enjoyed playing with the most for he would sit on the floor playing with it while watching TV, occasionally exclaiming "Wow".

The other two objects in the second category are air-pump and Chutes and Ladders. There were two occasions when he played with the air-pump. Once he used it to inflate a beach ball. Another time, however, he pumped air with it into a tent that he built claiming that it was air-conditioning. He said, "That's called an air-con. It gives air to the whole city and it's connected to our house... the pretend one." In this case, he did not physically transform the object but its use had deviated from its original intent and had entered into the realm of make-believe. Chutes and Ladders, on the other hand, was a game of chance. Alan attempted to play it

differently by changing the rules like skipping a square if it meant sliding down a ladder and losing 100 points, or moving diagonally, backwards, or simply whichever way he wanted, all because he could not bear the disappointment of losing the game. it was while playing Chutes and Ladders that Alan displayed some of his most frustrating moments during the entire study.

In the third category, the objects were intended to be transformed and were designed to enable one means of transformation to attain one end product, that is, one means to one end. One can also say that the route of transformation for these objects was linear and predetermined, that is to say, the object would start from one form and end in another, normally facilitated by devices such as hinges. Throughout the whole process of transformation, the object would still exist as one coherent unit until the final designated form took shape.

There are two objects in this category. They are book-school and Alphabet Robot. In the case of the book-school, Alan presented it to me as a plastic box with the appearance of a book but when he opened it, it was immediately turned into a school. In reality, the exterior surface of the box was decorated like a book while the interior was like a school complete with miniature desks and chairs. Alphabet Robot was designed in a similar manner. When Alan first showed it to me it looked like the alphabet F. After a couple of twists and turns, it was turned into a robot. In both cases, Alan went through the entire process in a matter-of-fact way, going through the

necessary steps to bring about the end product. The whole process of playing with these objects took as long as was necessary to go through the motions of the transformation, and Alan did not display or articulate any particular feelings or thoughts about them.

There are nine objects in the fourth category. In this category, the objects were intended to be transformed and were designed to enable various means of transformation to attain various end products, that is, various means to various ends. Alan played with them in the intended way. These objects are sandbox, construction paper, computer games, Lite-Brite, Disneyland Amusement Park, Transformers, Popoids, Construx, and Zaks.

First of all, Alan transformed construction paper into a handfull of cards by cutting them up with a pair of scissors and then proceeded to shuffle them like playing cards. He also folded them crosswise thus giving them three-dimensionality. The sandbox, on the other hand, contained sand, which Alan transformed into things, or rather, representation of things such as a road, a hill, or a pyramid. For example, he said, "This is the field, and that's the road out there." "We can make a different kind of camera." "Let's make a beach. You make the part where they sit." He transformed the sand into such things through various means. For example, he suggested, "We have to use our hands." "Flatten this part. Flatten it like this." "I'll scoop up some sand." He also tried pouring sand out of a watering can, making lines

with a little spade, banging and smoothing sand with his hands, or scraping sand off with a rake. During the whole time, he looked placid, and simply took the time to take pleasure in the physical activity such as banging and scraping, or simply touching the sand. There was one aspect, however, that appeared to have prohibited him from successfully transforming the sand into a desired end product. For example, when he tried to make a camera, it never took shape. The looseness of the sand simply did not allow the shape to form, and even when it did, it did not hold for the sand kept sliding away.

The computer was a major part of Alan's life. During the nine days that I spent with him, Alan played on the computer for eight times, each time spending at least half an hour. Even at this young age, Alan seemed to have mastered the skills and knowledge necessary to operate the computer and obtain access to its many programs, many of which were educational games designed to strengthen the cognitive faculty of children. By selecting diskettes containing the desired programs, inserting them into the drive, and retrieving them by typing the names of the programs, Alan enjoyed playing up to 18 games. They were Spacewar, Icondemo, Diggers, Kindercom, Racehorces, Monster Math, Pinball, Zaxxon, Decathlon, Ernie's Magic Shapes, PC Arcade, Robotware, Eaglelander, Bugblaster, Munchman, Brickbreaker, Hopper, and Astrogrover.

These games can be broken down into three categories. First of all, there

were games which challenged Alan's control of the keyboard and eye-hand

coordination. In most cases, the object of the game was either to escape from a

villain or to rescue a princess or some such similar themes. Since it was necessary to

go through a series of obstacles or dangers in order to score points, Alan had to move

his tiny fingers not only quickly but accurately. Alan really found it fun to play.

Often he would burst into laughter, exclaiming in a sing-song voice, "They'll never

get me. Ha..ha...ha." "I better get them before they get me. Ha...ha.." While he

could get very excited and ecstatic playing these games, he would appear rather

solemn and subdued playing others. Normally these games required more serious

learning, such as in Math, or shapes. Although these two types of games were

different in nature, Alan had made the same comment about them, that is, they could

get more and more difficult each time if he kept playing them. ' spite of the levels

of difficulty, Alan never showed any signs of frustration. He simply stopped when

the game was over, played it all over again, or put it away. The third and last type

of computer games that Alan played with was more creative in nature. That is to say,

they did not encourage only one correct answer or one way of scoring points, but

rather a more open-ended response. One example was Kindercom. By pressing

designated keys on the keyboard, Alan created vertical, horizontal, or diagonal lines

eventually forming a picture, which Alan described as a "fast painting". Creating this

picture for Alan was an evolving process. When the lines gradually formed shapes,

Alan would explain, "That's the door. I better change the colour. Yeah, maybe a

green door." "That's the knob." "This is the storage door. Maybe the staircase is

somewhere else." Thus, Kindercom was different from the other computer games in that it encouraged the creation of visual images.

