

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND
TECHNOLOGY

COLLEGE OF ART AND SOCIAL SCIENCES
FACULTY OF ART
DEPARTMENT OF PAINTING AND SCULPTURE

“EXPLORATION OF POINTILLISTIC SCULPTURE”

A THESIS SUBMITTED TO THE DEPARTMENT OF PAINTING AND
SCULPTURE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF FINE ART (SCULPTURE)

BY

SARFO, PRINCE KWAKU

JUNE, 2010

DECLARATION

I hereby declare that this submission is my own work towards the MFA and that to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree at the Kwame Nkrumah University of Science and Technology except where due acknowledgement has been made in the text.

KNUST

Student Name & ID

Signature

Date

Certified by:

Supervisor Name

Signature

Date

Certified by:

Head of Department's Name

Signature

Date

ACKNOWLEDGEMENT

I thank God Almighty for granting me ideas and the strength to put them into reality. I am also very grateful to all those who in diverse ways helped me to undertake this program. My special thanks to Mr. J S K Agbo and Mr. L.Y.F Lee Nukpe, my supervisors, for offering their time, patience and expertise. A warm gratitude is also due to all the lecturers in the department of Painting and Sculpture for their support and encouragement

Finally, I would like to say a big thank you to all my mates especially David, Eyram, Mr. Appiah and Rev. Mensah for helping me through the project.

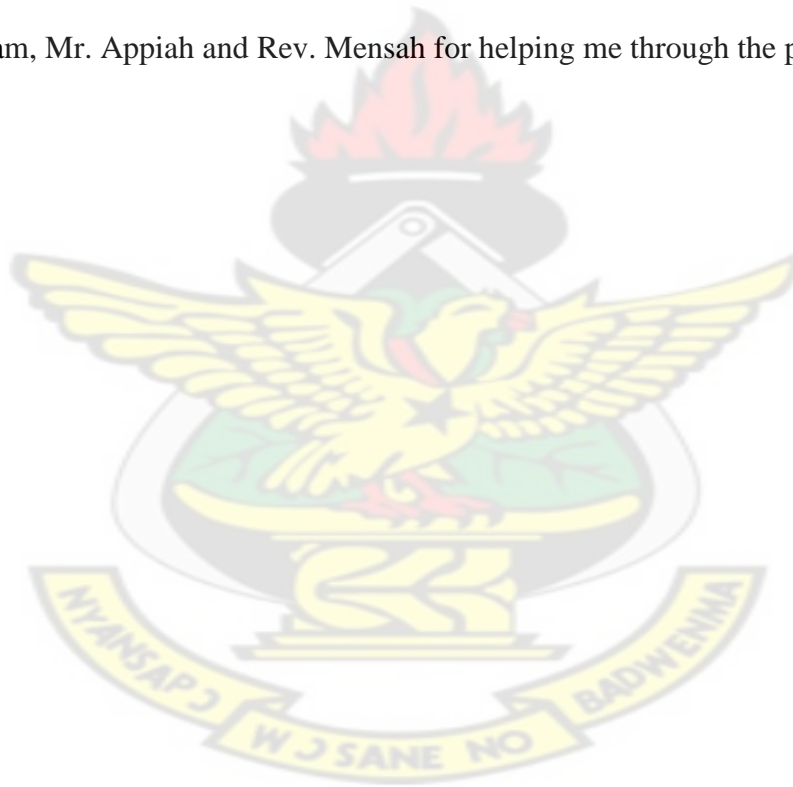


TABLE OF CONTENTS

	PAGE
Title page	i
Declaration	ii
Acknowledgements	iii
Table of content	iv-v
List of figures	vi
List of plates	vi - xii
CHAPTER ONE	
INTRODUCTION	1 - 5
Background to the study	
Statement of the problem	
Objectives	
Justification	
Delimitation	

CHAPTER TWO

RELATED LITERATURE REVIEW	6 - 31
---------------------------	--------

CHAPTER THREE

TOOLS AND MATERIALS	32 - 44
---------------------	---------

CHAPTER FOUR

WORKING PROCESS	45 - 97
-----------------	---------

Experimental

Projects

Appreciation and Interpretations of project works

CHAPTER FIVE

Summary, Conclusion and Recommendations	98 - 99
---	---------

REFERENCES	100 - 102
------------	-----------

List of figures

Figures	Page
Fig. 4.1 Pencil on paper	45
Fig. 4.2 Pencil and Charcoal pencil on paper	46
Fig. 4.3 Charcoal pencil on paper	46
Fig. 4.4 Charcoal pencil on paper	47
Fig. 4.5 Short strokes, Pen on paper	47
Fig. 4.6 Cross hatching, Pen on paper	48
Fig. 4.7 Charcoal shading on paper	48

List of plates

Plate	Page
Plate 2.1 Georges Seurat, <i>A Sunday Afternoon on the Island of La Grande Jatte</i> ,	10
Plate 2.2 Hedcut, Kevin Sprouls, <i>Arnold Schwarzenegger</i>	11
Plate 2.3 Hedcut, Self Portrait by Noli Novak	12
Plate 2.4 distance view of crayon series 2, Christian Faur	14
Plate 2.5 Closer view of crayon series 2, Christian Faur	14
Plate 2.6 Christian Faur, “The Dance I” (2006), Hand Cast Encaustic Crayons, 19.5 inches x 19.5 inches	15

Plate 2.7	Christian Faur, “Forgotten boy” (2008), Hand Cast Encaustic Crayons, 19.5in x 19.5in	16
Plate 2.8	cup used for the “Mona Lisa”	17
Plate 2.9	preparing the coffee	17
Plate 2.10	assembling the coffee	17
Plate 2.11	the assembled coffee	17
Plate 2.12	Coffee cup Mona Lisa, Close up short	18
Plate .2.13	Coffee cup Mona Lisa and organizers with drafted Image on paper	18
Plate 2.14	Distance view of the coffee cup Mona Lisa	19
Plate 2.15	Wider view “I’m looking at you” by Eung Ho Park	20
Plate 2.16	Detail shot of Eung- Ho Park’s “I’m looking at you”	21
Plate 2.17	Wall of Oil Barrels, Iron Curtain, Rue Visconti, Paris, 1962 by Christo and Jeanne Claude	22
Plate 2.18	Christo Mastaba, Stacked Oil Barrels, Project for MOMA, New York, 1968	23
Plate 2.19	Close up shot of the 13000 oil barrels	23
Plate 2.20	Distance view from front of the 13000 oil barrels	24
Plate 2.21	Full shot of “The Wall of 13,000 Oil Barrels” Indoor Installation and Exhibition, Gasometer, Oberhausen, Germany 1999	24

Plate 2.22	Lionel Bawden, Exhibition: The Roving Eye May 31 2006 - July 27 2006 Gigantic ArtSpace	25
Plate 2.23	The amorphous ones (the vast colony of our being)	26
Plate 2.24	Detail shot of the amorphous ones (the vast colony of our being)	27
Plate 2.25	Anatomy of the human eye	28
Plate 2.26	Subtractive colour mixing by Cantus, 2004	31
Plate 2.27	Additive colour mixing by Cantus, 2004	31
Plate 3.1	Hand Saw	32
Plate 3.2	Jig Saw	33
Plate 3.3	Jig saw blades	33
Plate.3.4	Hammer	34
Plate.3.5	Pincers	36
Plate.3.6	Tin opener	36
Plate 3.7	Rubber bucket	37
Plate 3.8	Three star nails	38
Plate.3 .9	Easy brand office pins	39
Plate 3.10	Bottle caps	39
Plate 3.11	Plywood	40

Plate 3.12	Acrylic paints	40
Plate 3.13	Milk tins	41
Plate 3.14	Latex foam	42
Plate 3.15	Neoprene contact glue	43
Plate 4.1	experimental work 1 in clay (front view)	49
Plate 4.2	experimental work 1 in clay (side view)	50
Plate 4.3	Experimental work 2 (Pins on foam)	51
Plate 4.4	Experimental work 2 (closer shot)	51
Plate 4.5	Removing labels from milk tin	52
Plate 4.6	Opening the milk tin with tin cutter	53
Plate 4.7	Washing of milk tins	54
Plate 4.8	Painting of boards (plywood)	54
Plate 4.9	Preparing plywood for the foam	55
Plate 4.10	Stippling pins into the foam	56
Plate 4.11	work in progress	57
Plate 4.12	finished work (front view) 24"x 36"x 3"	57
Plate 4.13	Finished work (¾ view shot) 24"x 36"x 3"	58
Plate 4.14	Painting the board	59
Plates 4.15	Out-lining the figure with nail and hammer	60

Plate 4.16	Bringing out features in the face	61
Plate 4.17	Showing progress in project two	61
Plate 4.18	Finished work (front view), 38"x 50"x 1"	62
Plate 4.19	Finished work (¾ view shot), 38"x 50"x 1"	63
Plate 4.20a	Painting the plywood	64
Plate 4.20b	Painting the plywood	64
Plate 4.21	Before editing	65
Plate 4.22	After editing	65
Plate 4.23	Applying neoprene contact adhesive on bottle caps	66
Plate 4.24	Pressing bottle caps to board	66
Plate 4.25	Working progress in project three	67
Plate 4.26	Working progress in project three	67
Plate 4.27	Painting the black out	68
Plate 4.28	Stage 1 of painting	68
Plate 4.29	Painting the of bottle caps with white acrylic paint	69
Plate 4.30	Stage 2 of painting project three	69
Plate 4.31	Stage 3 of painting project three	70
Plate 4.32	Final stage of painting	70
Plate 4.33	Finished work (front view shot), 38"x 50"x 1"	71
Plate 4.34	Finished work (¾ view shot), 38"x 50"x 1"	72
Plate 4.35	Painted board and bottle caps	74

Plate 4.36	Stage 1 of assembling of bottle caps	74
Plate 4.37	Stage 2 of assembling of bottle caps	75
Plate 4.38	Stage 3 of assembling of bottle caps	75
Plate 4.39	Final stage of assembling of bottle caps	76
Plate 4.40	Finished work (front view shot), 38"x 50"x 1"	76
Plate 4.41	Finished work (3/4 view shot), 38"x 50"x 1"	77
Plate 4.42	Boring nail hole at the bottom of milk tins	78
Plate 4.43	Stage 1 of nailing milk tins to the board	79
Plate 4.44	Stage 2 of nailing milk tins to the board	79
Plate 4.45	Stage 3 of nailing milk tins to the board	80
Plate 4.46	Bending nails at the back of board	80
Plate 4.47	Editing the picture with Corel Photo paint (1)	81
Plate 4.48	Editing the picture with Corel Photo paint (2)	81
Plate 4.49	Editing the picture with Corel Photo paint (3)	82
Plate 4.50	Final Image for painting	82
Plate 4.51	Stage 1 of painting the inside of milk tins	83
Plate 4.52	Stage 2 of painting the milk tins	84
Plate 4.53	Stage 3 of painting the milk tins	84
Plate 4.54	Closer view of painted milk tins	85
Plate 4.55	Stage 4 of painting the milk tins	85
Plate 4.56	Final stage of painting the milk tins (closer view)	86
Plate 4.57	Finished work, 62"x 74"x 3"	86
Plate 4.58	Applying white glue at the base of milk tins	87
Plate 4.59	Stage 1 of gluing milk tins to the board	88
Plate 4.60	Stage 2 of gluing milk tins to the board	88

Plate 4.61	Editing picture with Dream suit mosaic (1)	89
Plate 4.62	Editing picture with Dream suit mosaic (2)	89
Plate 4.63	Editing picture with Dream suit mosaic (3)	90
Plate 4.64	Stage 1 of painting the inside of milk tins with acrylics	90
Plate 4.65	Stage 2 of painting the milk tins	91
Plate 4.66	Stage 3 of painting the milk tins	91
Plate 4.67	Finished work, 62"x 74"x 3"	92
Plate 4.68	Finished work (¾ view shot) 62"x 74"x 3"	92

CHAPTER TWO

RELATED LITERATURE REVIEW

2.0 Pointillism

Pointillism is the painting technique in which dots of unmixed, pure colour are juxtaposed on a canvas. The dots blend together in the viewer's eyes to create tones when the painting is viewed at a distance. Aside the colour "mixing" phenomena, there is the simpler graphic phenomenon of depicted imagery emerging from disparate points. Historically, Pointillism has been a figurative mode of executing a painting, as opposed to an abstract modality of expression. Pointillism is a close relative of "stippling" and "divisionism", in which the artist, using brushes and different colours of paints, creates an entire composition out of dots. The French Neo-Impressionist painter George Seurat (1859 - 1891) is credited with developing Pointillism just as Kevin Sprouls (1979) is noted for stippling.

