Employing Glass wastes in mixed media Sculpture exploration

OKPALA, OBIDI
Department of Fine and Applied Arts
Nwafor Orizu College of Education, Nsugbe,
Anambra State

Abstract

Wastes result from utilization of resources within the ecosystem. The natural environment within the pre-industrial era was able to recycle almost all wastes generated. Through biodiversity and inter-dependability nature serviced and wastes itself. Industrialization presented man with the problem of waste glut. Not all wastes present can be recycled or easily disposed. In Nigeria, most metallic wastes and many aspects of plastic wastes are recycled or exported for recycling but glass wastes remain a problem. Thus the need arises for research and exploration into possible ways through which glass wastes can be reused. Art particularly sculpture is versatile both in media and technique. This research is therefore aimed at finding avenues that can render glass wastes employable as sculptural medium. The experiment is necessity be free with regards to concept media mix and combination. This affords the research ample scope and freedom. The results are in free standing relief forms and installations. Some are functional utilitarian or just aesthetic or both. The projects have provided means of reducing the mammoth of glass wastes clogging and degrading the environment and ecosystem. It also opened new trends and causeways in art and industry generally.
Keywords: Waste, Glass waste, Mix media Sculpture, exploration

Introduction

Industrialization and modern consumer culture have presented this age with a glut of materials. Some of the materials are basically industrially or home generated garbage. Saw dust from saw mills, glass shards, strips, and granules from glass factories and junkyards and paper from paper converting industries all are recyclable as art materials. Thus mixed media in art and especially in sculpture is the present craze.

Waste in common parlance is refuse; that unwanted aspect of an entity that is deemed useless. The Oxford Advanced Learner's Dictionary defines waste as materials that are no longer needed and are thrown away. There are different categories of waste; there are household, industrial, toxic and radio-active wastes. Some are naturally degradable, others are not or require a long time to degrade. There are materials which as wastes are useless for particular processes; but may be very useful for other activities or processes. They become by-products from which something else may be produced. An example is uranium, when exploited for energy, yields radio-active waste that is difficult to handle and from which the atomic bomb can spurn.

In Nigeria, waste management is a big problem. Although there seems to be a new awareness among states like Lagos, Enugu and Rivers, much more needed to be done. Even so, much of the garbage cleared from urban cities are being used to litter the rural setting and country sides close to the cities. Anambra State is a test case that interests this researcher. A drive from the city of Onitsha into the countryside presents a chaotic picture. Waste generated in the town is dumped few kilometers away- in the nearest undeveloped plot of land. Overtime the dump becomes a mountain.

The world has glass producing centers. Nigeria has a glass working tradition. The people of Bida have been known to work on glass; smelting and casting beads from antiquity. In modern parlance however, there are a few glass factories in Nigeria. Their products range from sheet glass to factory and blown vessels and other articles. The fragility of glass renders it a steady source of waste- A waste that hardly degrades and therefore difficult to dispose. In Onitsha alone tons of glass wastes are generated daily by secondary manufacturers and consumers. Large imported sheets are cut into window panes, table tops, mirrors, and framing sheets. In the process, slivers, chips, strips and shards of glass result. In garages and accident scenes, car windscreens are shattered into crystalline granules. A drive along the Onitsha-Enugu expressway presents one with remarkable heaps of glass bottles shattered during accidents involving haulage trucks. The wrecked vehicles are towed away for repairs or as scraps but the glass wastes are rarely attended to. Daily, homes dispose of broken wares, bottles, perfume and other cosmetic bottles, and glass furniture. The profusion of glass related wastes is therefore alarming and demands profound attention.

Glass waste is not eco-friendly. It does not rot easily; and has been known to defy the degrading natural elements for years. Quite precarious, would readily slash and injure the unwary handler. In Nigeria, there are no recycling plants and the Glass industry has not graduated into collection and exportation of glass wastes like the steel industry. A visit to the glass shops, framing shops, refuse dumps and an excursion to the outskirts of cities present one with the phenomenal problem of glass waste disposal. Thus this quantum of glass waste craves attention and urgently too; and no attempt can be too little or ignorable.

Goodall (2002) aptly expresses the need for eco-friendly consciousness towards waste disposal when she states that “the greatest danger to our future is apathy”. She continued to explain that one may feel helpless that one’s sole effort may be ineffectual, but opines that that should not stop attempts at solutions however infinitesimal they may seem. Her prayer being that we must engage our hearts to solving the problem of saving our world from the suffocation of waste and pollution. This researcher ever enthralled and captivated by the glut of glass wastes had been collecting choice glass wastes.

Overtime, this attraction has also included all glass wastes. The ubiquitous presence of glass, its peculiar qualities and overall form impinges on the artistic faculties, compelling the flow of ideas that present glass wastes as possible artistic media. The use of any categories of waste as medium would definitely reduce the glut of refuse- the extent of reduction notwithstanding.

Glass wastes have been used in art from past records and it is in mosaics that it has persisted. Getlein (2002) defines mosaic art as “painting” by assemblage of small coloured stones, bits of glass or coloured clay files into patterns or pictorial image. He notes that mosaic compositions are set in walls or ceilings or on floors. This presupposes that the technique requires a supportive background. Mosaic art is commonly associated with the ancients in Rome, Byzantium and Etruria. Janet and Alex D’Amato (1977) traced the possible origin of mosaics to cave dwellers who may have arranged attractive pebbles in pleasing designs. They listed different types of Italian mosaic techniques as Tessere, midden and miniatures. Thus from early history of mankind, glass was recycled. However, the Romans were not alone. Bida craftsmen of Nigeria did so, and still do produce beads from recycled glass bottles. Modern artists the world over explore and experiment on glass wastes. Adele Gaskida (2007) experiments with glass wastes. She lists possible techniques as smelting, casting, lamination, slumping, cutting, painting, and soldering. The thought of glass wastes as artistic media presents one with many ideas. The researcher therefore has attempted the recycling of glass wastes in mixed media sculpture.