Lite-Brite was another manufactured toy that encouraged the creation of visual images. it was made up of a plastic frame with a light bulb inside it and a top surface filled with tiny holes that formed a grid. An essential part of this toy was a set of tiny opaque coloured buttons which the player was supposed to insert into the holes to form a visual image. Another package that came with it was a set of templates complete with colour codes, which, if followed faithfully, would form a pre-designed image. When Alan invited me to play with this toy, he suggested doing the picture with a boy and a girl in it. He also insisted on turning off the bedroom lights, leaving only the light bulb in the toy to see by. He explained, "These ones are called violets, V, V." "You have to work on the girl and I'll work on the boy." "No, you have to put the same colour, O means orange, you see." "The boy has pink lips. The other one has R, red." "You have to follow instructions. I need B, B, B, B, B." Although the toy was supposed to encourage the creation of visual images, Alan did not create his own but simply followed the instructions. As a matter of fact, he was very adamant about it. He told me, "My friends want to do different letters. I don't like it when my friends do it. They can't be my friends anymore." Playing with Lite-Brite was a task that had to be finished. From the very beginning Alan told me that I had to help him, and towards the end, he said again, "I still haven't finished the boy. You have to help me." Despite my own frustrations with having to strain

my eyes in order to read the tiny letters in almost complete darkness, Alan seemed to enjoy the whole process very much. He was particularly fascinated by the contrast of light and darkness, and had even experimented with holding a table lamp above it, or shining a flashlight from different angles at it. He said, "I like it very much."

Disneyland Amusement Park was a toy made up of arches of railway track that could be connected together, as well as a number of decorative items such as a boat, a train, and some Disney characters. I was very touched when Alan made my name, a n n, with the railway track and then adorned it with Disney galore.

Transformers were one of Alan's favourite toys. They were designed in a manner similar to the Alphabet Robot but possessed much more intricate systems for transformation. Unlike the Alphabet Robot, which could only be transformed from an alphabet to a robot, Transformers could be transformed through various means resulting in various end products. While the Alphabet Robot stayed as one unit throughout the whole process of transformation without anything being added to or taken from it, Transformers came with many little parts that could be snapped on or off at different places on the core unit, which itself could be folded and/or twisted to facilitate the process of transformation. For example, Alan possessed a Transformer called the Sixchanger, which he explained could be changed into six things. There was another called a Head Master because its head could be turned into a little robot. As Alan played with his Transformers, the table was gradually filled with little parts

while he explained to me which ones were good guys and which ones were bad guys.
He used to watch them on TV, he explained. There were two things that struck me
as I watched him play. First of all, I was simply awed by the matter-of-fact manner
in which he transformed the objects. He was simply so familiar with the parts and
the procedures that the whole process was like a ritual. I finally found out what
brought that about. He said, "They all came in one box. There were pictures and
instructions. I still remember. I just looked at it, and I did the whole thing." I also
noticed that as a consumer, Alan wanted badly to collect as many Transformers as
possible. He said, "Next time I'm going to ask my mom to buy me Razorclaws. The
little ones are Predakins." "I'm getting a Decepticon." "I'm getting a Scrawcruncher.
It's a lizard." "I like going to Toy City 'cos I can see all the Transformers there."
There was no doubt that Alan loved these Transformers for he said, "Sometimes I
sleep with them."

The three remaining objects in this category, Popoids, Construx, and Zaks can
be classified as construction toys. In other words, they were designed to come in sets
of pieces of different shapes, colours, and sizes that could be interlocked by some
devices to form various end products. Popoids, for example, consisted of soft plastic
tubes of several lengths that could be linked together by devices that resembled bolts.
Construx, on the other hand, were sturdier and had more components such as wheels.
Similar to Transformers, they also came in fancy names. For instance, Alan had a
Dragster. He said, "It's so big. It's bigger than the other ones." In the case of

Zaks, the components came in triangles and squares of different colours.

Each piece was pre-set with grooves, which when interlocked with other pieces could form linked surfaces and/or three-dimensional structures. Since the surfaces were interlocked with devices resembling hinges, some parts could even move as a result. Alan was very much fascinated by this toy, not so much by its design, however, but by the pictures and names of the suggested end products. He said, "I like the ideas." As we flipped through the instructions booklet, he was fascinated by all the wonderful creatures that he saw, especially the Dragon, which he said was the biggest monster of all. We had played with Zaks twice, but both times Alan had displayed a great deal of frustration and reliance not only on the instructions but also on his adult playmate. The level of difficulty and the concept of right or wrong were definitely bothering him. For example, he said, pointing at a picture in the instructions booklet, "I don't know how to make that part. It looks kind of wrong." And for example, he said, "You have to help me. I can't do it. I can't do it. I can't do it. It's too hard to make dragons."