The pointillist's technique relies on the perceptive ability of the eye and mind of the viewer to mix the colour spots into a fuller range of tones. The individual dots of red, yellow and blue are sucked in through the eyes and mixed up in the mind to create a variety of shimmering shades. It is a style with few serious practitioners and is notably seen in the works of Seurat, Signac and Cross. The term "Pointillism" was first coined by art critics in the late 1880s to ridicule the works of these artists and is now used without its earlier mocking connotations.

Seurat shared his new ideas about pointillism with Signac, who subsequently painted in the same idiom. In the summer of 1884 Seurat began work on his masterpiece, "Sunday Afternoon", on the Island of La Grande Jatte, which took him two years to complete. One of the reasons that Georges Seurat used the pointillism technique was to get more light into his art. The white space between his dots makes his paintings seem to glow.

Seurat died in Paris on 29 March 1891 and one of his famous works 'Circus' was left unfinished at the time of his death.

2.0.1 Scientific theories and influences

During the 19th century, scientist-writers such as Michel Eugène Chevreul, Ogden Rood and David Sutter wrote treaties on colour, optical effects and perception. They were able to translate the scientific research of Helmholtz and Newton into a written form that was understandable by non-scientists. Chevreul was perhaps the most important influence on artists at the time; his great contribution was producing a colour wheel of primary and intermediary hues.

Chevreul was a French chemist who restored old tapestries. During his restorations of tapestries he noticed that the only way to restore a section properly was to take into account the influence of the colours around the missing wool; he could not produce the right hue unless he recognized the surrounding dyes. When seen from a distance Chevreul discovered that two colours juxtaposed, slightly overlapping or very close together, have the effect of another colour. The discovery of this phenomenon became the basis for the Pointillist technique of the Neo-impressionist painters.

Chevreul also realized that the 'halo' that one sees after looking at a colour is actually the opposing or complementary colour. An example is after looking at a red object, one may see a cyan echo/halo of the original object. This complementary colour (for example, cyan for red) is due to retinal persistence. Neoimpressionist painters, interested in the interplay of colours, made extensive use of complementary colours in their paintings. Chevreul advised artists that they should not just paint the colour of the object being depicted, but rather add colours and make appropriate adjustments to achieve a harmony.

According to Professor Anne Beauchemin (2008), most Neoimpressionist painters probably did not read Chevreul's books, but instead read "Grammaire des arts du dessin", written in 1867 by Charles Blanc, who cited Chevreul's works. Blanc's book targeted artists and art connoisseurs. Colour had an emotional significance for him, and he made explicit recommendations to artists which were close to the theories later adopted by the Neoimpressionists. He said that colour should not be based on the 'judgment of taste', but rather it should be close to what we experience in reality. Blanc did not want artists to

use equal intensities of colour, but rather to consciously plan and understand the role of each hue.

Neoimpressionists were also influenced by Ogden Rood who studied colour and optical effects. Whereas the theories of Chevreul are based on Newton's thoughts on the mixing of light, Rood's writings are based on the work of Helmholtz, and as such he analyzed the effects of mixing together and juxtaposing material pigments. For Rood, the primary colours were red, green, and blue-violet. Like Chevreul, he stated that if two colours are placed next to each other, from a distance, they look like a third distinctive colour. Rood also pointed out that the juxtaposition of primary hues next to each other would create a far more intense and pleasing colour when perceived by the eye and mind than the corresponding colour made by mixing paint. Rood advised that artists be aware of the difference between additive and subtractive qualities of colour, since material pigments and optical pigments (light) do not mix together in the same way:

Material pigments: Red + Yellow + Blue = Black

Optical / Light: Red + Green + Blue = White

The practice of Pointillism is in sharp contrast to the more common methods of blending pigments on a palette or using the many commercially available premixed colours. Pointillism is analogous to the four-colour CMYK printing process used by some colour printers and large presses, [Cyan (blue), Magenta (red), Yellow and Key (black)]. Televisions and computer monitors use a pointillist technique to represent images, but with Red, Green, and Blue (RGB) colours.

Plate 2.1 is a painting by George Seurat during the pointillism movement, and based on their experience from the books they read, he juxtaposed colours which from a distance made the painting looks smoothly rendered. From a closer look or when viewed very closely, the viewer can tell the individual colours placed side by side to composed Seurat's "*A Sunday Afternoon on the Island of La Grande Jatte*"

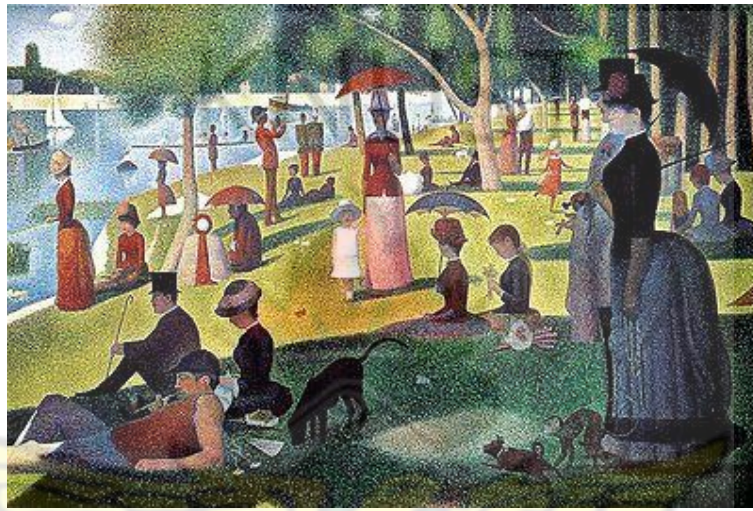


Plate 2.1

Georges Seurat, *A Sunday Afternoon on the Island of La Grande Jatte*, (1884–1886), Oil on canvas, 207.6 cm × 308 cm (81.7 in × 121.3 in), Art Institute of Chicago, Chicago.

2.1 Stippling

The act of stippling involves covering an area with dots. What comes right to mind is a wildly time-consuming technique, done with a technical pen and ink (usually black), in which an image is drawn dot...by dot...by dot. (One may also stipple glass, an engraving plate, a quilt or even an interior wall, the resulting image contains no lines). It is a collection of dots, strategically placed to suggest forms, shapes, contrast and depth. It is left to the viewer's eye to complete the picture, a proposition which seldom fails.

Kevin Sprouls is the creator of the Wall Street Journal portrait style known as 'hedcut'. The Wall Street Journal adopted the current form of this portraiture in 1979 when freelance artist Kevin Sprouls approached the paper with some ink dot illustrations he had created. The front page editor felt that the drawings complemented the paper's classical feeling and gave it a sense of stability. Additionally, they are generally more legible than photographs of the same size would be. Sprouls was subsequently hired as a staff illustrator and remained there until 1987. Today, there are six hedcut artists on staff including Noli Novak, Randy Glass and Nancy Januzzi.



Plate 2.2
Hedcut, Kevin Sprouls, *Arnold Schwarzenegger*

The style (hedcut) was so unique that the Wall Street Journal decided to keep it within for the paper. Some artists like Randy Glass and Noli Novak and others were taught how to stipple and work for the company. Noli Novak has been stippling portraits for the Wall Street Journal since 1987. Before Noli

Novak went to Wall Street Journal to learn stippling, she was a collage artist even though she attended music academy in Croatia.

Plate 2.2 and plate 2.3 are stippling images done for the Wall Street Journal, as compared to George Seurat's painting in plate 2.1, from a distance the dots blend to form a picture while from a closer look the viewer can see these individual dots that come together to form the picture



Plate 2.3

Hedcut, Self Portrait by Noli Novak

Even though the technique used in the plates (plate 2.2 and plate 2.3) is similar to that used by the researcher, the above work in plate 2.3 is flat on the surface though it looks three dimensional on the paper. As compared to the work in plate 2.3, the researcher used three dimensional materials to achieve the same look when viewed direct from the front. Since the works are projected from supports, the three dimensional individual materials from the supports create shadows against light and that also creates a unique effect as compared to

plate 2.3. The shadows created when light falls on the work from an angle create a shade which enhances the tones in the work.

2.2 Christian Faur

Ohio-based artist Christian Faur brilliantly uses crayons in a manner between pointillism and pixilation and the results are those of a genius. Christian Faur's earliest memories are of making art involve the use of wax crayons. He still remembers the pleasure of opening a new box of crayons: the distinct smell of the wax, the beautifully coloured tips, everything still perfect and unused. Using the first crayon from a new box always gave him a slight pain. Through a novel technique that he has developed, he again finds himself working with the familiar form of the crayon. Christian Faur, looking for a new technique, experimented with painting with wax, but he didn't feel the results were satisfactory. Then, at Christmas in 2005, his young daughter opened a box of 120 Crayola crayons he had bought her, and everything clicked into place. He decided he would create pictures out of the crayons themselves. In plate 2.5 is one the works Christian Faur executed with crayon sticks. Different colours of crayon sticks were arranged in a way that from a distance, the viewer can see a figure, while from a closer look the viewer can only see solid or three dimensional crayon sticks parked in a container or a box.

Seen from the side, not only does the work involved become more apparent, but an almost separate beauty emerges. The sculptural aspects of the pieces come into view, like miniature crayon horizons, tilted to reveal their relief. These side-ways typographies of colour give us a little insight, from this angle, of what our brains see so differently when viewed from straight on.



Plate 2.4

Distance view of crayon series 2, Christian Faur



Plate 2.5

Closer view of crayon series 2, Christian Faur

Because of the three-dimensional nature of the crayons, the individual surface images appear to change form as the observer moves about the gallery space. The images completely disappear when viewed from close up, allowing one to read the horizontally sequenced crayon text and to take in the beautifully coloured crayon tips, all the while being reminded of that first box of crayons.

Faur assembled more than one hundred thousand hand cast crayons of varying colours and shades to produce a body of work which is unlike anything done before in art. These individual “pixels” of wax are precisely stacked into specific locations inside of wooden frames to produce a new art form that uniquely balances the qualities of both photography and sculpture. Further, the

product is a series of photorealistic landscapes and figurative images that are formed at the surface of the thousands of tightly packed crayon tips. The imagery that makes up this new body tends to focus on isolated elements represented as children, barns, and water towers, within determinate landscapes, which are intended to reference the individual crayon whose solitary existence, like that of the individual element, is rendered obsolete in the amalgamate. The direct representation of language in each piece further imbues the works with meaning and brings an aspect of colour into each composition reminiscent of DNA coding.

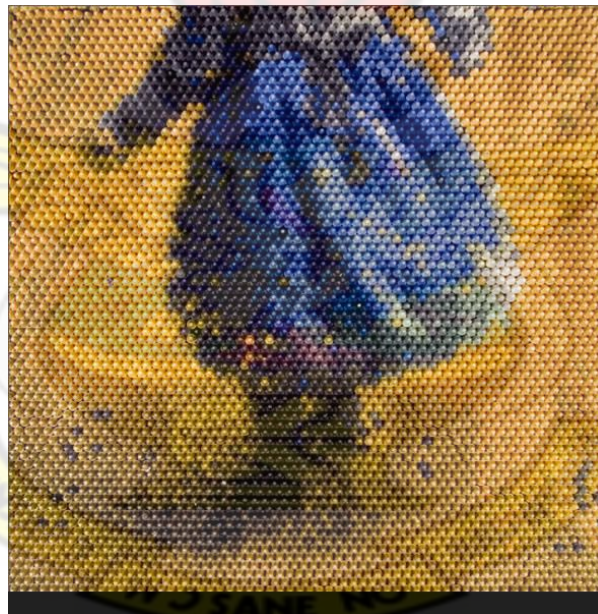


Plate 2.6

Christian Faur, “The Dance I” (2006), Hand Cast Encaustic Crayons,
19.5 inches x 19.5 inches



Plate 2.7

Christian Faur, “Forgotten boy” (2008), Hand Cast Encaustic Crayons,
19.5in x 19.5in

In the work above (plate 2.8), Faur made it more solid or three dimensional with the coloured crayon he added. As the viewer goes or moves away from the work the figure in the picture also moves backward leaving the colours at the front. As the viewer goes closer to the work there is realization that all the crayons both the grey scale and the coloured are all on the same plane. From a distance this work looks as if the figure in the picture is standing behind a glass with dots of colours sprayed or painted on the surface.