Onitsha, a major trade centre, and a sure destination of the dubious importations, presents a test case of a city in squalor, particularly as it concerns non degradable wastes like glass. Thus the problem emanates as to how else can glass waste be used or recycled. Its transmutations are many and glass wastes inevitably occur.

Glass waste is not eco-friendly, is not biodegradable and quite precarious- would slash, nip, or gorge the unwary handlers. In Nigeria, there are no recycling plants for glass and glass wastes are not

exported like metal scraps. It thus contributes to the amazing degradation of the environment. Recycling, the scale notwithstanding, seems the only immediate approachable avenue to attempt combating the menace. Although glass wastes have been used from antiquity in art; they were used mainly for mosaics, jewelries, encrustation and decorative purposes, this research tackles the problem of applying glass wastes to sculpture. The objective here is to search for more avenues through which glass wastes can be used as artistic media in a wider and more involving scope.

Solid waste, a modern menace attracts concerted efforts at discovering and deriving of solutions to curb it. Re-cycling, one of the accepted remedies is the main theme of this research: Recycling as a creative enterprise: The use of glass wastes in mixed media sculpture. The aims therefore is attempting to reduce the glass wastes by finding ways, techniques and forms through which they can be used in mix media sculpture. This would be in combination with other related materials. Hopefully, the results, collectibles, would be both aesthetic and lucrative.

The research will therefore Explore and experiment on waste glass using some already established techniques of glass working to produce sculpture, and seeking out new techniques that expand the scope of recycling of glass waste. Also, the research will develop and present attempts in finished practical compositions and constructions in an exhibition format. Much of the glass wastes were used in casting or construction, some however were directly converted and renewed by mere cutting, painting or mounting. Perfume or wine bottle with an exotic form was easily converted into a flower vase or table decorative piece. That would be minimalism at its best.

Literature Review

Glass waste is solid waste, hard and costly to recycle and difficult to dispose of. It takes as long as 1000 years for a glass bottle to decompose. (IEA- Italian Environmental Association 2003). The Italian Environmental Association's research on wastes and their decomposition rates, presents an insight into the awareness of the advanced nations regarding the menace of solid wastes. Glass is all around us. What really is Glass? What is its composition? How was it discovered or invented? In man's explorations of its origin, Johnson (1978), Ellis (1993) and Davis (1973) agree on the fact of glass being a medium of great antiquity. Their assertions establish that there are two aspects to the discovery of glass. The first must have been in Egypt evidenced by the relics of the ancient that dates back to 4000 B.C. from where the tradition of glass production spread to other parts of Mesopotamia. Johnson (1978) Ellis (1993). The second is the tale of the Phoenicians accidentally discovering glass on the shores of the mouth of River Bellus in Greece. Davis (1973). However, Davis (1973) discarding the tale of the Phoenicians asserts that "prior claims of Egypt to the discovery seem established firmly enough". This is because Egyptian stone beads have been found covered with glass glaze. This can be dated to about 4000 B.C. The Phoenicians were said to have discovered glass on the mouth of the Belus when after having rested their cooking pots upon lumps of natron- (a natural carbonate of soda)- they found, when their fire had died down, that the natron had combined with the sand to form glass.

Johnson (1978) in his fascination explains that of all the substances and media, that glass is unique- "for against all appearances and common sense explanation, it is not a solid" for scientifically, glass is described as a liquid in suspension- or a super cooled liquid. Betz (1974) notes that glass is formed by the fusion of three major oxides silica (sand) or silicon dioxide (SiO_2); soda or sodium dioxide (NaO_2) and lime, or calcium dioxide (CaO_2). He explains that sand is most important in glass formation. It imparts viscosity, soda speeds fluidity during melting and lime or calcium adds durability by providing protection against the corrosive effects of water. Getlein (2002) agrees that sand is the principal ingredient for making glass and emphasizes that while there are many formulas for glass production, that the addition of other materials to sand affect colour, strength, melting point and so on.

Glass is essentially manmade but Macdonald's Reference Library (1974) notes that some natural glass exist on earth and more recently have been found on the moon. It explains further that during the test of the atomic bomb over the desert of New Mexico; it was noted that a thin sheet of

glass was left on the ground as result of the enormous heat of the bomb blast. Furthermore, Ellis (1993) in his discourse- "capturing the Dance of light"- explains that glass in several forms has been with man; that some of such varied forms are fulgurites, tektites, and obsidian. Where fulgurites are results of the strikes of lightning, tektites are from fiery crashes to earth of meteorites. Obsidian which is the most prevalent of natural glasses is born in the hot cauldron of volcanoes and was first used by man as tools millions of years ago. Glass has given us tumblers for drinks, bulbs for light, clears the haziness of failing eyesight and as a mirror becomes a scepter for variety allowing us see the hidden corners of ourselves. In packaging, glass is playing invaluable roles as bottles, vials, flasks, etc. car windscreens and other numerous items are produced from glass.

Early Egyptians who first used glass as manufactured by man, left relics of glass artifacts. The Pharaoh's head believed to be that of Amenhotep II and the mask of Tutankhamen (1352 BC) all testify to the great antiquity of glass usage by man. They bore glass glazes. The mask cast from solid gold has decorative blue stripes of glass. "The earliest known glassmakers worked in Mesopotamia as far back as 2500 BC- casting beads and other small objects to imitate precious stones". Whitehouse, in Ellis (1993), and Johnson (1978) states that the first glass was probably made by accident in one of the 18th dynasty ceramic workshops in Egypt. This may have been as a turquoise glaze used on pottery beads. The early glass wares comprising bottles and jars were pale green. Fairly transparent and light in weight.