In the fifth and last category, the objects that Alan played with were not normally intended to be transformed and were designed for one functional purpose. However, they happened to have designs that allowed numerous means of transformation to attain numerous end products, that is, numerous means to numerous ends. Compared to other objects in other categories, Alan spent the most time playing with these objects. They were a book, sofabed, and cushions. While he

played with the book only once, he played with the sofabed and cushions 10 times, each time in a most relaxed and happy atmosphere.

The book that Alan played with was square, about four inches thick, and had coloured pages. One time Alan pretended that it was a hamburger, holding it in his hands with it closed. While he did not not transform the book in this case, he did transform it in another occasion. Since the book had stiff, heavy pages, it displayed a beautiful pattern of colours while it was being opened. It was during this action that Alan was inspired to play with it. He tried opening it up by different degrees, leaving the space tightly or loosely between the pages. He tried opening it up all the way till the covers of the book were back to back and called it a flower. He tried opening it up till the covers formed 180 ° and left it on the shelf as a decoration. In short, he seemed to have so much fun with it that he said, "Hey, maybe I can ask my dad if I can have this book."

The sofabed and cushions in the Leong's family room, where Alan watched TV, proved to be the greatest source of creative output for Alan in his environment. Since the Leongs owned a sofa with some 20 large, square, comfortable cushions on it, and a light-weight foam sofabed that opened up easily into two large rectangular and one half-cylindrical shapes, Alan had some handy materials to transform into numerous structures. During the time I spent with Alan, he had created some 15 architectural projects and other things with these materials. For example, he had

made a house with a tunnel leading to it, another one with slanted roofs on it, a tent with a roof that was shaped like a pyramid, a tower, a horse, a carpet, a maze, a slide, a pyramid, a mountain, a flower, and a bridge, among other variations of the same themes.

Since these objects did not have any interlocking mechanisms and were not at all heavy, it was rather effortless for Alan to assemble them and take them apart. As a result, he never encountered any difficulties or got frustrated during the building process, or got dismayed when the structures had to be demolished. In fact, demolishing them was a fun thing to do. For instance, Alan said, "I'm squashing the flower!" as he happily threw himself onto it and started rolling around with the cushions. Perhaps it was because of the size and softness of these materials that made physical contact and activity such an intrinsic part of this evolving process. In this process, time was not a concern. It was a slow process, during which one could hear Alan singing and whistling, occasionally lolling on the floor watching TV, before he got up again to admire his creation or to modify it. To Alan, it was not a task, but an enjoyment, an enjoyment that helped enhance his daily life.

(5) THE TRADITION OF THE READY-MADE IN THE ART FIELD

-Alexander Calder

I have chosen Alexander Calder as the artist whose process of transforming ready-made objects into works I am going to examine in this chapter.

As an introduction to his process of transforming ready-made objects into works, it has been noted that Calder was rather reticent in reference to his work. Rose (1969) remarked:

> Throughout his long career as one of the pioneering sculptors of the 20th century, Alexander Calder has been unusually reticent, making very few statements about his work and theorizing as little as possible when he could be persuaded to speak. (p. 4)

Similarly, Lipman (1976) stated that Calder "repeatedly makes it clear that he just wants to work, not talk about it" (p. 32).

In spite of his reticence, one can still observe a number of characteristics in connection with Calder's process of transforming ready-made objects into works. First of all, it appears that this process was often initiated and/or inspired by his marked love and knowledge of a subject matter. It is this almost obsessive love that sparked an impetus for exploration and transformation. Interviews with Calder were often filled with exclamations such as "I was very fond of", "I've always loved", and

"I've always been delighted by". For example, he said, "I was very fond of the spatial relations. I love the space of the circus. I made some drawings of nothing but the tent. The whole thing of the vast space - I've always loved it" (Lipman, Foote, 1972, p. 46). Another time he said, "I've always been delighted by the ways things are hooked together. It's just like a diagram of force. I love the mechanics of the thing - and the vast space - and the spotlight" (Lipman, Foote, p. 42). This almost obsessive love is perhaps best illustrated by his execution of the *Circus*, which Caldc.· began in 1926 and enlarged for the next five years, ending with a troupe of 55 people and animals, none of them more than 14 inches high (Lipman, Conrads, 1985, p. 6), and all of them transformed from ready-made objects. As Calder said:

> I went to the circus, Ringling Brothers & Barnum & Bailey. I spent two full
>
> weeks there practically every day and night. I could tell by the music what act
>
> was getting on and used to rush to some vantage point. Some acts were better
>
> seen from above and others from below....I always loved the circus - I used to
>
> go in New York when I worked on the Police Gazette. I got a pass and went
>
> everyday for two weeks, so I decided to make a circus just for the fun of it.
>
> (Lipman, Foote, p. 8)

It is this sense of fun and play that constitutes the second characteristic in Calder's process of transforming ready-made objects into works. It is apparent that Calder had the intention of making things that are fun and playful. He said, "They call me a 'playboy', you know. I want to make things that are fun to look at, that

have no propaganda value whatsoever" (Lipman, Foote, 1972, p. 124).