2.3 Coffee cap Mona Lisa

Aroma festival is an annual coffee festival organized by coffee producers, coffee sellers and coffee drinkers. In July, 2009 at the Aroma Festival at The Rocks in Sydney, Australia (the year’s annual coffee festival), the organizers used 3,604 cups of coffee, four shades using different amounts of coffee and milk, to create a replica of Leonardo da Vinci's “Mona Lisa”.



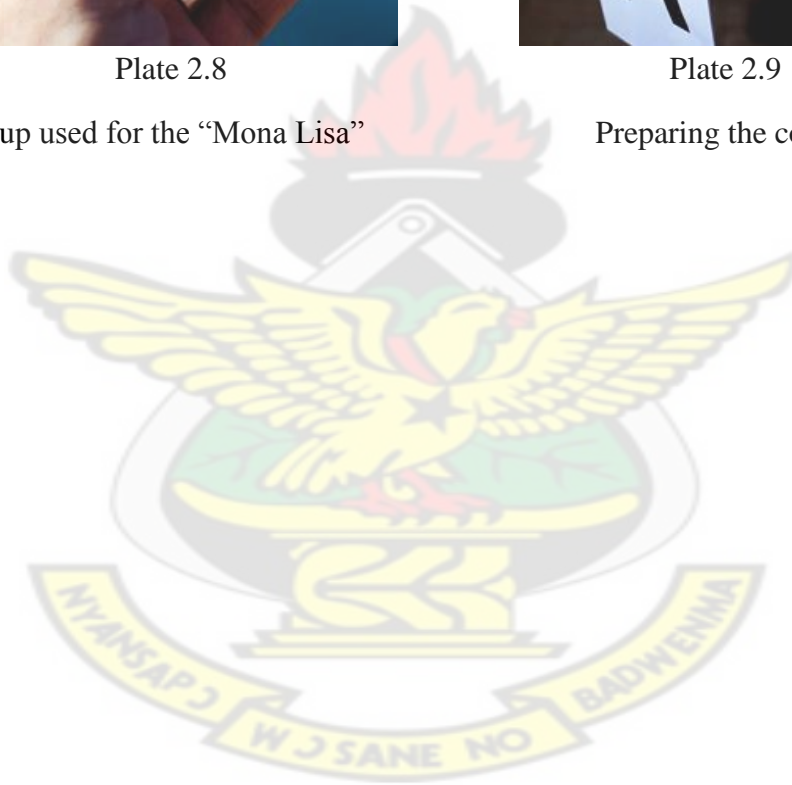
Plate 2.8

Cup used for the “Mona Lisa”



Plate 2.9

Preparing the coffee



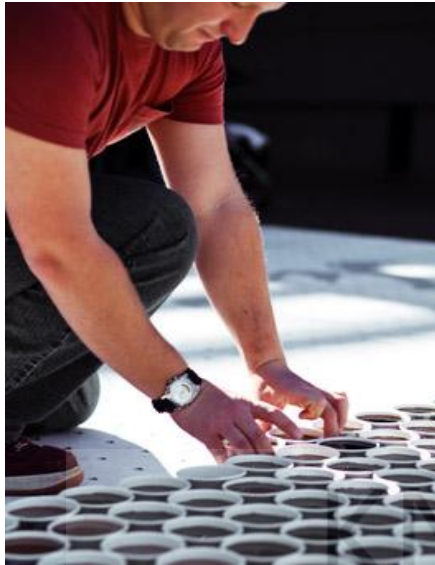


Plate 2.10

Assembling the coffee



Plate 2.11

The assembled coffee

Stages before coffee cup Mona Lisa was achieved.
A pointillist's work is always viewed from a distance. The Coffee Cup Mona Lisa was so huge viewers had to go very far to see a good picture of Mona Lisa. Again, because the picture was formed with the liquid coffee and milk, the picture couldn't be hanged or leaned on a wall or mounted vertically



Plate 2.12

Coffee cup Mona Lisa, Close up shot



Plate .2.13

Coffee cup Mona Lisa and organizers with drafted Image on paper



Plate 2.14
Distance view of the coffee cup Mona Lisa

Plate 2.8 - plate 2.14 are similar to the project the researcher is undertaking out of empty milk tins. The technique, idea and approach are almost the same even though there are differences. The picture being taken after project was made with liquid coffee with different quantity of milk in thousands of coffee cups arranged in a blended manner to create a replica of Leonardo da Vinci's famous painting "Mona Lisa". The researcher's project consists of opened milk tins with the inside walls painted. The project can be mounted vertically since the milk tins are attached to the support while the "Coffee cups Mona Lisa" was meant to be on the ground and was meant to last only a day because the coffee was assemble to be consumed. Though coffee cups were arranged artistically to form "Mona Lisa", the coffee was there for coffee customers to consume to mark the year's Coffee Festival.

Another material that can be use for pointillism is bottle caps. A series of bottle caps are painstakingly glued from the back to the support and their interiors are painted. A similar work was done by Eung-Ho Park, who used

epoxy resin to hold the bottle caps from the back to a wall surface and painted the interior with acrylic paints. He titled his work “I am Looking at You”, based on his experience in New York where all eyes were on him. He has depicted a crowd, with the various colours of human eye lenses. Ho-Park used colour to represent a person and for that matter the different colours used represent a certain number of people. Eung Ho-Park is always working with materials around him (everyday objects) and uses human beings and human parts as his reference. The work is similar to the researcher’s work in terms of material, arrangement and bondage.



Plate 2.15 Wider view

I'm looking at you by Eung Ho Park

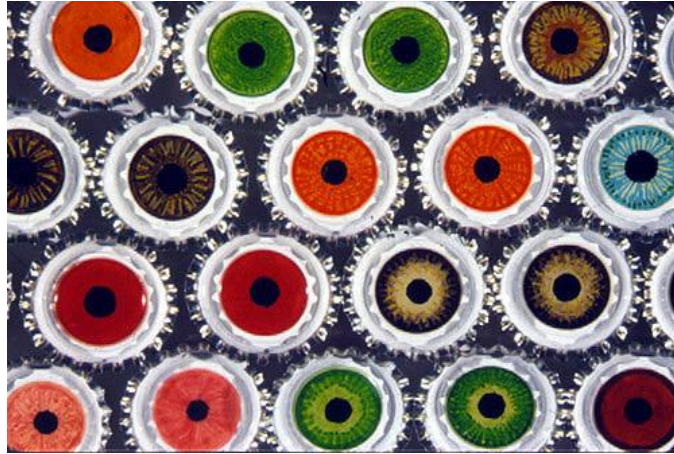


Plate 2.16
Detail shot of Eung- Ho Park's "I'm looking at you"

Similar to Eung Ho-Park wall sculpture as seen in plate 2.15 and plate 2.16 are 'The Iron Curtains', 'The Wall of 13,000 Oil Barrels' and 'The Mastaba' by Christo and Jeanne Claude. These are huge temporary installed art where Christo and Jeanne Claude used empty oil barrels of different colours. In 1958, Christo began working with oil barrels, because they were the largest containers he could find that were both unbreakable and easy to come by. Since then, he has stacked numerous barrel structures, sometimes with the intent to create massive, freestanding forms, and sometimes with the intent to create environmental obstructions. The structures were an early indication of Christo and Jeanne-Claude's predilection for creating sculptures that almost pass for ordinary phenomena that one scarcely notices in everyday life. They prefer their works to be disturbingly ambiguous, and thereby causing the spectator to do a double take.

In conjunction with his first personal exhibition in 1961 at the Haro Lauhus Gallery in Cologne, Christo exhibited his first outdoor barrel structures. The gallery was very near the Cologne waterfront where Christo sighted several

stacks of oil drums, cardboard barrels, and paper rolls. Viewing them as familiar art materials, he instantly recognized their sculptural possibilities and set about “borrowing” them. Rearranging the piles of cardboard barrels and rolls of paper, he proceeded to shroud them in tarpaulin, which he secured with cord.

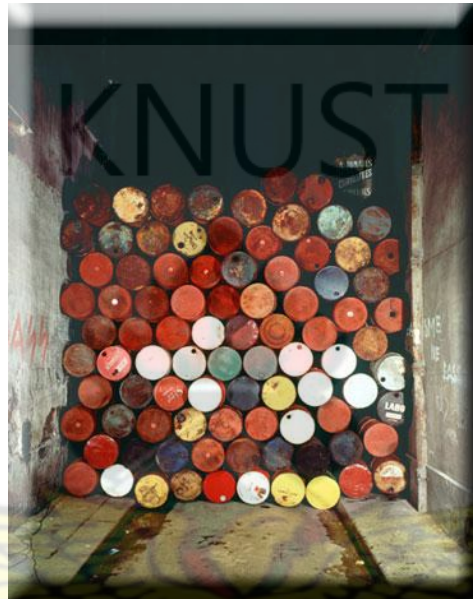


Plate 2.17

Wall of Oil Barrels, Iron Curtain, Rue Visconti, Paris, 1962 by
Christo and Jeanne Claude 4.3 x 3.8 x 1.7 meters (14 x 12.5 x 5.6 feet)

Though Christo and Jeanne Claude use barrels of different colours they do not concentrate on the colours as they arrange them. Their concentration is on the creation of massive sculptural work, and for that matter thinking about how and where they can do something that will cause the viewer to ask how and why? The researcher finds Christo and Jeanne Claude’s huge sculptures similar to his work especially the frontal look. Christo and Jeanne Claude’s arrangement of colours of the barrels does not create necessarily a figure or a naturalistic form, while the researcher’s arrangement of colours always creates a figure. Christo and Jeanne

Claude's arrangement always cause the viewer to trace the colour arrangement to see if it resembles or creates something.



Plate 2.18

Christo Mastaba, Stacked Oil Barrels, Project for MOMA, New York, 1968



Plate 2.19

Close up shot of the 13000 oil barrels



Plate 2.20

Distance view from front of the 13000 oil barrels

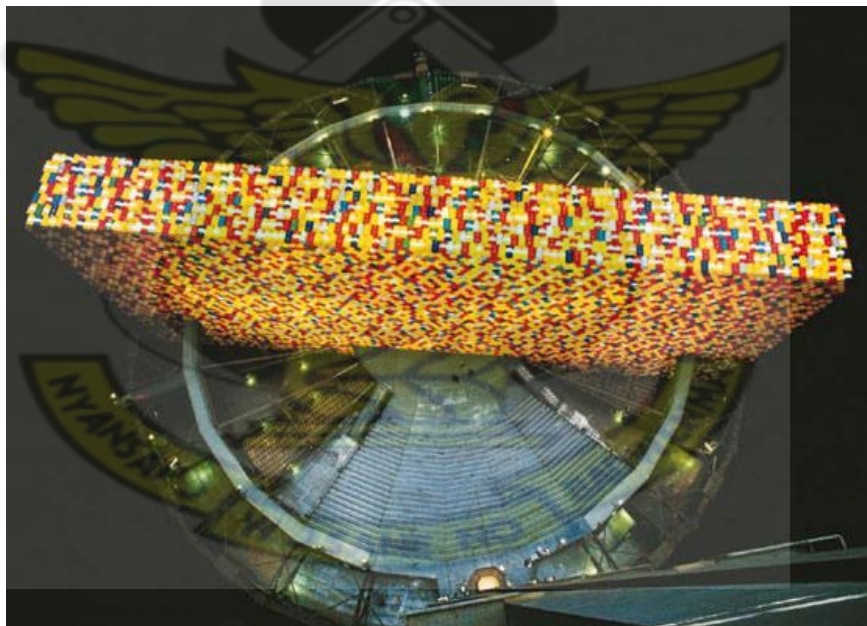


Plate 2.21

Full shot of “The Wall of 13,000 Oil Barrels”

Indoor Installation and Exhibition, Gasometer, Oberhausen, Germany 1999

2.4 Lionel Bawden

Bawden is an artist who uses colour pencils in most of his works. He binds the colour pencils into a block and carves into a desired form. Because of the different colours used the carved surface displays a colourful pattern.

Mathematically and artistically a dot is considered 360 degrees just as a circle is 360 degrees. The surface of the carved block of pencil therefore displays circles of different colours. Though he has not termed his work as a pointillistic sculpture it can be termed as such because of how the pencils are put together and what they look like after carving



Plate 2.22

Lionel Bawden, Exhibition: The Roving Eye May 31 2006 - July 27 2006
Gigantic ArtSpace



Plate 2.23

The amorphous ones (the vast colony of our being)

The above art work in plate 2.25 is what Bawden calls ‘The amorphous ones (the vast colony of our being)’. This work was among the exhibition he held at GrantPirrie Gallery in Sydney, which he titled the exhibition ‘New Works on Paper’ He bonded the pencils and carved it into different forms and mounted the finished work on piled paper with the paper serving as the pedestal. Usually we use pencil when drawing, shading and hatching to create a form on paper. Bawden on the other hand decided to bind all these pencils and carve into a form.