And that at about 100BC, the Romans brought glass makers from Egypt to Italy. That was after the Roman conquest of Syria and Egypt. Syria and Egypt were the two great centers of glassmaking in the ancient world (Macdonald's Reference Library- 1974). There are conflicting assertions regarding the invention of the glass blowing tube. Johnson (1978) credits the invention to Syrians in the 1st century B.C. while the Macdonald Reference Library (1974) presents Rome, asserting that during the reign of Augustus 27BC-14AD that the blowing tube was invented but still posits that probably it was "first used in Syria" in a crude form. However, the Syrians may have invented a tool which got refined and revolutionized by the Romans. The Romans by the use of tongs and shears modeled many articles from the hot bubble of glass. Glass dishes, containers, jars, bottles, ornaments and buttons were plentiful in Ancient Rome. The Roman conquest of Europe helped spread the glass making tradition throughout the empire. Glass stations were established at France, Greece, Germany, Spain and Britain, but the finest artists remained in Venice and Rome.

Glass has many varieties; and its working techniques are almost as many. Essentially manmade, natural glass also exists on earth and has been recently found on the moon. Heat at a very high temperature is very necessary in glass production. The basic raw materials of sand, limestone, soda ash and cullet go into the furnace to produce glass but by varying the mixture of these raw materials, the different kinds of glass are born. In addition to varying of mixture, different techniques also produce different effects and forms of glass. Basic techniques of glass working are discussed below. Some of them are of great antiquity.

Glass blowing was invented nearly 2000 years ago and it revolutionized the glass making process. From antiquity till date, it remains the popular method of producing tableware and decorative glass. Blowing entails picking up a gob or blob of molten glass on the end of a blow pipe, smoothened on an iron surface and rounded off on a hollowed out block of wood and blowing it into shape manually by mouth and industrially by machine. By swinging and spinning while being blown, the glass balloon is shaped as desired. The blowing process was the main technique in producing the crown and cylinder glasses.

The crown glass method was the earliest technique of mass production of sheet glass for window panes. Blowing was also the basic step in this process. A large bulb is blown and opened up at the bottom. It is then attached to a rod or 'punity' and spinned quickly causing the bulb to fan out into a disc. The cooled disc is cut into squares for panes. Usually, the spinning leaves the central point to which the punity is attached raised when the rod is detached; this raised center is thicker than the edge and has fine concentric circles. Its resemblance to a crown gives the crown glass its name.

The 19th century welcomed the development of the cylinder glass. Cylinder glass has the advantage of even thickness and flawless surface. Blowing is also the basic step in its process. A large bulb of glass is blown and swung into a cylindrical shape. The bottom and the stalk are cut off leaving a cylinder with open ends. A vertical cut produces a flat sheet when carefully bent back. Cylinder glass is less wasteful than crown glass. Crystal glass which was developed from the rock crystal- a form of clear quartz- and the glass used in building the crystal palace of 1851 Great Exhibition was produced by the cylinder technique.

Macdonalds (1974) notes that of the three forms of flat glass today, 'sheet glass' is the most plentiful. Sheet glass is produced by having the ingredients of silica, soda ash and limestone fed into a tank and melted at a temperature of over 1500ºC. The molten glass is then drawn upwards out of the tank as a wide ribbon into large cooling towers. Sheet glass production is continuous and is stopped only for maintenance of machinery. Because the glass contacts only the pulling rollers until it cools, the finish on both sides is smooth. However, distortions still occur because of the upward stress. Thus the glass is not suitable for windscreens and windows.

Float glass combines the best of plate glass and sheet glass. Float glass has no distortions and needs no polishing. Float glass was developed in 1959 (Macdonald 1974, Ellis (1993) and has greatly replaced other modern methods in flat glass production. Sheet glass is pulled vertically between rollers and plate glass rolled out on a flat table but float glass is poured onto liquid tin. Since the flattest surface of all is a liquid surface; the liquid tin surface guarantees a smooth result underside; intense but controlled heat is used to ensure the smoothness of the upper side. This procedure leaves both sides with shinning finish as ground and polished plate glass. Ellis (1993) notes that "float glass method has become the most widely used means of producing flat glass". Glass thread is also bonded together to make wadding or spun into continuous yarn. The yarn is used in production of very many specialist fabrics in the building and fashion industry. Glass threads are very fine and glass wool is used variously in industry. The Macdonald Library (1974) notes that individual fibres have a diameter of .00024 of an inch and when bonded together form a flexible mat. A mat that is very versatile, and found useful in industry, fashion and science. Thus glass in its many forms, due to its nature and use, engender wastes.

Man's advancement from cradle to modernity has resulted in industrialization, population explosions and migration creating disequilibrium in order of natural environment. Johnson's (1978), Betz's (1974), Getlein's (2002) and the Macdonald Library's (1974) perceptions on the nature and alchemy of glass production, vividly place glass within its technical realms; thus accentuating the main thrust of this project as not an overt interest in glass manufacture but in glass wastes.

In 2005 recycling culture was ushered in as an intellectual and creative enterprise in the formation of "Art is everywhere" project. Ikenegbu (2007) explains the project's cardinal objectives as training young talents and artists alike to enable their insightful appreciation and utilization of the creative qualities of discarded objects. And Buhari (2007) opines that "the idea of "Art is Everywhere" is an art initiative and a cultural concept that immediately demystifies and dispels assumptions, preconceptions and biases that any of us may hold as exclusive knowledge or supreme opinion about what the people consider art". This researcher accepts the above opinion and would express the belief that in pursuance of the creative urge; the artist often is let loose into the psychic terrain of creativity, in a commune serenading with what is and what is not within and without the immediate environment. In so doing, coming forth with ideas and creations that may or may not conform to existing traditions and stereotypes. Suffice it is to say that therein lies the joy of the true creative spirit.