Calder's childlike, playful qualities have been commented on by the French critic, Michel Seuphor, who remarks "C'est un enfant, ce Calder...c'est l'enfant en l'homme...tout le mystère de l'enfance" (Lipman, 1976, p. 40). James Johnson Sweeney, Calder's long-time friend and foremost critic, on the other hand, claimed, "Calder has always played his art as he plays his life. But play with Calder is never frivolous. It is serious, but never solemn. Play is a necessity for Calder which he has to respect, to treat seriously" (Lipman, p. 40). In another occasion, Sweeney claims that Calder's originality lies "in his determination to respect the role of play...exploiting this element for aesthetic ends" (Lipman, p. 45). Hobhouse (1976) made a similar remark:

> Calder's imagery, as well as his method, are derived from the experience of the child - not the primitive, naive or Rousseauian child - but the serious, upright, information-gathering kind, who spends his weekends with books and telescopes, inside museums and homemade chemistry labs, taking machines and animals apart to see how they work. (p. 38)

With the *Circus*, the process of transformation does not end with the completion of the works, it goes on further to become full performances, which Calder gave for friends and for special audiences in Europe and the United States (Lipman, 1976, p. 57). In the film *Calder's Circus*, photographed in colour by

Carlos Nilardebo at Calder's home in Saché in 1961, one can witness Calder's

childlike and playful qualities even more clearly. From the beginning to the end,

Calder's Circus demonstrates Calder's total engagement in his make-believe world.

For example, as Thomas Wolfe told us in his novel *You Can't Go Home Again*:

> It (Calder's circus) started, as all circuses should, with a grand procession of
>
> the performers and the animals in the menagerie. Mr. Logan accomplished
>
> this by taking each wire figure in his thick hand and walking it around the ring
>
> and then solemnly out again....Then came an exhibition of bareback riders.
>
> Mr. Logan galloped his wire horses into the ring and round and round with
>
> movements of his hand. Then he put the riders on top of the wire horses,
>
> and, holding them firmly in place, he galloped these around too. Then there
>
> was an interlude of clowns, and he made the wire figures tumble about by
>
> manipulating them with his hands. (Rose, 1969, pp. 6-7)

As Hobhouse (1976) pointed out, "Calder's absorption requires the elaborate pretense

of a child that stick-legs are real legs, that a piece of cloth adequately conveys the

whole costume, that sound effects don't approximate but are real voices" (p. 38).

This observation illustrates Calder's spirit of play beautifully.

To Calder, transforming ready-made objects into works is an evolving process.

Calder said, "I can never know in advance what I'm going to do" (Arnason, 1971, p.

68). And as Lipman (1976) remarked, "Calder has always valued the elements of

chance and spontaneity" (p. 254). In other words, the process consists of a series of

trials and experiments. In reference to the large sculpture, *The City*, Calder described

the process as follows:

> I made the model for it out of scraps that were left over from a big mobile. I
>
> just happened to have these bits, so I stood them up and tried them here and
>
> there and then made a strap to hook them together - a little like objets trouvés.
>
> (Arnason, p. 73)

This process of trials and experiments can perhaps be attributed to what Sweeney

explains as Calder's "practical, inventive turn of mind, quick to find expedients; that

masterful grasp of material things" (Lipman, 1976, p. 41).

A congruous part of this evolving process is a tendency to work in series. As

Elsen (1974) pointed out, "serial productivity relieves the pressure of constant

originality and allows him (Calder) to enact variations on an idea" (p. 2). An

excellent example is the *Circus*, comprising numerous variations of creatures,

growing from two suitcases into five (Lipman, Foote, 1972, p. 18).

Apart from serial productions, Calder also made countless individual works,

often spontaneously, many of which are long lost and never intended for posterity.

As Calder recalled, "One of the first animals I made was out of a loaf of bread. You

know these long thin loaves called ficelles. I made a bird out of it" (Lipman, 1976,

p. 183). In 1929, the *New Yorker* reported another bread sculpture: "Conversation

lagging one night at a dinner party in Paris some three years ago, Mr. Alexander

Calder amused his table companions by making a chicken out of a piece of bread and a hairpin" (Lipman, p. 183). Thus, it is likely that in some instances Calder did not place as much value on the product as the fun of making it. As Lipman suggested, it is perhaps "the experience of making it, not the object itself, that has the greatest value for Calder" (p. 83).