Most art works done in pointillism, painting, graphics or sculpture are frontal meaning the viewer has to be in front of the work in order to see what has been done. Bawden’s works which display several dots of different colours can be viewed from all angles. In some of his works, the colour dots create rhythmic patterns based on the arrangement of the colour pencils and in the others where he used one-colour pencils, the dots only create or add surface texture to the form he carves.



Plate 2.24

Detail shot of the amorphous ones (the vast colony of our being)

2.5 The human eye and colour

The human eye can see 7,000,000 colours. Some of these are eyesores. Certain colours and colour relationships can be eye irritants, cause headaches, and wreak havoc with human vision. Other colours and colour combinations are soothing. Consequently, the appropriate use of colour can maximize productivity, minimize visual fatigue, and relax the whole body.

Colour originates in light according to science. Sunlight, as we perceive it, is colourless. In reality, a rainbow is testimony to the fact that all the colours of the spectrum are present in white light. Scientifically, the colour the human eye sees when an object is sighted is based on the reflection of the object when light from the sun falls on it or white light from an artificial source falls on it.

It is believed that when a white light falls on an object, the object absorbs all the colours in the light and reflects what it can not absorb and that is what determines the colour of the object. The above elaborates the usual definition given to colour which says "Colour is the visual effect that is caused by the spectral composition of the light emitted, transmitted, or reflected by objects."

According to a research term in the school of biological science (University of Bristol) (2009), the retina contains two types of photoreceptors, rods and cones. The rods are more numerous, some 120 million, and are more sensitive than the cones. However, they are not sensitive to colour. The 6 to 7 million cones provide the eye's colour sensitivity and they are much more concentrated in the central yellow spot known as the macula. The experimental evidence suggests that among the cones there are three different types of colour reception. Response curves for the three types of cones have been determined. Since the perception of colour depends on the firing of these three types of nerve cells, it follows that visible colour can be mapped in terms of three numbers called tristimulus values.

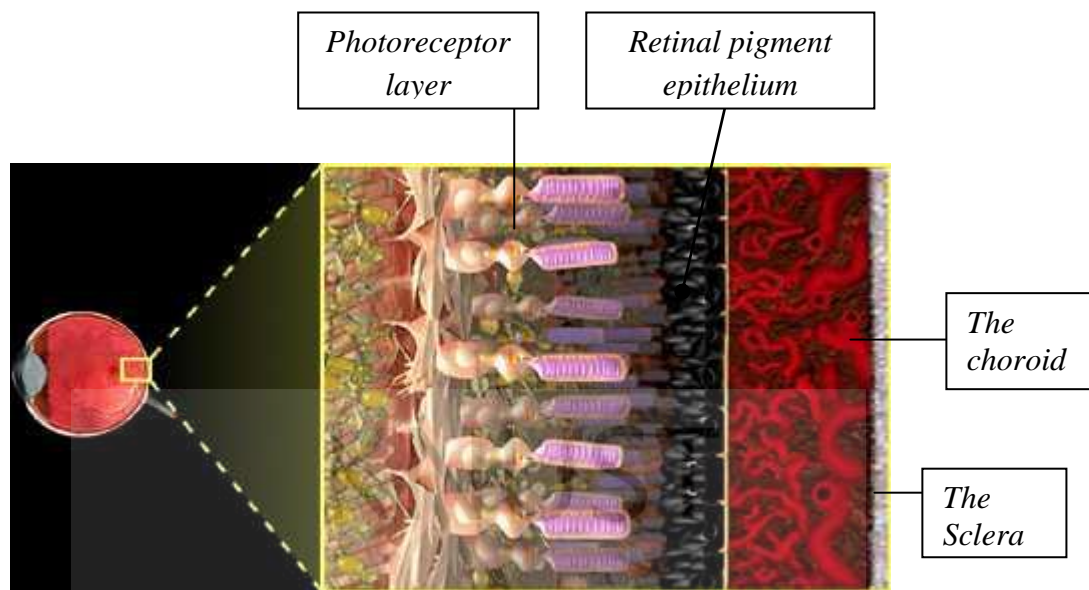


Plate 2.25

Anatomy of the human eye

<http://www.macula.org/images/layers.jpg>

- The photoreceptor layer is composed of light-sensitive cells called rods and cones. Light images are converted into electro-chemical signals inside the photoreceptors.
- Under the photoreceptors is a dark layer called the retinal pigment epithelium or RPE. Cells of the RPE absorb excess light and transport oxygen, nutrients and cellular wastes between the photoreceptors and the choroid.
- Bruch's membrane separates the blood vessels of the choroid from the RPE layer.
- The choroid is a layer of blood vessels that supplies oxygen and nutrients to the outer layers of the retina.
- The sclera is the fibrous, white, outer covering of the eye.

2.6 Trichromats

Humans have three kinds of colour receptor cells – or “cones” - in their eyes. Each type of cone contains a different visual pigment. These three cone types are called "red", "green" and "blue."

Therefore, we are “trichromats” (tri = 3, chroma = colour).

(All hues can be produced by mixing red, green and blue light. This is how a colour television set works; a mixture of these three wavelengths of colour produces several million visible colours.)

2.7 Why Colour Matters

Colour plays a vitally important role in the world in which we live. Colour can sway thinking, change actions, and cause reactions. It can irritate or soothe your eyes, raise your blood pressure or suppress your appetite. As a powerful form of communication, colour is irreplaceable. The colour used in an art work or used as a finish for an art work is very important to the artist and the client. In interior design, colour is even more powerful. This is the art we live in. Dynamic colour combinations may create one effect: subtle combinations, a different effect. Likewise, art contributes to how the total design works. Furthermore, the right colours in artwork help to achieve harmony between the furniture, flooring, window coverings and other fixtures. The above are all factors considered during this project. Based on how the human eye sees colours, colour separation was done during the preparation of images for the project. The three colour receptors being ‘red’, ‘green’ and ‘blue’ in the human eye which determines the colour of an object sends signals to the brain before some one can tell the colour of an object. Any colour aside these three colours (red, green blue) is seen when two or three of these sensitive receptors

work together. In between these three receptors are the 7,000,000 colours the human eye can see.



Plate 2.26

Subtractive colour mixing by Cantus, 2004



Plate 2.27

Additive colour mixing by Cantus, 2004

CHAPTER FOUR

THE WORKING PROCESS (METHODOLOGY)

General working process

The project was done with different materials and different approaches.

Step 1

Idea developing

Series of drawings were done to develop ideas on how to come up with pointillistic sculpture. Figure 4.1 shows how different sizes of circles and ovals were used to create a figure. This was to know how oval and rounded objects could be assembled, constructed or bonded to form a pointillistic sculpture.

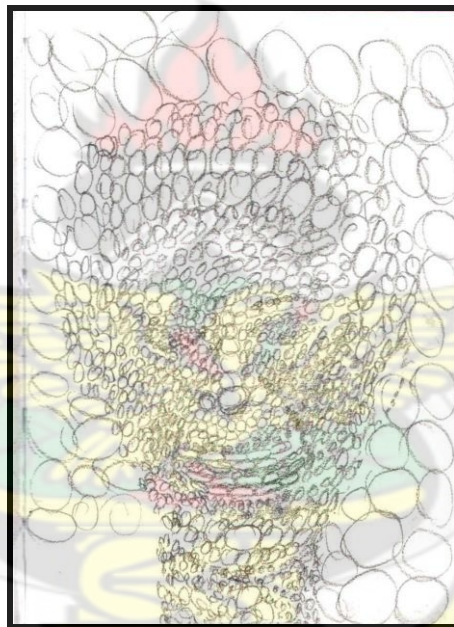


Fig. 4.1

Pencil on paper

In figure 4.2 the researcher used the short stroke style of drawing or shading with reference to the research findings where some painters like Vincent van Gogh used short strokes to paint during the pointillism movement. The idea was to find out how similar objects can be assembled or constructed to form a sculpture piece.