Materials, Tools, Techniques and Procedures of Production

Materials

This project involved practical explorations, experimentation and identification of feasible techniques and forms that engender easy recycling of glass wastes as artistic media. Hopefully, all the

materials, especially glass wastes were sourced locally. However, other materials like resins, glues, chemicals, wood, metals, etc. come from suppliers or sourced from markets.

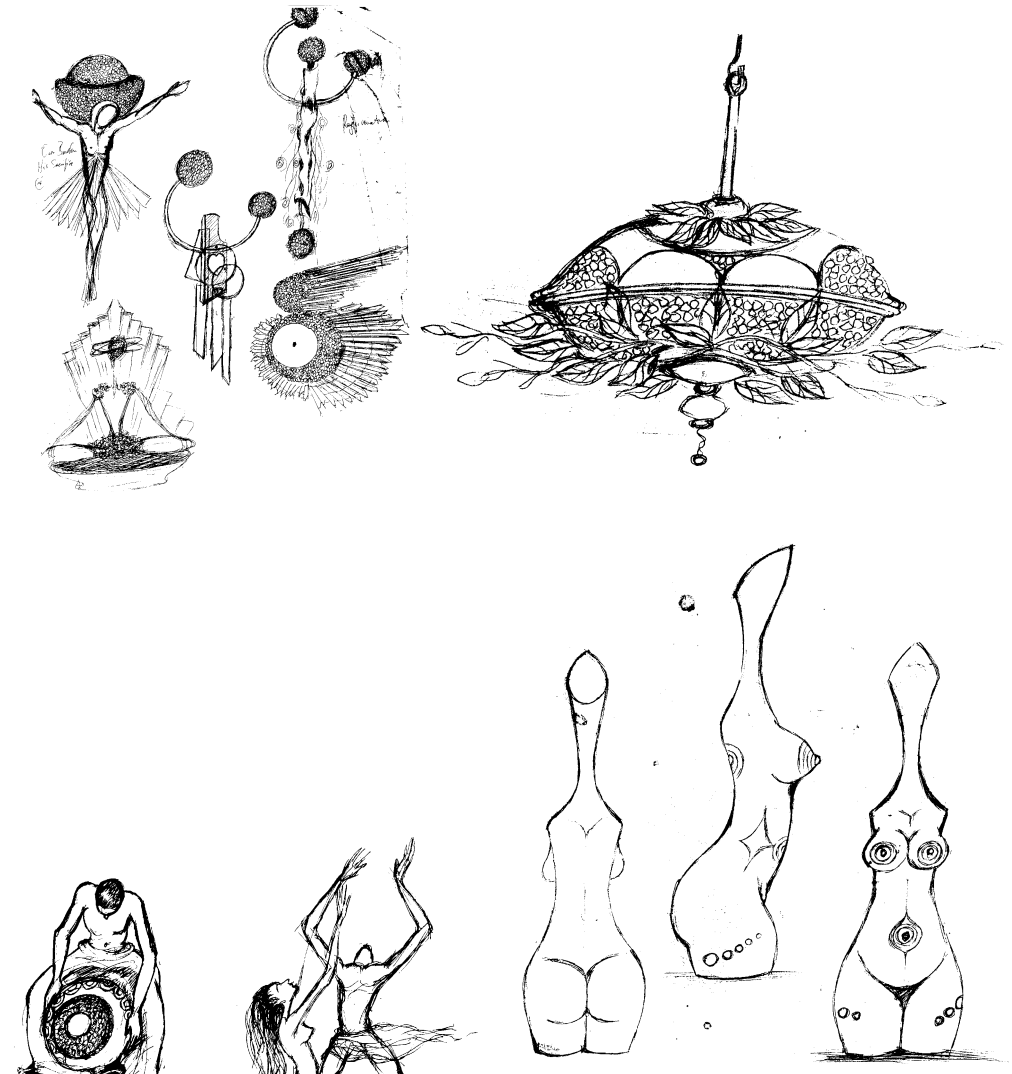
Tools and Equipment

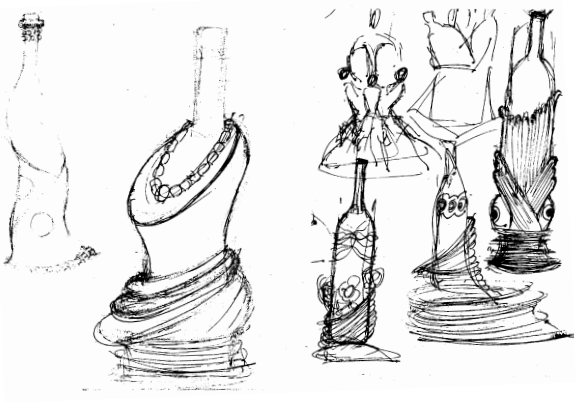
Tools and equipment were freely employed, and ranged from wood working tools, to metal, clay, concrete and jewelry tools. Some equipment and tools are listed below:
Arc and Gas welding machines, Angle grinders and files, Saws, (manual and electric), Hammers, Pincers, cutters and pliers, Vice and clamps, Wood planers, sanders and Burnishes, Spraying machines, Brushes , Spatulas and modeling tools, Knives and scrappers, Chisels, gouges, axe, adze and mallets, Shovels, trowels and head pans, Assorted basins and vessels, etc.