Calder's use of tools and materials is also an integral part of the process of transforming ready-made objects into works. It seems that the very workshop that Calder set up is a favourable environment to facilitate this process. Elsen (1974) reported, "Just the sight of his workbench, a multi-purpose operating table, battlefield and junk pile, helps one realize that he (Calder) has set up the conditions for a daily dialogue with his materials" (p. 9). It is evident that Calder's materials, however small, are indispensable in this process. Here is an incident to prove it:

> There came a moment during a visit with Calder this summer in his workshop near Saché, France, when a sculptor companion picked up a piece of scrap metal - which her host construed as a desire for a souvenir. In an embarassed, apologetic way Calder explained that he did not want to surrender the scrap as "it might come in handy". (Elsen, 1974, p. 7)

Despite Calder's wealth and ready supply of materials, he used fairly simple tools and equipment. As Elsen (1974) told us, "Calder has avoided complicating his equipment, or as he put it, 'I have avoided mechanization of tools' " (p. 7).

Arnason, on the other hand, remarked, "it is as if Calder wanted to remain a primitive with mechanics" (Elsen, p. 7). The majority of the circus characters, for example, are transformed ready-made objects such as yarn, cloth, cork, rubber tubing, buttons, and metal bottle caps assembled together by glue and/or cut and bent wire. Perhaps Calder's attitude towards the use of materials can best be expressed in his statement: "I feel an artist should go about his work simply with great respect for his materials...simplicity of equipment and an adventurous spirit are essential in attacking the unfamiliar and unknown..." (Lipman, 1976, p. 33).

Thus, it appears that Calder's success lies not in a high level of technology and mechanization but rather in the extent to which he explored and exploited the means of execution that he worked best in. As Rose (1969) noted, Calder "has always found it easier to think with his hands, to think in terms of specific materials" (p. 8). And as Calder himself was known to have expressed, "I think best in wire" (Lipman, Conrads, 1985, p. 42) and "I seemed to have a knack for doing it with a single line" (Lipman, Conrads, p. 52), he made full use of his strengths, which resulted in what one recognizes, for example, as Calder's creatures.

In transforming ready-made objects into works, it is apparent that Calder attempted to carry out his intent of recreating the real world. In 1960, Calder expressed this intent during an interview:

Q: Léger once called you a realist. How do you feel about this?

C: Yes, I think I am a realist.

Q: Why?

C: Because I make what I see. It's only the problem of seeing it. If you

can imagine a thing, conjure it up in space - then you can make it, and

tout de suite you are a realist. The universe is real but you can't see it.

You have to imagine it. Once you imagine it, you can be realistic

about reproducing it. (Arnason, 1971, p. 72)

In another occasion, Calder further explained it by saying, "If you can't imagine

things, you can't make them, and anything you imagine is real" (Rose, 1969, p. 24).

Thus an intricate interplay between realism and imagination lurks behind Calder's

process of making works.

In recreating the real world, Calder also drew upon his own observations and

memories. The *Circus*, for example, was most likely the result of an accumulation of

observations made during Calder's visit to the circus, Ringling Brothers & Barnum &

Bailey, everyday for two weeks. As remarked by Bruno E. Werner in 1929 in one of

the first serious reviews of Calder's work:

Calder has studied his creatures so carefully; a mule stretching his head

forward, a bellowing dog with stiffened knees, a singer reading from a sheet

of music with an inflated diaphragm, a small man and a large woman bent

over as they run home through the rain (one senses the rain even though it

cannot be seen). (Arnason, 1971, p. 20)

Such realistic gestures could not have possibly been rendered without careful observation on Calder's part.

It is also interesting to note that Calder did not only draw upon his short-term memory in creating works but also a long-term one. As suggested in his autobiography, the final attraction of Calder's *Circus*, the chariot race, was possibly executed in memory of an experience that Calder had when he was nine years old:

> On January 1, 1907 - I was nine - mother, Peggy, and I actually went to the Tournament of Roses. In those days they just had four-horse chariot races and tent-pegging....I also remember well some other races with lighter chariots pulled by four donkeys. In one of these, the guy who was trailing pulled out a piece of tin tied on the end of a big stick and banged it on the donkey's asses - he finally won and that touched me very deeply. (Calder, Davidson, 1966, p. 22)

Perhaps this episode could explain the tenacity of action in the chariot race in Calder's *Circus*.

As a realist, Calder attempted to create a sense of likeness in his works. According to Gombrich (1971), there are two ways of achieving this: one is based on form and the other is based on function (p. 2). Both approaches can be found in the *Circus*.

Two examples of representations that are based on form are the wildhorses and the strongman. The wildhorses, for example, are portrayed with the bent contours of wire made to resemble the contours of a horse, very much like the lines in a drawing. The strongman, on the other hand, has a body, which, down to his dangling genitals, is depicted in a two-dimensional contour suggestive of a strongman. With the addition of a triangular tiger-spotted loincloth, it is unmistakable that the image depicted bears a resemblance to Tarzan. In short, the property of shape is predominantly used to create representations that are based on form.