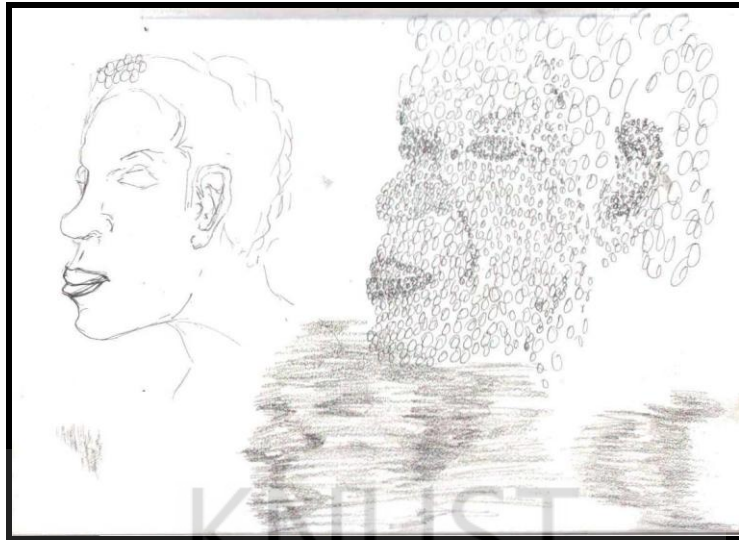


Fig. 4.2
Pencil and Charcoal pencil on paper

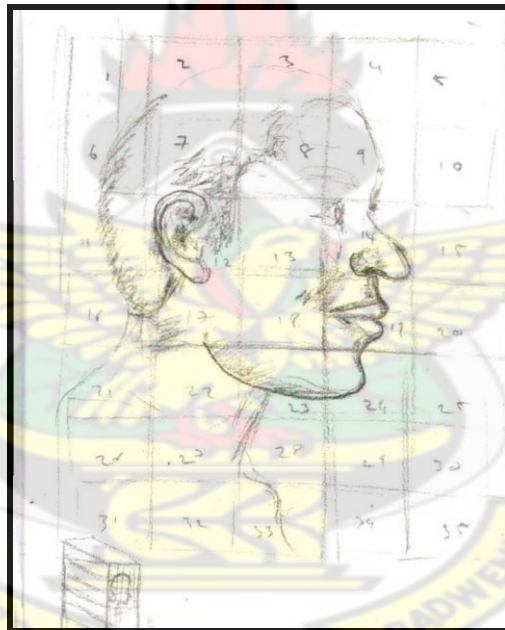


Fig. 4.3
Charcoal pencil on paper

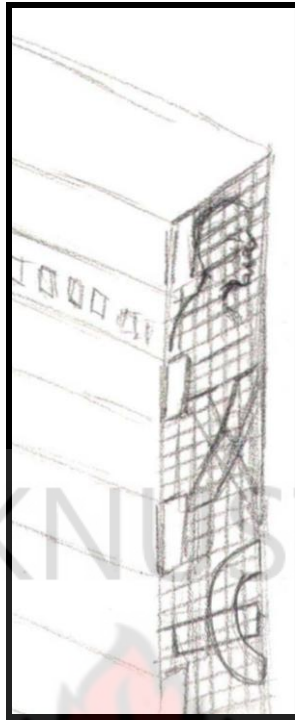


Fig. 4.4

Charcoal pencil on paper

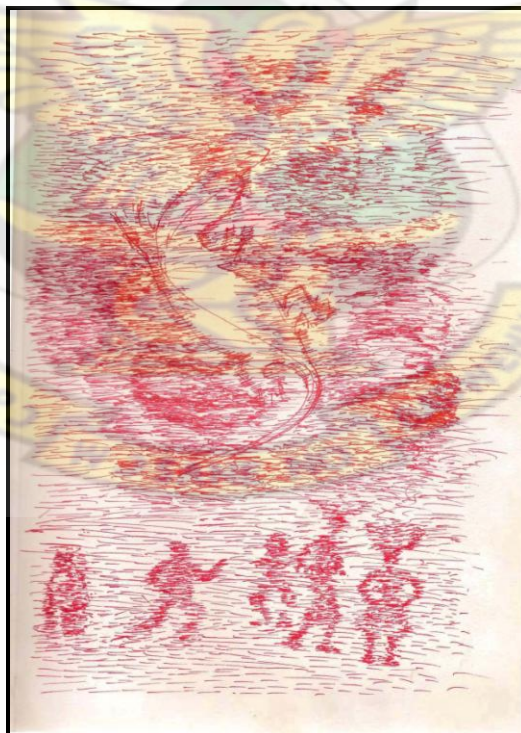


Fig.4 5

Short strokes. Pen on paper

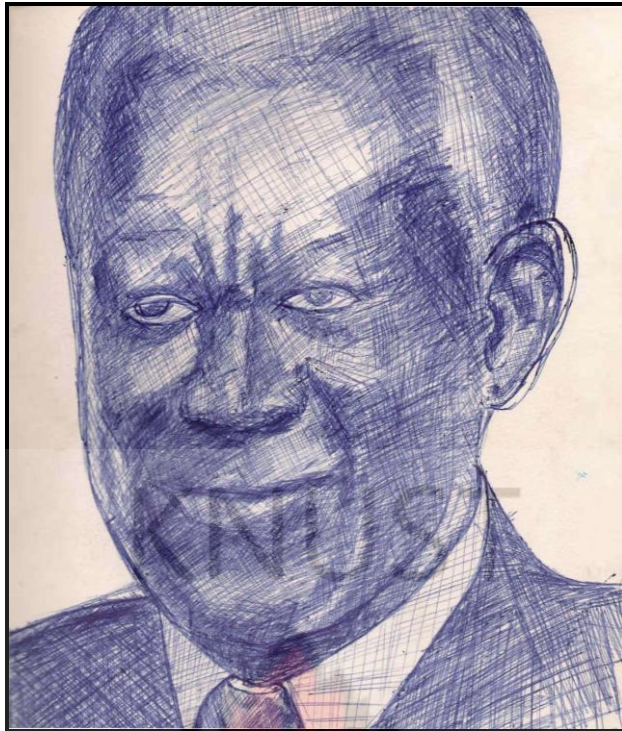


Fig. 4.6
Cross hatching, Pen on paper

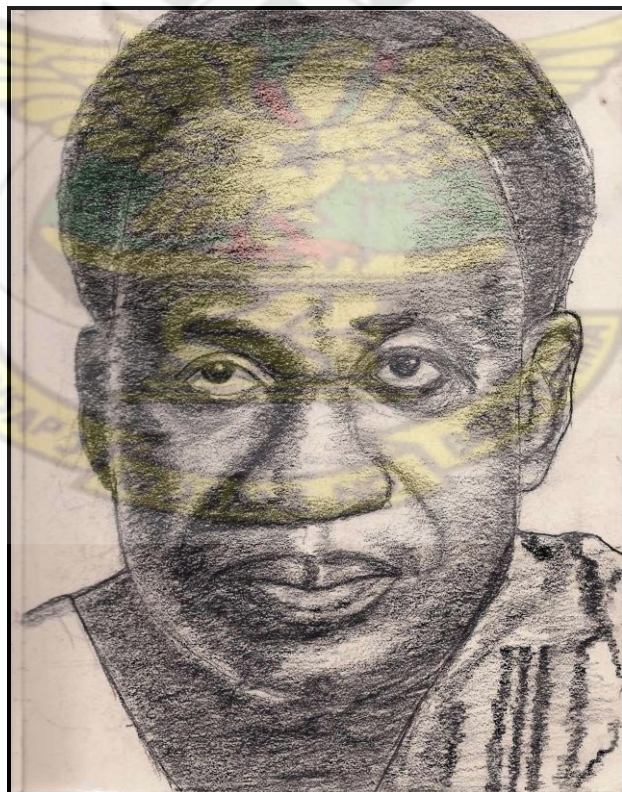


Fig. 4.7
Charcoal shading on paper

Step 2

Experimental

Two different experiments were conducted before the various projects began. The first one was done in relief with clay. The second one was also a relief done with pins on foam.

Experiment 1

The researcher modelled the portrait of Dr. Kwame Nkrumah (first president of Ghana) in relief. The relief work was then covered with clay rolled into balls till the resemblance was achieved. This was done to find out whether the resemblance can be maintain after covering the whole surface with the clay balls.

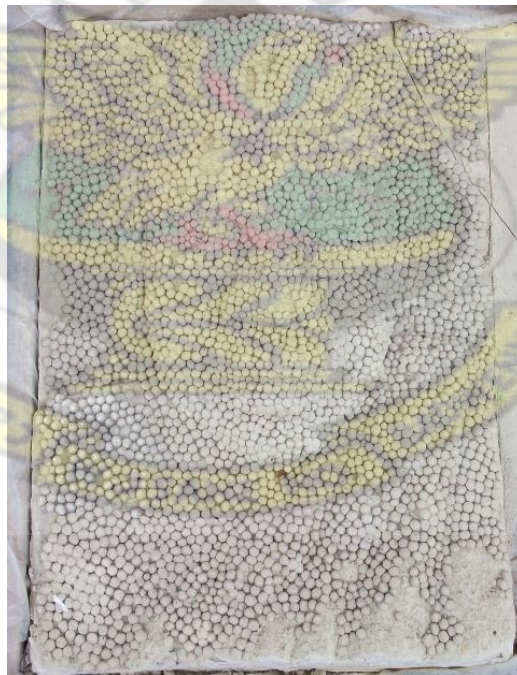


Plate 4.1

Experimental work 1 in clay (front view)



Plate 4.2

Experimental work 1 in clay (side view)

After the whole work was covered with the clay balls, the researcher realized that though the clay balls are glued or stuck to the relief surface with clay slip they fall off when a slight force is applied on the work's surface. For that matter this material and its technique was not used for a major project.

Experiment 2

The researcher's second experiment was done with 'easy-brand' office pins on foam supported with plywood. A linear drawing of the portrait of Dr. Kwame Nkrumah was drawn on the foam. The pins were then stippled into the foam about 1/3 of its length. Different shades were created with the spacing of the pins. Though the resemblance was not achieved accurately, it was made clear how the different tones or shades can be achieved

As shown in the plate 4.3, the researcher's intension was to cover the lines with the pins but after experimenting, the lines were still showing through the pins. For this matter the researcher developed a technique of getting accurate proportions and resemblance. This technique was used in project one. The picture was printed big and pasted on the foam for accurate proportions.

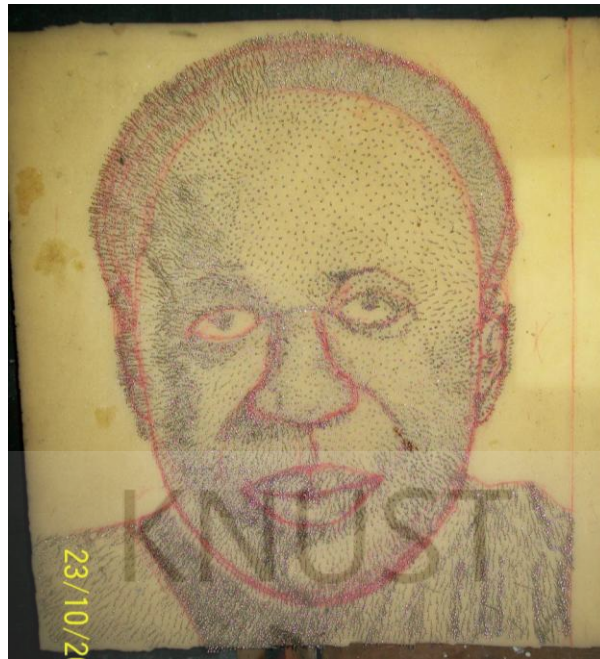


Plate 4.3

Experimental work 2 (Pins on foam)

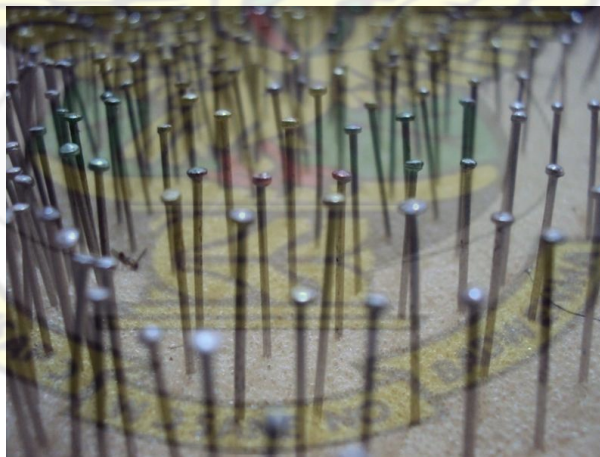


Plate 4.4

Experimental work 2 (closer shot)

Step 3

Gathering of material

Materials for the projects were gathered from various locations. Milk tins were gathered from near by Senior High Schools dinning halls. Bottle caps (bottle tops) were also gathered from drinking spots, snack stores and stands, etc.

Step 4

Preparing materials for work

Milk tins were opened with a tin cutter and washed to do away with labels and rotten milk from the tin.



Plate 4.5

Removing labels from milk tin



Plate 4.6
Opening the milk tin with tin cutter



Plate 4.7
Washing of milk tins

Step 5

Preparation of support

The plywood as the support for the work was cut into the various sizes to begin with. In the case of the bigger works the pieces of plywood were joined with white glue and nails into a frame. The supports were then painted with acrylic paints.



Plate 4.8

Painting of boards (plywood)

Step 6

Executing the works

The various materials (milk tins, bottle caps and pins) were assembled, constructed and glued onto the various supports to form human figures.

Project one

“Dr. Kwame Nkrumah” in office pin

This is the project that was done with easy brand office pins on high density foam. These tiny pins were pushed about 1/3 of its height into the foam. The different spacing of the pins created the figure.

Step 1

Preparation of support

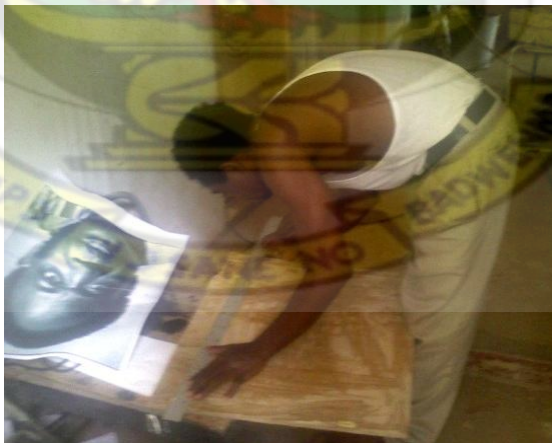


Plate 4.9

Preparing plywood for the foam

A two inches thick high density foam was cut into 20 X 23 inches and glued to equivalent plywood size with neoprene contact adhesive

Step 2

An image of Dr. Kwame Nkrumah was enlarged to the size of the foam and printed for accuracy and proportion.

Step 3

The pins were stippled about 1/3 of its height into the foam to create the figure. Dark areas had the pins stippled closer to each other while lighter areas had the pins stippled widely apart. Different spacing was used to create the different grades of tone to complete the work.



Plate 4.10

Stippling pins into the foam

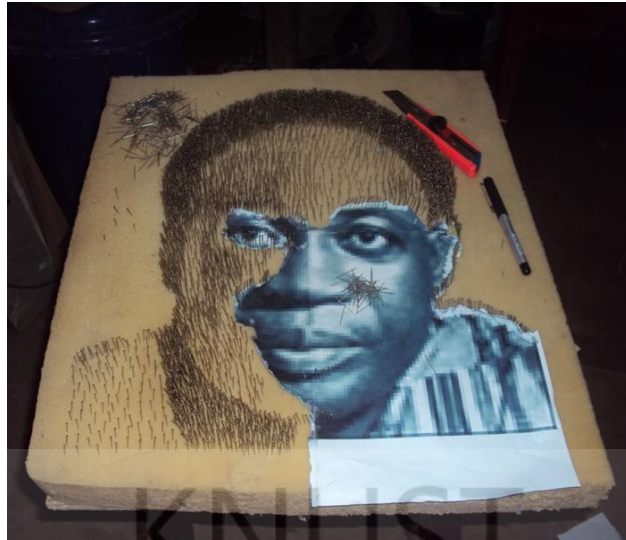


Plate 4.11

Work in progress



Plate 4.12

Finished work (front view) 24"x 36"x 3"



Plate 4.13

Finished work ($\frac{3}{4}$ view shot) 24"x 36"x 3"

Project two

“Dr. Kwame Nkrumah” in Nails

This project was executed with one-inch three-star brand nails on painted plywood. The nails were hammered into the board about 1/3 of its height. The details in the work was done by the spacing the nails (where dark areas have closely packed nails while light areas have the nails widely spaced).

Step 1

Preparation of support

A cut 3 X 4 feet plywood was painted with white acrylic paint



Plate 4.14

Painting the board

Step 2

Executing the work

One-inch three-star brand nails were driven with hammer to out-line the portrait of Dr. Kwame Nkrumah. Different tones were achieved with different spacing in-between the nails.