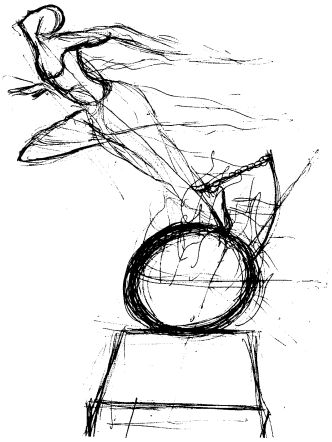
Techniques and Procedures

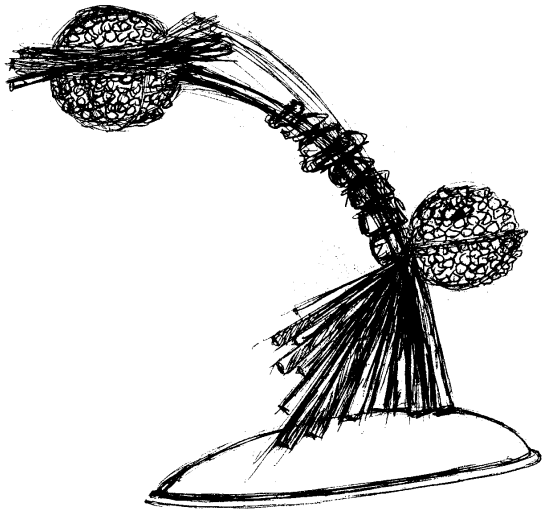
Techniques and procedures employed were determined by the design objectives which in turn stemmed from given concepts. Freehand sketches and studies in pencil and ink were made, followed by models and Marquette. Motifs, symbols and colours although unrestricted relate more to the local and traditional theme.

Techniques of design favoured were, construction, casting, packing, cutting, painting, weaving, encrustation and installation. The construction techniques involved were welding, forging, and joinery. Fig. 1 present the sketches on which the experiments were based.









Modelling, Casting, Cutting and Construction

Modeling is an additive and subtractive technique. Where the glass wastes cannot be used directly as modeling material, they are however cast into forms from molds picked from modeled forms. Casting presents itself in the picking of molds from models and the eventual casting of the final pieces from the molds.

Whole bottles are cut into pieces using the acid, fire and water technique. The cut pieces in themselves cannot be complete until they are assembled and composed through construction. Construction concerns joining different cut pieces together, or joining cut pieces of glass to other forms produced from other convenient and compatible media.

Production of "Do your bit"

Plate 1: Clay Model of Globe in "do your bit

Plate 2: Casting of Globe (Drape Casting)

Plate 3: Do your bit: Glass, Terracotta, Fibre Glass. 61cm/2ft high Obidi Okpala (Photo by the Researcher)

The components of the piece above are: a glass globe, and terra cotta and fibre glass figures. The figures are old works by the researcher which were conveniently construed into the design. Thus the parts of the work, "Do Your Bit" which have direct concern with the project are the globe produced from glass granules and the assemblage. Plates 2A to D illustrate the casting of the globe and present the individual parts: the terra cotta and the fibre glass base.

The globe was modeled in clay, from which a piece mold is picked in Plaster of Paris and Silicon paste. With apoxy resin as binder, the globe was cast from the glass. The glass granules were sprinkled into the surface of the mold before the resin was mixed and poured on the glass mass. Soap and petroleum jellies were used as surface separators. They were applied on the inside surface of the mold- the soap jelly first before its oily petroleum counterpart. The globe is held up by four figures, two males and two females who are struggling to hold up the seemingly crumbling planet. The figures are fired and glazed clay. The figures whose foot holds seem precarious are equally supported by a mass of lower figures. These lower figures were produced by modelling and casting in clay and fibre glass. And in their dynamic motive stance, exude strength, confidence and vigor; complementing the efforts of those they are supporting.

"Do your Bit" is a 61cm high sculpture; as functional as it is decorative and aesthetic, in the day it would serve as a conceptual ornament within a room. Electrically wired, the globe has a light bulb within. At night, it would metamorphose into an ornamental lamp and present the room bathed in subdued colour and ethereal lighting. Thus whether in the day or at night, the message of the need to conserve, preserve and ensure the healthy future of our planet is assuredly relayed. It consistently impinges on our conscience, imploring us to help ensure a greener, healthier and safer planet by doing our little bit in co-operation and commitment.

Production of "The Vase"

Plate 4: Application of acid

Plate 5: Burning

Plate 6: Separation after Dipping in Cold Water

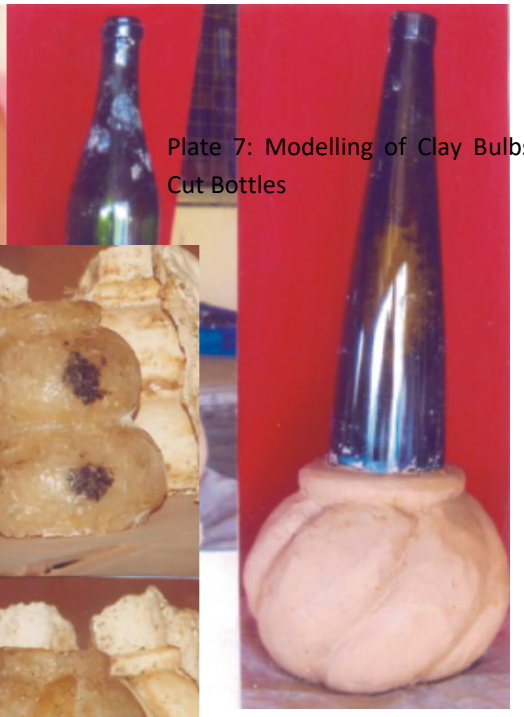


Plate 7: Modelling of Clay Bulbs unto Cut Bottles

Plate 8: Casting

Plate 9: Cast Mold on Clay Bulb

Plate 10: The Vase: Glass Bottle, Glass. 46cm/18" high. Obidi Okpala (Photo by Researcher)

The vase, 46cm high was produced by the combination of four techniques, viz: cutting, modelling, casting, and construction. The base of a fine and elegant bottle was cut off by employing the alcohol and fire method. A convoluted bulb was then cast from a mold picked from a clay model. The convoluted bulb picked in fibre glass is then joined to the cut upper half of the bottle. The result, an elegant and very stable vase; decorative as well as functional.