On the other hand, there are several examples of representations that are based on function. The legs of the stretcher-bearers, for example, do not in the least resemble legs in form, for they are shaped more like windmills than legs, but they do represent legs in function. When they are pushed forward, the continuous motion facilitated by the "windmills" enable the stretcher-bearers to "walk", thus fulfilling the function of transportation; and their slightly bouncing movement represents legs in motion. Another example of representation that is based entirely on function is the risqué act in which a lady descends from above. She does not resemble a human figure in form, since she is only made up of a cork as her head, two strings as her legs, and a round piece of fabric as her skirt. She has no proper body, especially a torso, whatsoever. In other words, she does not have a human body in form. Her skirt, however, carries the function of a parachute, and her head, the function of a stabilizer. The slightly swaying, descending movement produced as a result

represents the act in motion. One more example of representation that is successfully based on function is the act with Josephine Baker. In this case, the famous singer is not recognized by her physiognomy, since there is almost none depicted, but rather by her music and most important of all by the fluttering birds that made her performance so unique. The birds themselves are representations based on function for by no means do they resemble birds in form, since they are merely torn pieces of paper. What gives them life and a sense of likeness to real birds are their quick, flying movements and the twittering sounds reminiscent of real birds.

As the examples above indicate, an integral part of Calder's representations based on function is the element of motion. As Hobhouse (1976) stated, to Calder, "the priority is to make something come alive" (p. 38). Calder himself made a similar remark in 1932 when he wrote in the group catalogue of the Abstraction-Création group: "How does art come into being? Out of different masses...out of directional lines....My purpose is to make something like a dog, or flames; something that has a life of its own" (Elsen, 1974, p. 4). Perhaps motion is the most effective way to suggest that something is coming alive or that something has a life of its own. However, the kind of motion that is used to make Calder's creatures come alive is not a monotonous kind of motion as in clockwork toys or carousels but rather an ingenious kind that is specific to and most appropriate for the object portrayed. For example, the legs of the stretcher-bearers convey a walking motion; the risqué act with the lady descending from above conveys a paced swaying

motion indicative of a parachute; and the birds flying down to Josephine Baker convey a fluttering motion suggestive of real birds. One cannot help but speculate that perhaps Calder's ingenious way of creating motion was cultivated by his earlier training in mechanical engineering, for Calder said, "Mechanical engineering is not just practically important, for building motors, for example, it is conceptually important. A mechanical engineer studies machines from the point of view of efficient motion" (Rose, 1969, p. 12).

Perhaps one very important factor that helps create a sense of likeness in the *Circus* to the real world is an element of suspense and uncertainty. As Sweeney (1951) pointed out:

> The dog might not succeed in jumping through the paper hoop. The bareback rider might not recover her balance. The aerialists might land in the net beneath, or might succeed in catching the swinging bars with their toes. The number of failures was uncertain; but an eventual success brought relief and restored equilibrium. (p. 18)

Thus an alternation of suspense and surprise eliminates what could otherwise have been a much too mechanical and predictable rendition of the real world.

Other properties that Calder used to create a sense of likeness in the *Circus* are colour, texture, weight, and size. For example, he used the property of colour and size to create a likeness for the clown. His red nose, which is actually a balloon, and

which can be blown to an exaggerated size, is the major feature of identification for a

clown. Calder, on the other hand, used mainly the property of texture to create a

likeness for the lion. Its thick woolly hair tells us that it cannot be any other animal

but a lion. As for the tumbler, Calder used mainly the property of weight to create

the likeness of tumblers in action. Their weighty hands and/or feet allow them to

tumble and hold the poise in space.

Whether Calder created works based on form, function, or other properties

like colour, texture, weight, or size, one can often note a sense of economy in his

representations. As Elsen (1974) stated:

It was probably his experience with Brancusi, the Constructivists and

Mondrian that helped Calder develop his ethic of "sticking to the issue" of

what his fellow artists then referred to as "the essential". This meant stripping

form to a clarity of focus and terseness of statement. (p. 6)

One last characteristic in Calder's process of creating works is a sense of

aesthetics. Even as a child, Calder was very sensitive to aesthetic qualities. For

example, while reflecting on his childhood, Calder recalled how he and his friends

played: "It dismayed me to see the other kids playing with the trains and horses

without any discriminations for size and colour" (Calder, Davidson, 1966, p. 21).

Calder later reiterated the importance of aesthetics in 1932 by saying, "Disparity in

form, colour, size, weight, motion, is what makes a composition....It is the apparent

accident to regularity which the artist actually controls by which he makes or mars a work" (Lipman, 1976, p. 33). Elsen (1974) also commented that "fundamental to Calder's aesthetic - as it was for Léger, Kandinsky and Mondrian, all of whom wrote passionately about it - is contrast" (p. 6). In an early essay in which Calder commended the work of the Futurists, he also expressed an intent of composing motions: "Not a simple translatory or rotary motion, but several motions of different types, speeds and amplitudes composing to make a resultant whole. Just as one can compose colours, or forms, so one can compose motions" (Lipman, 1976, p. 172). Thus, it is very likely that Calder maintained an awareness of aesthetics and exercised discrimination of it in his process of transforming ready-made objects into works.