Plate 4.15

Out-lining the figure with nails and hammer



Plate 4.16

liv
Bringing out features in the face



Plate 4.17

Showing progress in project two

Step 3

Finishing the work

A wooden frame was prepared to frame(38"x50"x1") the work



Plate 4.18

Finished work (front view), 38"x 50"x 1"



Plate 4.19

Finished work (¾ view shot), 38"x 50"x 1"

Project three

"Dr. Kwame Nkrumah" in bottle caps/tops

This project was done with bottle caps turned opened and painted with black and white acrylic paints.

Step 1

Preparation of support

The support (plywood 3 X 4 feet) was painted with light-blue acrylic paint to enhance the spaces that will be created in-between the bottle caps after gluing.

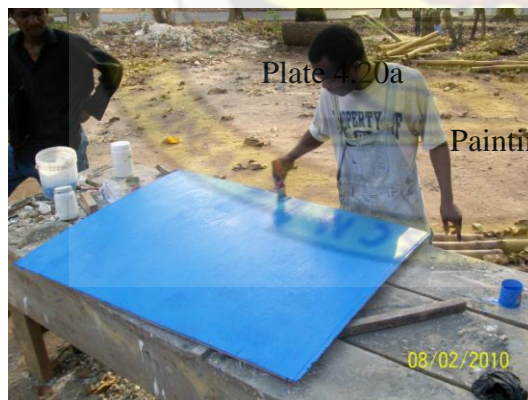


Plate 4.20a

Painting the plywood

Plate 4.20b

Step 2

Preparing the image

A black and white image of Dr. Kwame Nkrumah was edited with Corel Photo paint to achieve a total black and white pixilated image for the work

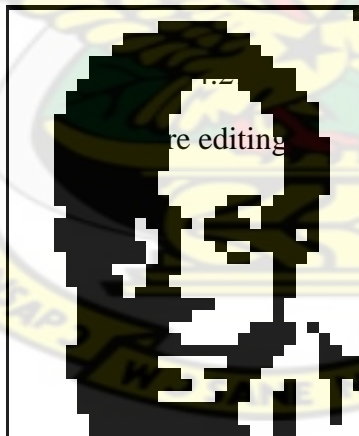


Plate 4.22

After editing

Step 3

Experiment

An experiment was done with nails and neoprene contact adhesive to determine which of the two is faster and appropriate. Neoprene contact adhesive was selected to bind the bottle caps to the board.

➤ Step 4

Gluing the bottle caps

Neoprene contact adhesive was applied on the board and at the back of the bottle caps and allowed some time to dry. The bottle caps were then hammered to the board for a firm hold in horizontal and vertical line.

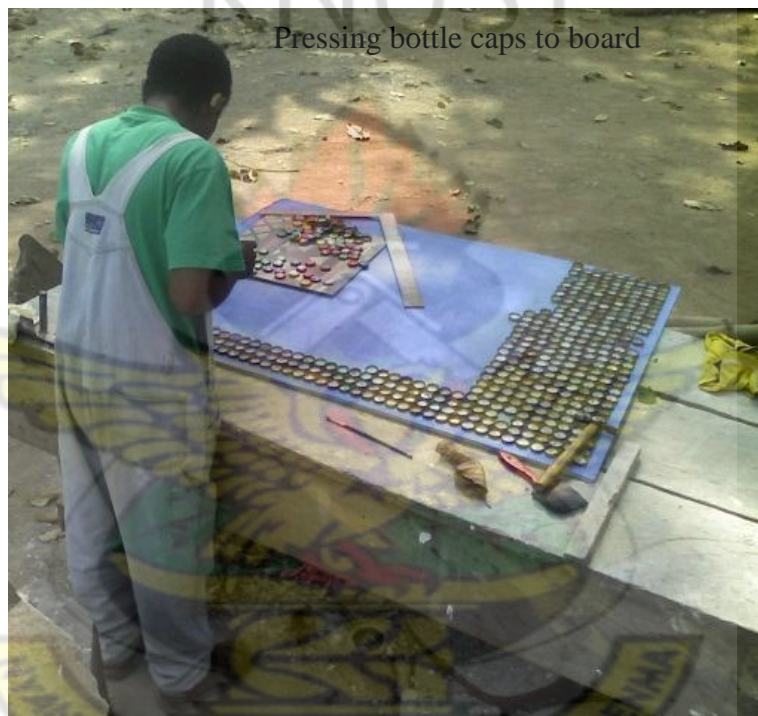


Plate 4.23

Applying neoprene contact adhesive on bottle caps



Plate 4.24



Pressing bottle caps to board

Plate 4.25

Working progress in project three



Plate 4.26

Working progress in project three

Step 5

Painting bottle caps

The glued bottle caps were painted with black and white acrylic paint based on the total black and white drafted image. The black ones were first painted and then separated them from the white



Plate 4.27

Painting the black out



Plate 4.28



Stage 1 of painting

Plate 4.29

Painting the of bottle caps with white acrylic paint



Plate 4.30

Stage 2 of painting project three



Plate 4.31

Stage 3 of painting project three



Plate 4.32

Final stage of painting

Step 6

Finishing the work

A wooden frame was made to frame and finish the work.

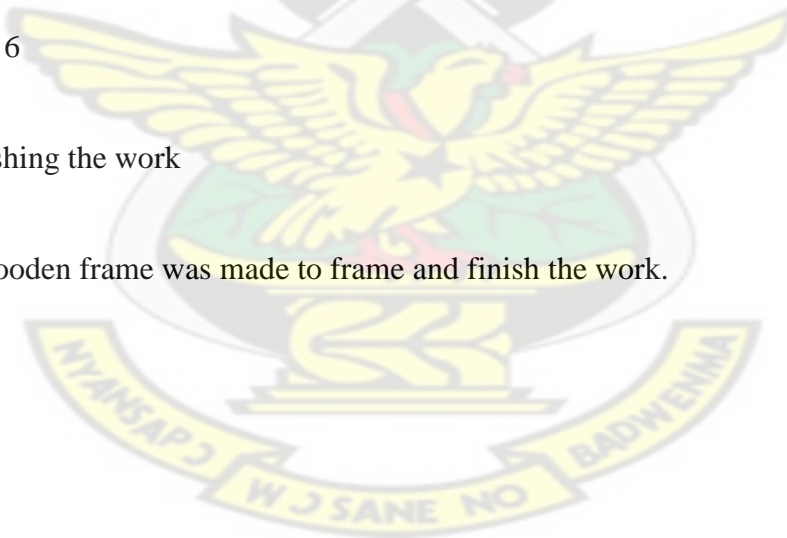




Plate 4.33

Finished work (front view shot), 38"x 50"x 1"



Plate 4.34

Finished work (3/4 view shot), 38"x 50"x 1"

Project four

“President Barrack Obama” in bottle caps

This project was done with the original colours of the bottle caps.

Step 1

Preparing the support

The cut (3 X 4 feet) plywood was painted with black acrylic paint

Step 2

Preparing image for work

A picture of Barrack Obama was drafted with Corel Photo paint

Step 3

Assembling the bottle caps

The bottle caps were assembled on the board according to how the colours appear on the drafted image, when the correct colours arrangement was achieved, the bottle caps were then nailed to the board in their various positions.



Plate 4.35

Painted board and bottle caps

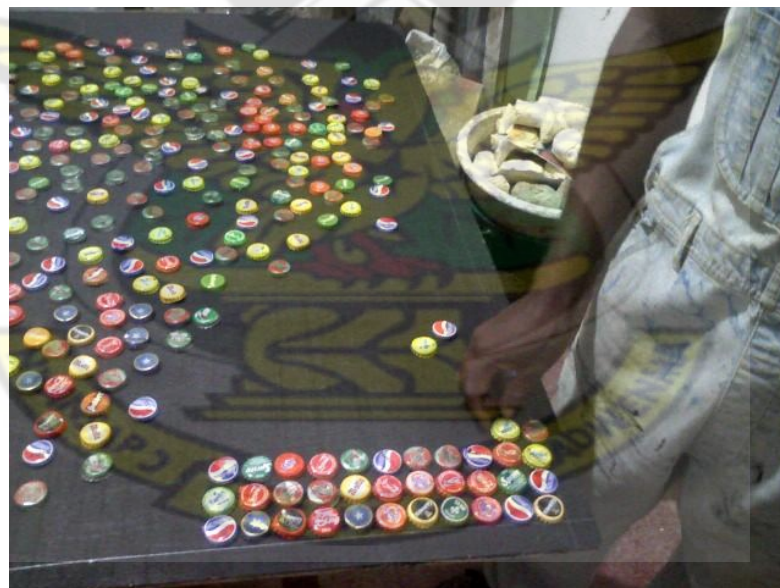


Plate 4.36

Stage 1 of assembling of bottle caps



Plate 4.37

Stage 2 of assembling of bottle caps



Plate 4.38

Stage 3 of assembling of bottle caps

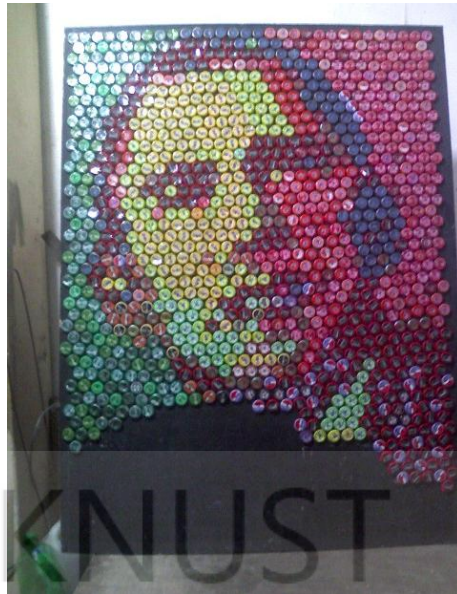


Plate 4.39

Final stage of assembling of bottle caps

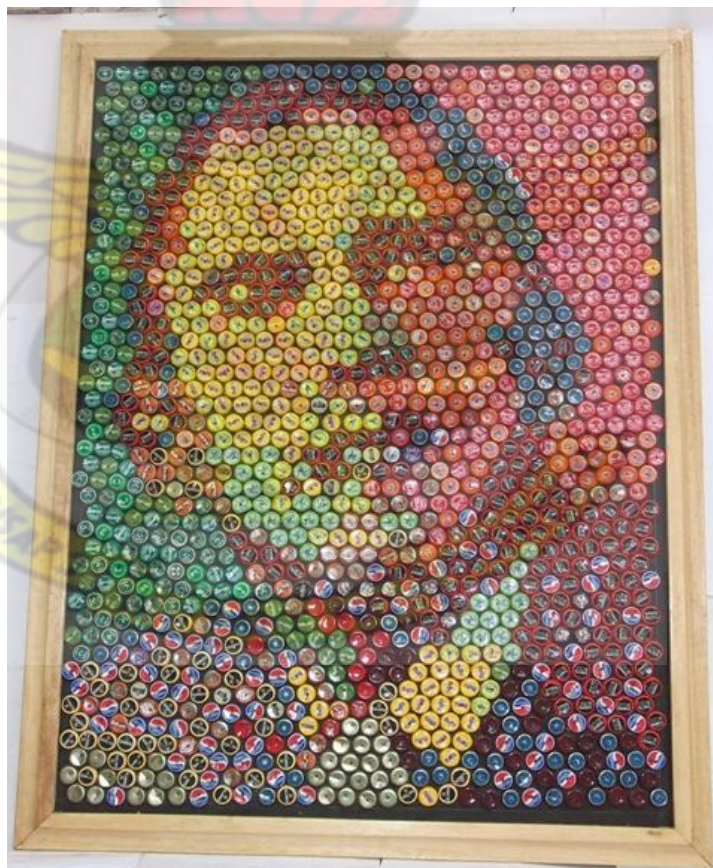


Plate 4.40

Finished work (front view), 38"x 50"x 1"



Plate 4.41

Finished work (3/4 view shot), 38"x 50"x 1"

Project five

“Mr. Kofi Annan” in Milk tin

Step 1

Support preparation

The cut pieces of plywood were joined in a frame to a size of 5 X 6 feet and painted with black acrylic.

Step 2

Nailing the can

The washed milk tins were nailed to the board with one inch three star brand nails in a horizontal and vertical arrangement. A total of 647 milk tins were used in this work.