Seen against light, it reflects and shines exuding a translucent shimmering beauty. A hitherto discarded bottle consigned to garbage heap and granules of shattered automobile windscreens have been given a new lease of life in a conceptual marriage of form and context.

Other explorations from this research

Plate 11: Nuptial Lights: Glass, Fibre Glass. 91cm/3ft high. Obidi Okpala
(Photo by Researcher)

Nuptial lights present an elegant female form (in plate 11) in a regal flowing gown. The figure is in motion, striding on an ornamental and floral pedestal. The female form 76cm high started as a clay model from which a mold was picked. The final glass cast was then taken from the mold. The pedestal was also modelled in clay, a plaster mold followed before the positive was picked in different coloured glass chips held together by resin and reinforced with fibre glass. The round pedestal is 15cm high. Floral relief designs give it a bold greenish and fertile base. The whole form mirrors the white, peaceful and pious symbolism of Christian nuptial union. The forward looking figure reflects faith, hope, fecundity and blissful expectations. The pedestal conceals electric fittings and a bulb. In day light, the form decorates the room and satiate the beholders' aesthetic needs. At night, the throwing of a switch transforms the whole form into a shimmering piece. A piece which in transformation is a colourful and radiant sensation illuminating its immediate environment in soft subdued lighting. The fluidity and dynamism presents a remarkable and imposing dance in space. Standing 91cm in overall height, it will serve as a very adequate centerpiece on a large dining table, more so when accompanied by a couple of sprawling floral arrangements to complement and accentuate its happy reflections. Plate 6A to D illustrate the different stages of production.

Plate 12: Adam and Eve: Glass, Fibre Glass, Metal. 198cm/6ft 8" high- Obidi Okpala (Photo by Researcher)

The couple, abstract forms, male and female representing Adam and Eve are constructed from glass, glass fibre and metal. The heads, busts and hips of the figures were individually modelled onto the metal frame in clay. Plaster molds were picked from which fibre-glass pieces were cast. The detachable head gears of the figures were separately produced using glass chips of varied colours and made to fit the heads snuggly. The metal frame was constructed from 4cm galvanized pipes. The round pipes show at the necks and are the legs welded to round thick metal disks salvaged from mechanic junk yards. The weight of the discs offer adequate stability to the tall lanky forms.

The metal frames are construed such that the upper parts form the knee, socket into the lower parts. Electrical wires run through the pipes up to the heads where light fittings are concealed. The detachable headgears are actually translucent globes. At night the figures become standing lamps that produce soft subdued lighting. The figures are semi-nudes. Conceptually, cubistic in orientation, they mirror and represent our biblical ancestors. Their nudity reflects the humility, innocence and obedience that reigned before the temptation and fall. The figures are aptly presented as a couple and would make good interior pieces in a large room, or hall. At night, the lights thrown by the forms are luminous enough but subdued and dreamy. The harsh colours of the forms in day light adequately signify the blatant reality of man's dastardly fall from God's favour and his continued relentless forage through the trails of blood and doom. However, at night, the mellow light from the heads casting on the form presents a different picture. Rather with shadows cast, the figures present a picture of strength, determination and hope. Plate 10 illustrates produced glass crowns.

Weaving, Casting, Construction

Some glass wastes come in slivers. These are narrow strips that result when louvre panes are cut from large sheets of glass. They are not pliable but are brittle, very precarious to handle. Using metal wires sourced from discarded clutch and throttle cables of automobiles or from electric cables, the strips of glass were woven into mats before being incorporated into compositions. The compositions combined cast and constructed forms with the woven glass mat.

Plate 10: *The Crown*, Glass, Metal. 25cm/10" high Obidi Okpala (Photo by Researcher)

The crown is a construction from cast glass granules and woven strands of glass. It is an experiment that explored the possibility of weaving as a technique in the working of glass waste. The cast and woven components are held together on a metallic frame work. The frame is fabricated from small aluminum profiles. It is quite light and this lightness facilitates portability. Although not quite successful here, due to the fragility of the glass strands, the weaving technique may still be useful in dangling, mobile and kinetic designs and conceptions. Strands emanate when glass sheets are cut into window panes or during general manufacture of glass forms and accessories. Automobile windshields shatter into fine granules that are almost homogenous. Strands of glass are never the same in size in width or lengthwise. They are equally prone to easy breakage and are very precarious to handle; the edges are very sharp and dangerous.

These problems notwithstanding, results of further explorations are shown in the appendix. The crown can be adapted to serve as a wall bracket shielding a light fitting on the wall. Plates11 A to D illustrate weaving of glass strands.

Painting

Painting is a decorative technique. Through painting, discarded items are given new forms and life. Clear wine bottles and broken glass items metamorphose into utilitarian and decorative pieces.

Plate 12: Odinani: Glass Paint, Acrylic Paint. Size: 14″ Obidi Okpala (Photo by Researcher)

"Odinani" is construed by painting of a found wine bottle. In Igbo language, "Odinani" means custom and tradition. By imbuing a discarded wine bottle, a modern day vessel with traditional motifs of Igbo extraction, the bottle acquires a new identity and form. An identity that transcends mere change of form, but imbibes latent qualities. The bottle becomes a traditional collectible, an extra-ordinary artifact that can be traced and identified with a particular source- Africa and Igbo in particular. A functional object that while serving the utilitarian functions of a vase is also a pleasing form- an aesthetic experience. The notable point that must be stressed being that prior to its recreation and redefinition, the bottle was a human refuse- waste discarded and awaiting disposal. The technique of glass painting requires special paints. Glass paints are transparent and opaque lacquers. Dunsterville (1997) explains glass paints as transparent lacquers, of many different types and variable quality; simply applied with a brush. She further stresses that the paints take only about ten minutes to dry naturally. Although glass paints abound abroad, they are still new materials here relatively. Dunsterville asserts that glass paints were researched in the 1950s, and are regarded as new media; and that they are found in glaciers or DIY (do-it-yourself) shops, that is abroad. They are quite scarce here in Nigeria. The only colour available is black and in small bottles.