(6) CRITERIA AND PROTOTYPE OF A READY-MADE TOY

As an introduction to this chapter, it is essential to emphasize that in order to suggest criteria of ready-made toys that a child like Alan would possibly enjoy and benefit from, all preconceived ideas of my concepts in design have been put aside. I have attempted to examine the data very carefully and thoroughly without any bias or judgment. My goals in doing so are to try to extract all the positive aspects from the data, to incorporate these aspects in the criteria while eliminating those that might induce unnecessary frustrations. In other words, I would like to promote a sense of satisfaction and happiness through these toys.

By comparing the characteristics of how Alan played with objects and the characteristics of how Calder transformed ready-made objects into works, I have derived some criteria for designing an art educational toy.

First and foremost of these criteria is the allowance for transformation/s within the design of the toy. Integral to Calder's process of creating works vis-à-vis the utilization of ready-made objects is the process of transformation. Through various means of transformation such as bending, cutting, pasting, and attaching, works are made from ready-made objects. On the other hand, my observations of how Alan played with objects indicate a major characteristic, which is the transformation of objects; objects that are either intended or not intended to be transformed, and that

allow single or multiple transformation/s. Hence, I am inclined to recommend that the first criterion for designing art educational toys be the consideration for possible, if not maximum, transformation/s via appropriate design concepts and/or mechanisms.

As well, toys may have a greater value if they are designed to encourage transformation as an evolving process. For example, when Alan played with the cushions and sofabed in the family room, the process of transformation lasted for hours in an afternoon, sometimes for days on end, during which his ideas kept changing and then taking shape time and again. In other words, multiple transformations took place. Hence, I would recommend that toys be designed to facilitate this exploration. This may be achieved in several ways. Firstly, these toys, or objects constituting these toys, can be presented as an integral part of the child's environment, whereby dialogues with them are conveniently set up. In this respect, the environment is similar to Calder's workshop. It would also be desirable if the materials can be supplied in abundance. For this reason, they are best to be manufactured and sold economically. Moreover, the simpler the interlocking devices are, if they are called for in the design at all, the more conducive they may be to the process of transformation, and the less frustrated and disappointed the child is likely to be. After all, Calder used simple tools and equipment to transform ready-made objects into works. Lastly, the evolving process of transformation may be facilitated if the experience of making something is emphasized rather than the product. That is to say, toys may encourage an in-depth exploration of the transformational process

rather than the attainment of a specific or predetermined end result. In this respect, it is essential to develop appropriate instructions to go with the toy as well as responsible marketing techniques. After all, playing is an enjoyment and not a task.

In addition, if I consider my findings with Alan, I find that his process of playing with objects was to a great extent motivated by his wide range of interests. Hence, I would suggest that these interests be integrated as much as possible within the design of toys and hopefully be used as a source of inspiration and motivation to create works. For example, Alan was fascinated by motion and speed, and had tried different ways to generate them, such as by spinning, twirling, throwing, rolling, sliding, pedalling, and operating motorized objects. He also had a passion for robots and fantasy creatures, as well as the fancy names given to them. The fact that these creatures came in a series and variations also held a great deal of magic for him. He was also interested in geography, strategies, computer, and verbal skills such as spelling. He was captivated by the whole idea of transformation. He liked pretty patterns and designs. Last but not least, he was fond of architecture, the building of houses, tents, or generally enclosed spaces proportionate to his size that he could hide or live in, as well as labelling these spaces as he built them such as the office, garage, driveway, or tunnel. Upon reviewing the process of how Calder transformed ready-- made objects into works, one cannot help but to notice that the *Circus* was inspired and motivated by his love and fascination not only for the circus, but also for the engineering of motion and mechanics. Hence, if I were to design toys for Alan, I

would take his interests into consideration and attempt to facilitate them to surface; that way, the end product/s as well as the process of transformation would possibly be of more value to him.

I would also suggest that toys enable the re-creation of the real world, and at the same time, encourage pretence play or make-believe. As my observations of Alan indicate, pretence play was central to the process of playing with objects. In other words, the goal of transforming objects for Alan was to create things that are called for in his make-believe world. Another good example of transforming objects to facilitate a make-believe world is Calder's performance of the *Circus*. To this end, perhaps toys can be designed to promote the re-creation of the real world based on imagination and/or observation, a sense of likeness based on form, function, and other properties such as colour, texture, weight, and size, as well as an awareness of aesthetics and composition, with concepts such as balance and contrast, light and darkness.

Since physical activity is an integral part of Alan's life, toys can also be designed in such a way that physical activity such as building, climbing, sliding, or jumping is allowed. The sense of touch is also significant in this process of play and physical activity, hence the material may possess a tactile quality as well. I would also recommend that the material be soft, comfortable, but sturdy at the same time to stand the test of rough-and-tumble play.

With these criteria in mind, I have attempted to come up with one prototype of a ready-made toy. Some preliminary concepts of this prototype are as follows:

Sand Dough - a malleable material with the natural, tactile quality of sand but without its looseness and inability to hold. It is to be a modelling material that does not harden, hence allowing repeated usage and a degree of comfort and physical contact. It is to be packaged in different sizes but can also be obtained in bulk. The idea is to offer an alternative to the already saturated toy market of synthetic, fabricated toys that are often pre-cut and pre-set, and needless to say with predetermined end products. It is to be made of real sand with a colour range reflective of different types of sand in the world.