Plate 4.42

Boring nail hole at the bottom of milk tins



Plate 4.43

Stage 1 of nailing milk tins to the board



Plate 4.44

Stage 2 of nailing milk tins to the board



Plate 4.45

Stage 3 of nailing milk tins to the board

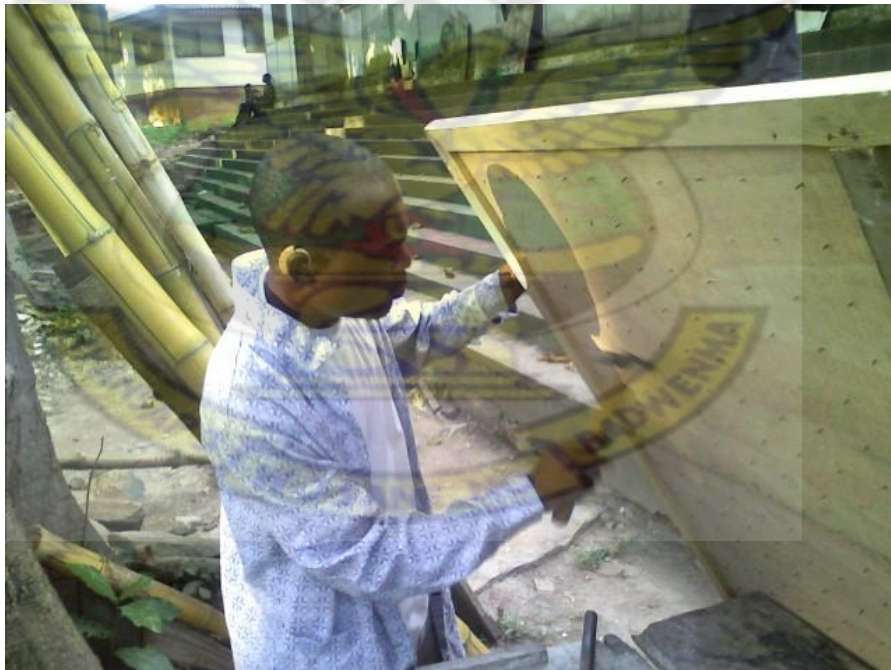


Plate 4.46

Bending the nails at the back of board

Step 3

Preparing the image

Corel photo paint was used to edit Kofi Annan's coloured picture into pixels according to the arrangement and number of milk tins on the board.

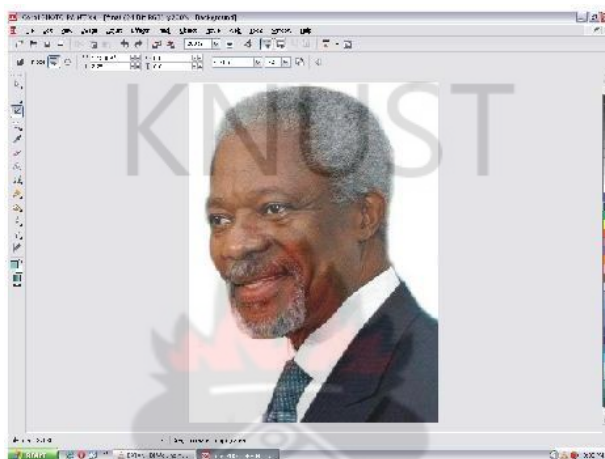


Plate 4.47

Editing the picture with Corel Photo paint (1)

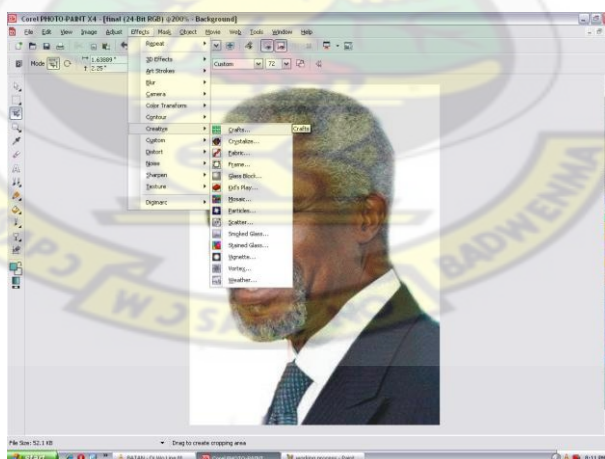


Plate 4.48

Editing the picture with Corel Photo paint (2)

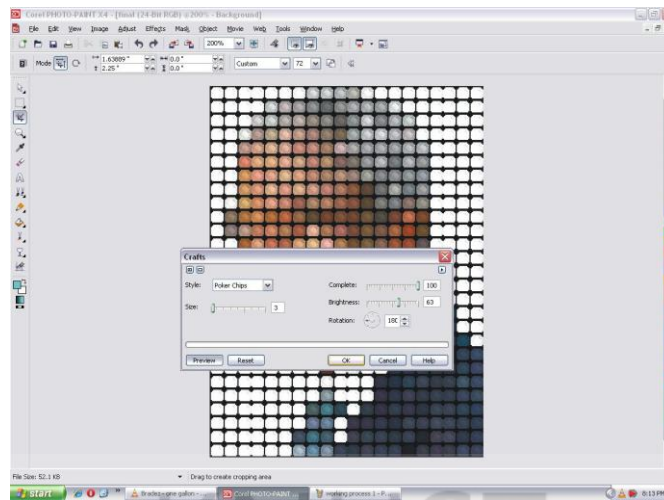


Plate 4.49

Editing the picture with Corel Photo paint (3)

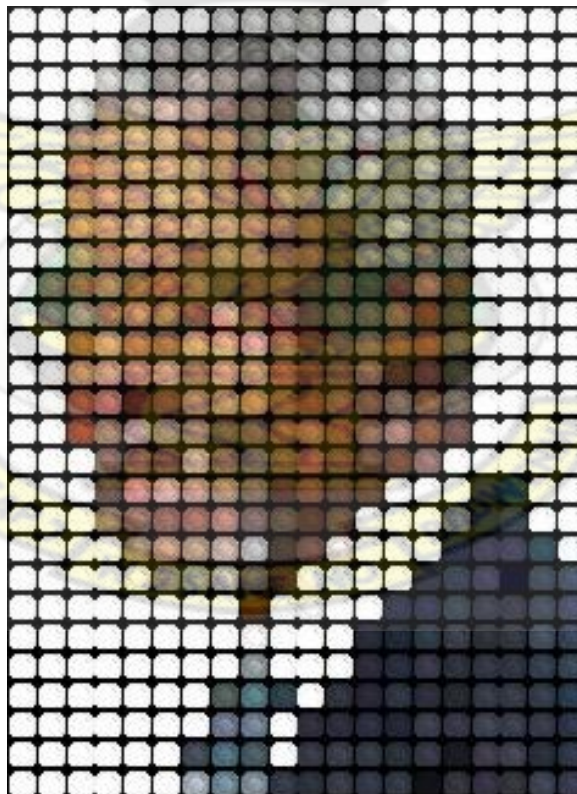


Plate 4.50

Final image for painting

Step 4

Painting the work

Based on the colours in the drafted image the work was painted by mixing colours from the three primary colours with white for lighter colours and black for darker colours



Plate 4.51

Stage 1 of painting the inside of milk tins



Plate 4.52

Stage 2 of painting the milk tins



Plate 4.53

Stage 3 of painting the milk tins



Plate 4.54

Closer view of painted milk tins



Plate 4.55

Stage 4 of painting the milk tins



Plate 4.56

Final stage of painting the milk tins (closer view)



Plate 4.57

Finished work, (62"x 74"x 3")

Project six

“Nelson Mandela” in milk tin

This was done with 714 milk tins. The milk tins were painted with black and white acrylic paints.

Step 1

Preparing the support

Pieces of plywood were joined to form a board of 5 X 6 feet and painted with black acrylic paint

Step 2

Gluing the cans

The milk tins were bonded to the board with white glue (carpenter’s glue).

This was due to experiment done to find out how firm the white glue can hold the milk tins to the board since the nailing was time consuming

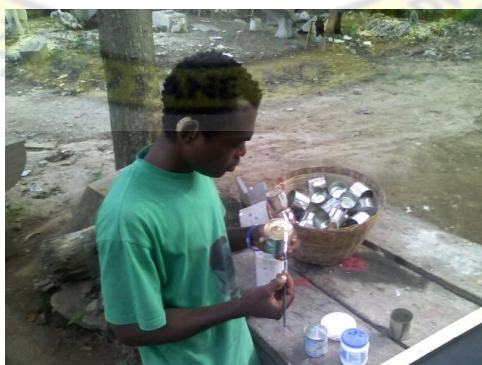


Plate 4.58

Applying white glue at the base of milk tins



Plate 4.59

Stage 1 of gluing milk tins to the board



Plate 4.60

Stage 2 of gluing milk tins to the board

Step 3

Image preparation

An image of Nelson Mandela was converted to one bit black and white and converted to eight bit black and white and saved as jpeg image with Corel photo paint. The black and white image was then opened with dream suit mosaic to add special effect for the painting of the milk tins

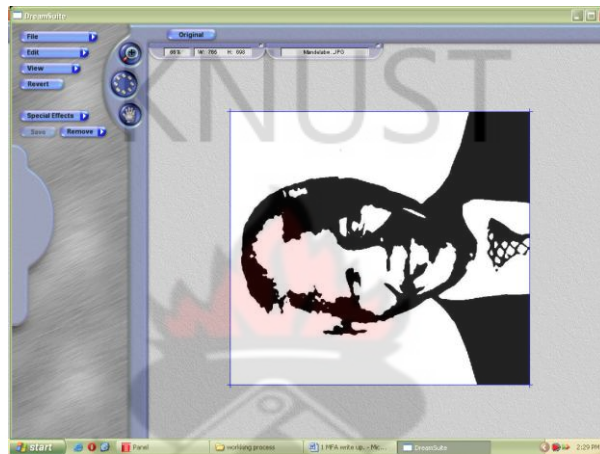


Plate 4.61

Editing picture with Dream suit mosaic (1)

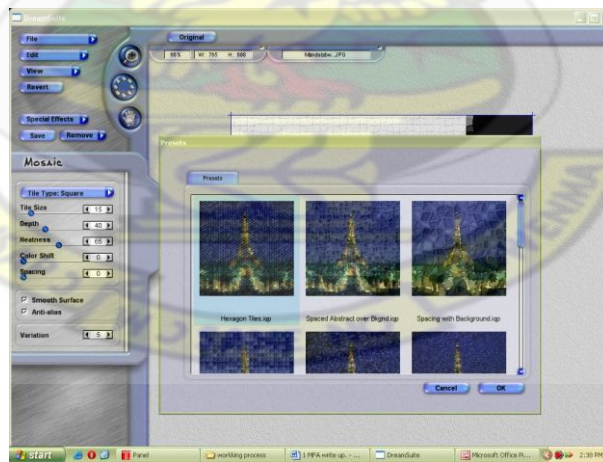


Plate 4.62

Editing picture with Dream suit mosaic (2)

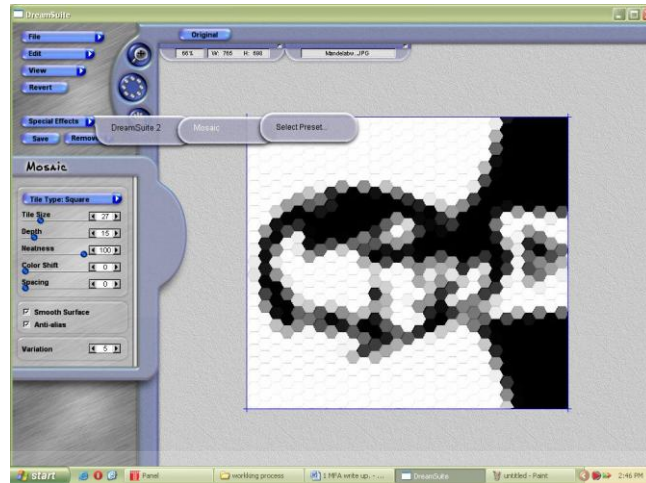


Plate 4.63

Editing picture with Dream suit mosaic (3)

Step 4

Painting

With the edited image as a reference material the milk tins were painted with black and white acrylic paint



Plate 4.64

Stage 1 of painting the inside of milk tins with acrylics



Plate 4.65

Stage 2 of painting the milk tins



Plate 4.66

Stage 3 of painting the milk tins



Plate 4.67

Finished work, (62"x 74"x 3")



Plate 4.68

Finished work (¾ view shot) 62"x 74"x 3"

Appreciation and Interpretation of project works

➤ **Project One**

This is a relief work that was done with easy brand office pins on high density foam (yellow). The size of the work is 18"x 24"x3". Stippling technique was employed on the foam with the pins to create a portrait of Dr. Kwame Nkrumah (first president of Ghana). The element of design "space" was used in this project. The pins stippled on the foam, seen from a distance from a frontal direction, look just like dot. Similar to pencil or pen dot shading, where dark areas have the dot closer than light areas, the pins were spaced such a way that dark areas have the pins closed up and light areas opened up. With no lines drawn on the foam, the pins look just like a shaded picture on the foam. As the viewer moves closer to the work, the image dissolves into the individual office pins. When the observer views the work from a $\frac{3}{4}$ angle from a distance, he sees the image as well as the individual office pins. Again as the viewer moves from the front of the work to the side, the image becomes darker. This is because the viewer sees the side of the pins and that adds a bit of shade to the picture. The effect of light also affects the work depending upon the direction of light source. When the light is directly in front of the work, slight shadows are created by the pins against the background. When light falls on the work from the side, top or lower part, the pins create shadows which add extra shade to the picture, making it a little darker.