The paint used here is of German make. This explains why this attempt is restricted to one colour- black. Recycling of glass bottles through painting would prove very interesting should materials be available. The piece "Odinani" can serve as an interior decoration in a room, a flower vase and planter on a window sill, or on a center or corner table. Being transparent, when displayed near a light source or view against light, its reflection and refraction of light where with water, would definitely add to its beauty. Plates 13 A to C show stages of the painting technique.

Encrustation

Encrustation is the covering of a surface with chips, granules or any material. It could be the layering of paste, example paint, glue or resin. The material for encrustation used here are granules and small chips of glass. With glues and resins as binding cement, surface of works were covered. This effect makes the surface to shimmer and reflect light in the inherent colours of the glass chips used.

Plate 14: Agbomma: Cast Stone, Metal, Glass, Fibre Glass, Fibre, Wood. 46cm/18" high. Obidi Okpala (Photo by Researcher)

'Agbomma' is a piece, also destined for display on a mantel piece, corner shelf, book shelf, bedside, or any suitable spot within the interiors of the home. A functional piece, it is a combination of several media- cement, metal, fabric, fibre glass, glass, wood and beads have been united to produce a dynamic piece.

The lithe torso in dynamic pose was modelled in clay, the mold and final piece followed in cement aggregate. The drapery is jute fabric, the base wooden; supporting a metal candle stand. The shimmering, glistering granules and pieces with which the piece is encrusted are glass sourced from discarded shattered automobile screens and assorted bottles. The work is a very good example of a free and random composition of found materials salvaged from the garbage heap. Cement and aggregates and fibre glass were the only materials bought.

The drapery was achieved by soaking a piece of jute fabric in epoxy resin before drapping it on. The strung beads around the waist and the torso on the pedestal were glued on with resin. Whether lit or not, the work would definitely be more complete with a candle installed. However, the sculptural candle stand was an old almost forgotten work of the researcher which through encrustation has been refurbished and enhanced. Plate 15 shows the process of encrustation.

Packing

Packing consists of artistically packaging glass wastes such that the creative composition would represent an intended concept. Packing definitely required the introduction of receptacles like baskets, plates, bowls or calabashes. Such vessels were used as found or were constructed from given materials as required.

Plate 16: Light (Interior): Found Objects (Metal) and Glass Wastes. Obidi Okpala (Photo by Researcher)

Installation

Installation is a recent occurrence in art. Through arrangements, positioning and dramatic presentation, installation technique was used in attempts to dramatize the menace and glut of wastes as man and his environment are affected. The installation presents raw wastes, converted, refurbished and recycled wastes, - all in thematic, dramatic and happening arrangements that are conceptual and may be found entertaining.

Plate 18: Pack Me Beautifully: Glass Wastes, Bin and Light
Obidi Okpala (Photo by Researcher)

Installation art combines time, space, sound, even the artist and audience in composition and expression. The work above combines the space provided by the hall, the assortment of glass waste, items and works found or recycled from glass waste and the participation of the artist and audience to achieve desired and even unanticipated effects and results.

The works presented in the appendix and the one installed in situ present the very latent cache of art media hidden in garbage heaps. Enlightening and enthralling in their expressiveness, the works attempt to coax that sense of purpose, commitment, inventiveness and creativity from the audience. They reemphasize the need for caution and conceptual reflections regarding our consumer, culture, wasteful orientation and dispositions. The plates 19 A to E present the construction and presentation of the installation: Pack me beautifully.

Summary of Findings

This project prompted a careful incursion into human living habits regarding waste generation and disposal; and briefly discussed waste recycling but dwelled on a particular category of waste. Exploration of this nature would tend to lead on into multi-dimensional possibilities because wastes abound in our modern environment. Some wastes are bio-degradable, others are not. Some are easily recycled, while many of the industrial categories prove very difficult to handle and even very hazardous to life, not just to human life alone but to the ecosystem.

Therefore, when an attempt is made to sift possible artistic media from man's refuse, and the department is sculpture, a big box of uncertainties and revelations is definitely being opened. Furthermore, when from the myriad of items that constitute a garbage heap glass waste is chosen, the problem gets more compounded. However, the choice of mix-media sculpture with its multifarious techniques and materials assured and provided the researcher a safe house and stable pedestal; the research would have proved to be an attempt in futility without a combination of other materials with the glass waste. This is because alone, glass can only be cast, blown and constructed in very complicated and technical workshops and settings. With glass waste, it would have been almost impossible. With other materials present, possibilities have been found to abound.

Glass wastes have been used in art from antiquity but not to the magnitude this research may have exposed. The precepts of modernism exposed and prompted the art into experimentation. Modernism enforced the departure from age long accepted and horned principles of representation in art; principles that created almost rigid departments and techniques, in painting for instance. It led into the gamble with genuine materials like wood, glass and metals giving birth to contre-relief. According to Tarabukin (1983) contre-relief first appeared in Russian art. He notes that Braque and Picasso were however the first to use labels, papers and sawdust. Tatlin went further to create his reliefs from genuine materials. But still in contre-relief the artist still is not free from conventional form and artificiality of composition. He is still working on close to a flat surface. Contre-reliefs are still viewed from one position as in painting.