In the meantime, on top of elaborating on the design of *Sand Dough*, I would also like to further examine the possibilities of incorporating the interests that Alan had shown in the design of toys, such as the engineering of motion and speed, architecture, and fantasy creatures. I am also planning to work on two ideas. Firstly, to acknowledge the merits of construction toys but at the same time to modify the ideas and designs existing today so as to introduce the qualities of softness, comfort, and pliability. Secondly, to venture into the realm of furniture design that allows transformations into alternative end products; in other words, furniture that is designed not only for one intended use, but rather, for multiple transformations.

(7) CONCLUSIONS

Although this project has enabled me to gain some insights into the design of art educational toys, I realize that since the study only examined one child, the findings may not be applicable to other children. As a result, future studies can be done to a larger number of children including those of other ages, then perhaps characteristics of how children play with objects can be extracted and classified according to different age groups.

On the other hand, although there have been many artists who work in the tradition of the ready-made, there is not a great deal of literature written on their creative processes. Another suggestion for future study, therefore, is to conduct interviews with living artists who are working in this tradition, and perhaps to document their creative processes in their working environment with a video camera. Subsequently the data gathered would perhaps be more detailed, as well as more applicable to the customs and beliefs of this era.

As a conclusion, I would like to suggest that the design of a good art educational toy lies not only in the design of the object itself, but also in the conditions, directions, as well as the structures in which the toy is to be used. To this end, a sequel to this study may be entitled *Toy Designing, Activity Planning, and Art Education.*

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Appendix 1: Excerpts from the Journal

Video Index	Events	My Responses	Alan's Responses
	Date: July 22, 1988		
	Example from Category #1:		
	Map of Canada		
5570	Pours puzzle out, eats chips.	He shows knowledge of the world, the environment.	"Let's start now. I now what this means. Look. Ontario is brown. Manitoba is pink, Saskatchewan is green, Alberta is brown. This is the whole country of Canada. We live on earth. I know the moon is in space and shines right onto

5766   Shows map.   He shows knowledge and he

integrates knowledge in the playing

process.

here."

"I know what this means. This is

Toronto."

5799   This is a task with specific ends.

"My mom says we should start the

sides first. Then we can remember

how the middle goes." "That's for

the bottom. See that's part of the

word. I told you there's the word

part. I'll get the word part. You

check on the rest of them."

"This takes long, eh?"

Date: July 28, 1988

Example from Category #2:

Exercise bike

5186

Plays with pedal and wheel.

Because of his small size, the way he adjusts to adult size things is special, sees and explores things uniquely. He is fascinated by motion and speed.

Twirls pedal, plastic around.

He likes even to turn things that I wouldn't think of doing. Shows his detailed exploration, touches knobs etc. It is a multi-sensory experience, tactile. He is also

5221   Touches moving wheel with

        hand.

        watching TV.

        "Wow."

        Date: August 2, 1988

        Example from Category #3:

        Alphabet Robot

2050   Manipulates object.

        Two alternatives of transformation,

        either F or alphabet, but is able to

        to make learning of alphabets fun.

2069   Hides robot under desk.

        He likes hiding things or hiding

        generally.

        "Can you see it?"

Date: July 22, 1988

Example from Category #4:

Zaks

4889	Follows instructions from booklet.	This is a predetermined means.	"You have to do it like this."
		Is he feeling inadequate?	"You have to put those on the grey ones. I don't have the grey ones."
4944	Compares what he is making with the pictures.	Concept of right and wrong comes into play.	"It looks kind of wrong."
		Task-oriented. Level of difficulty is involved.	"Now they make it difficult." "I don't know where this one comes from."

"I'm getting the strider, the big one."

Marketing techniques make him feel inadequate and make him want to collect the whole series.

Date: August 3, 1988

Example from Category #5: Sofabed and Cushions

2653   Shines lamp on assembled house. Crawls in house.

It looks aesthetically pleasing. He is totally relaxed and at ease.

Pushes roof and sides of doorway down while fixing lamp.

"What a pity!" But he does not seem concerneᵈ that a part of the beautiful house is demolished.

| 2684 | Crouches down to watch TV. | He likes to label things as he plays along. He likes to elaborate on the spaces, expanding or modifying them. Make-believe is involved.

This is part of his daily life. Creations are applicable to his interests. He has his own space, his own world. He can have a sense of power and control. | "This is the office room." "This is where I study maps." "This is the study room, and this is the way to go into the living room." |
| 2734 | Rebuilds walkway of living room.

Whistles again while | Evolving process: thinks, redecides, evaluates.

It is an enjoyable process. | |

working, thinks, looks,

hesitates before putting a

cushion down. Puts bigger

cushions down on two

smaller ones to make slanted

roofs.

2862   Finishes house.

It looks so impressive, stunning.

It involves simple methods of

construction without screws, just

makes use of existing materials in

the environment. Hence it is

determined by his environment but

it is also a means to change the

environment indirectly.

He is anxious to tell me, "I've

finished a new house." "Wow."