➤ **Project Two**

This is a relief work done with 'three star' brand one-inch nails on a wooden board (plywood). The size of the work is 38"x 50"x 1". The technique used in this project was construction. The nails were hammered about 1/3 of their length into the board to create a realistic portrait of Dr. Kwame Nkrumah. This project referenced a style of drawing employed in the Wall Street Journal for portraiture which was introduced in 1979.

The work has standing black nails on a white board which create shadows against background. These shadows add some dark shades to the work depending on the light source; the degree of dark shade is either low or high. When light falls on the work from the front, the work looks like pointillistic shading with pencil or pen but when viewed direct from the front short or no shadow is created. When viewed from a ¾ angle, the image looks darker with surrounding light.

➤ **Project Three**

This is a relief project executed with bottle caps (tops), junk material, on a wooden support (plywood). The size of this work is 38"x 50"x 1". The technique employed in this work was assembling and construction of the bottle caps to create the portrait of Dr. Kwame Nkrumah. The image created is in Black and white with no intermediate colour. The bottle caps were assembled and constructed onto the board with neoprene contact adhesive (type 99) and painted with black and white acrylic paint.

The work is a realistic art created with reference to the pointillism movement. The idea of putting raw colours (the primary colours) side by side (juxtaposition) and viewing it from a distance, the two colours closer creates a third colour in between them unlike the 19th century pointillist who used many raw colours for their works, the researcher used only two colours to form the figure. Though the image created has no definite line, from a distance, all the facial features are shown in the picture.

➤ **Project Four**

This is a relief project executed with bottle caps (crown corks) on a wooden support (plywood). The size of this work is 38"x 50"x 1". The technique employed in this work was assembling and construction. The actual colours of the bottle caps were used to create the portrait of President Barrack Obama of the United State of America. The bottle caps were assembled and nailed to the board. With reference to the scientific proof of how the human eye sees colour and how the pointillist broke away from the usual way of painting, a pointillistic sculpture was done with the bottle caps (crown corks)

The project is a realistic sculpture though the colours used are not the actual colours of the person in the picture. There was the arbitrary use of colours in the picture. From a distance these colours behave just like coloured bulb lighting effect on the face of the person in the picture.

➤ **Project five**

This project is a relief work fashioned out of milk tin. The milk tins were constructed (nailed) to the ply wood and painted with acrylic paints afterwards. The different colours painted come together to form the portrait of Mr. Kofi Annan (former secretary general of UNO). The size of the work is 62" x 74" x 3". The pointillist style of painting was employed in the project. A close up viewer can hardly tell what is in the picture but can tell the different colours in the work. As the viewer moves away from the work, the image in the picture becomes clear. From a $\frac{3}{4}$ view, the solidity of the colours is seen as the direction of light source courses shadows in the individual milk tin. The depth of the painted milk tins as against a moving light, adds movement to the work, as the shadow created in the tins moves in the opposite direction of the moving light. When a light falls on the work from the front, the colour of image becomes lighter, but as the light moves to the side the colour becomes deeper because of the shadows created inside the tins.

➤ **Project six**

This project is a relief work produced out of opened milk tins. The milk tins were glued and assembled to the plywood and painted with black and white acrylic paint afterwards. The two colours painted come together to form the frontal portrait of Nelson Mandela (former president of South Africa). The size of the work is 62" x 74" x 3". The position of light affects the brightness and the dullness of the work. A moving light also adds dimension to the work

as the light creates a shadow within the painted milk tins, the shadow moves as the light move. The distance between the work and the viewer affects the clarity of the work. As the viewer moves away from the work, the work become clear but from a closer view the image vanishes into painted milk tins.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

The researcher has explored pointillistic sculpture through out the project. Different materials have been used in the entire project to achieve pointillistic effect in sculpture. Some of these materials such as milk tin and bottle caps were painted, assembled and constructed to form a sculpture work. Materials such as bottle caps, nails and office pins were being used how they are with out any modification.

The researcher has been able to disprove the fact that an observer has to go closer to an art work to be able to see the detail in the art work. The technique and style employed in the researcher's project is such that the observer have to move away from the work to be able to see the details in the work and the more the observer moves away the clearer the image in the picture

Though the researcher experienced problems such as finding the right colours in the bottle cap project, similar colours were available to replace the unavailable colours. The inaccuracy of the lines in the two bottle caps projects is due to where the bottle caps were gathered from. The bottle caps were gathered from different places and for that matter opened with different bottle openers, some of the bottle were

distorted more than others. For this reason, it was difficult to get straight lines with the bottle caps.

One of the challenges through the project was the source of milk tins for the project. It was gathered from the near by senior high schools dinning halls and most of these senior high schools take milk once within the week and this prolonged the researcher time of gathering the project materials

In the nail project, when a nail is driven wrongly and is removed and nailed again, it creates a hole where it was removed. This turns to conflict with the black dots that the nail create to form the figure.

Conclusion and recommendations

There is nothing new under the sun. There are a whole lot of styles and techniques being used by various artists. It's up to Ghanaian artist to read and research to find out how other artists outside Ghana are working. There are also a whole lot of materials which although has not been used can be used for sculpture.

Gone are the days where for something to be called art it should have certain properties, certain qualities or certain classifications. We are in the Era where any thing can be art and art can be any thing. It is therefore recommended that artists and for that matter sculptors research and explores more styles, techniques and materials rather than sticking and doing what people know to be art already. The researcher would also like to recommend that the Ghana government bursary and

thesis grant given to student are increase and paid in time to enable student to under go proper research and exploration

REFERENCES

Adams L. S, Art Across Time, vol. ii. New York, McGraw Hill, 1999

Clark M. (2003), Concise Dictionary of Art terms; Oxford University Press, UK

Chevreul M. E. & Martel C. (1855) The principles of harmony and contrast of colours, and their applications to the Arts, Kessinger Publishing, LLC (April 13, 2009)

"Eye, human" Encyclopædia Britannica. 2009.

Ecology of vision (2009), school of Biological science, University of Bristol

Hogan C. M. (2009), *Gold Nuggets: Calochortus luteus*, GlobalTwitcher.com, ed. N. Stromberg

Simon & Schuster, Adventures in History, p.178, New York. ISBN 0684801647

Simpson I. (1987). *The Encyclopedia of Drawing Techniques*, London: Headline. pp. 62–64. ISBN 0747200513.

Schwartz & Jeffrey M. (2003), The Mind and the Brain: Neuroplasticity and the Power of Mental Force. Harper Perennial. pp. 337, ISBN 0060988479.

The world book Encyclopedia, vol.17 (1994) – World Book, Inc. U.S.A.

Roorda A. & Williams D. R. Center for Visual Science, University of Rochester, Rochester, New York 14627, USA (Macmillan Magazines Ltd. Nature | vol. 397 | 11 February 1999)

World Sculpture News, Vol. 15, No. 1, winter, p. 58

Anatomy of the human eye Retrieved from www.macula.org

<http://www.macula.org/images/layers.jpg>

Christian Faur, crayon series 2, jpg Retrieved on 02/2009 from

<http://shapeandcolour.files.wordpress.com>

<http://shapeandcolour.files.wordpress.com/2009/02/christian-faur-crayons2.jpg>

Christian Faur, "The Dance I" (2006), jpg Hand Cast Encaustic Crayons, Retrieved on 02/2009 from www.christianfaur.com

www.christianfaur.com/crayons/crayonSeries1/images_lg/image9.jpg

Christian Faur, "Forgotten boy" (2008), jpg Hand Cast Encaustic Crayons, Retrieved on 02/2009 from www.shewalkssoftly.files.wordpress.com

www.shewalkssoftly.files.wordpress.com/2009/02/forgotten-boy.jpg

Coffee Cap Mona Lisa, Aroma coffee festival, retrieved on 08/2009 from www.artstyleonline.com

www.artstyleonline.com/art/mona-lisa-made-of-3604-cups-of-coffee/

Coffee Cap Mona Lisa, Aroma coffee festival, retrieved on 08/2009 from www.eatmedaily.com

www.eatmedaily.com/2009/08/mona-lisa-made-from-3604-coffee-cups/

Georges-Pierre Seurat. (2008, April 2). New World Encyclopedia, Retrieved 23:08, August 7, 2010 from http://www.newworldencyclopedia.org/entry/Georges-Pierre_Seurat?oldid=683071

Georges Seurat, *A Sunday Afternoon on the Island of La Grande Jatte*, Institute of Chicago, Chicago. Retrieved from <http://en.wikipedia.org>
http://en.wikipedia.org/wiki/File:Georges_Seurat_-_Un_dimanche_après_midi_à_l'Île_de_la_Grande_Jatte_v2.jpeg

Lionel Bawden (2006), *The Roving Eye May*, Gigantic ArtSpace. Retrieved on August 2009 from www.giganticartspace.com
www.giganticartspace.com/artist.html?id=1147472105129898184&ex=23&from=therovingeye

Lionel Bawden (2006), *The amorphous ones*. Retrieved on August 2009 from www.3.bp.blogspot.com
www.3.bp.blogspot.com/_hg7EChN_qs4/SbwdQyQN4ul/AAAAAAAAABT4/TQCjdzWRx4/s400/Wynne+Prize+Lionel+Bawden.jpg

Malyon J. (2007) "Pointillism" Artists by Movement. Artcyclopedia,
<http://www.artcyclopedia.com/history/pointillism.html>

Neoprene contact adhesive Retrieved from www.dupontelastomers.com
<http://www.dupontelastomers.com/Products/Neoprene/adhesives.asp>

Sprouls K. Hedcut, *Arnold Schwarzenegger* retrieved from

www.randyglasstudio.com

http://www.randyglasstudio.com/portraits/wsj/portraits/arnold_shwarzenegger.html

Subtractive and additive colour mixing by Cantus, 2004 retrieved from

<http://mysite.du.edu/~jcalvert/optics/colmix.gif>

KNUST

[www.bosch-presse.de/TBWebDB/en-](http://www.bosch-presse.de/TBWebDB/en-US/PressText.cfm?CFID=2011027&CFTOKEN=446645a8b43a1652-DD6E7392-C02B-8FEF-4C5A7C33F8BACAA8&Search=1&id=3194)

[US/PressText.cfm?CFID=2011027&CFTOKEN=446645a8b43a1652-DD6E7392-C02B-8FEF-4C5A7C33F8BACAA8&Search=1&id=3194](http://www.bosch-presse.de/TBWebDB/en-US/PressText.cfm?CFID=2011027&CFTOKEN=446645a8b43a1652-DD6E7392-C02B-8FEF-4C5A7C33F8BACAA8&Search=1&id=3194)

www.asktooltalk.com/articles/toolhistory/jigsaw.php

[www.bosch-presse.de/TBWebDB/en-](http://www.bosch-presse.de/TBWebDB/en-US/Presstext.cfm?CFID=966836&CFTOKEN=cece6a5aa499beb-5E99CC9E-F1AA-6F6B-6979F2BF6B0F7136&Search=1&id=3317)

[US/Presstext.cfm?CFID=966836&CFTOKEN=cece6a5aa499beb-5E99CC9E-F1AA-6F6B-6979F2BF6B0F7136&Search=1&id=3317](http://www.bosch-presse.de/TBWebDB/en-US/Presstext.cfm?CFID=966836&CFTOKEN=cece6a5aa499beb-5E99CC9E-F1AA-6F6B-6979F2BF6B0F7136&Search=1&id=3317)

www.colormatters.com/kids/eye.html (accessed on 27th June 2010)