The other aspect was the actual attempts to create with the identified categories of glass waste. In this regard, the results presented and exhibited bear out the extent of success or otherwise of the attempts, the finish may not meet a very fine aesthetic level. With the crown in plate 5, the aim was to explore the workability of glass shards and slivers using the weaving technique. Some works in the appendix exhibit successful combinations of the weaving technique with other techniques. "Do your bit …" plate 1, 'Nuptial lights' plate 3, 'Adam and Eve' plate 4 are some examples of attempts at near complete and detailed finish. The researcher thus presents the results. They are veritable bounties of a tortuous and challenging adventure. Some of the works may not be said to qualify as art but they still may be seen and accepted from the materials and techniques point of view.

Nevertheless, Art is enquiry, it is expression, experience, form, organization and order. It is many things to many people; but all in all, the simple denominator is that art is definite and beautiful whether created or found. Cayton (2006) tracing the different aspects of the meaning of art presented the following: That art is a formal expression of a conceived image in terms of a given medium, a creation of form by the mind faculties, a significant form, an eloquent existence, an unexpected inevitability of formal relations, a unified pleasure given manifold, a paradigm or diagram with meaning that gives pleasure, that which gives pleasure apart from desire and objectified pleasure.

The researcher would add, an imitation, a propaganda, a definitive stroke in time and place. One can go on with very many attempts at definitions. However, not every art is pleasure giving and beautiful, nor is every art, form in the real sense. The researcher's attempts were directed by the aims and objectives pursued and had been compelled at some stages to subjugate beauty and aesthetics by preponderance on practicability and workability.

The researcher begs the dream and wishes the African spirit would seek that harmony, culture it and effect it. He perceives this enquiry into glass waste as just a beginning. Africa and Nigeria in

particular seems more influenced by art and philosophy of the west, thus there is need for artists in Nigeria to look beyond the west for ideas and inspirations.

The results of this work may not prove as technically perfect as machine tooled products, the researcher would want them seen as hybrids- as natural artworks and as an incursion into technology. In their eclectic realms, they may prove to be forerunners of better arts/technology to come. They may be likened to the works of Diego Giacometti and his contemporaries whose works are as artistic as they are utilitarian and mechanistic. They are individually or collectively reflections of the rigors and trials that preceded and resulted to their birth.

Suggestions

Nigeria is not an industrial society. The availability of foundries, forges, machine tools would have helped immensely in the execution of this research. Needed facilities were envisioned; seen in books, browsed and viewed on the web but are beyond reach. The Federal Government is striving to facilitate research in all ramifications, but administrators at given levels rather that serve as cogs on the wheels, seem to be wrenches in the works. Federal criteria for research grants are often replaced with local rules and resolutions. The federal authorities must devise means through which the creative public can be reached directly.

a. This can be achieved through instigations, development and maintenance of competitive research.
b. Research results if acquired and developed with the copyright and royalties observed would encourage further quest.
c. Companies and industries must be compelled to sponsor research and research competitions by the authorities.
d. Centralize subsidized machine shops and facilities should be established by the government to serve creative individuals.
e. The culture, tradition of the arts and artists must be recognized as center points and stakeholders and as invaluable sources of dreams, ideas and innovations.

Conclusion

Art is ever natural, creative in its versatility and resourcefulness. The researcher had to rely on committed tenacity to exist through this endeavour. The themes of light, form and time (light and time) directed his visuals and conceptions. Art being objectified feelings and impressions gives focus to hitherto subjective visions, it is vocal, visual and evocative. The works presented in the preceding chapters and in the appendix are results of attempts by the researcher to express his innermost emotions and impressions borne out of the conviction that glass waste can be recycled not just through industrial processes but as artistic media. They elicit the audiences' appreciation, consumption and criticism. The researcher hopes they meet their approval, and pleasurable satisfaction- "Lighting the times".

References

Awake Magazine, February 8, 2002.

Buhari J. (2007). "Introduction*".Art is Everywhere in Creative Art and Design Waste to Art Recycling Workshop* Enugu: Department of Fine Arts IMT.

Business Week, London: Business Week January 2003.

CENS Furniture: *The Professional Buyers' Reference for Furniture Products* (Sept. 2008). Hong Kong: China Economic News Service.

D'Amato J. (1977). *Italian Crafts: Inspirations from Folk Art.* New York: Evans and Co.

Davis, F. (1973). *Antique Glass and Glass Collecting*, England: Hanunly'n Publishing.

Dunsterville, J. (1997). *The Glass Painting Book.* Ontario: Readers Digest Association.

Ellis, W. S. (1993). Glass Capturing the Dance of Light *National Geographic*. Dec. 1993 Vol. 184 No. 6.

Getlein, M. (2002). *Gilbert's Living with Art*. New York: McGraw-Hill.

Goodall, J. (2002). The Power of One *Time Magazine* Sept.2 2002.

Ikenegbu, O. (2007). Where is Art? In *Art is Everywhere*-Waste to Art Recycling Workshop, Enugu.

Interior Magazine (Furnishing and Home Textiles for International Contact and Residential Markets). August/September 2001, London: Benjamin Dent & co.

Johnson, L. (1978). *How to Restore and Repair Practically Everything*. London: Michael Joseph.

Macdonald, G. (1974). *Glass*. Junior Reference Library, London: Macdonald Educational.

Newswatch, July 18, 1988. Lagos: Newswatch.

Rescue Mission: Planet Earth. A Children's Edition of Agenda 21 (1994), New York: Child Charitable Rights.

Sculpture (2001). New York: International Sculpture Centre.

Tarabukin, N. (1983). *From the Easel to the machine in modern Art and modernism: A critical anthology*. New York: Harper & Row.

Time Magazine November 8, 1982.

Time Magazine September 2, 2002.

White, P. T. (1983). The Fascinating World of Trash. *National Geographic*. April 1983. Vol. 163 No. 4.