Dross

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The word d r o s s refers to matter that is foreign, worn out and impure; it is a phantom material condition, that is unnoticeable to such an extent that it almost does not exist in our perception. Dross is worthless; it is an incidental, displaced material [figure 1], a by-product of chemical reactions that serves no purpose. Nevertheless, when it appears, a necessity is created for its removal. In time and through the use and misuse of language, the word has ended up in signifying waste, impurity[1] or any incongruous accumulation of disparate elements, pieces and material fragments. However the etymological origin[2] of the word refers to a residual substance that emerges in transitional material stages, such as the process of melting a metal or the process of sedimentation of a liquid.

The purpose of analyzing thoroughly the ingredients and the properties of dross substance lies beneath the fascination of metamorphic materials. Dross may be an alchemical fiction and a phantom material condition, but at the same time it is a product, or better stated a by-product, of social reality, paraphrasing Donna Haraway, who denotes that "the boundary between science fiction and social reality is an optical illusion"[3]. The intrinsic properties of dross substance are analyzed to serve as a medium for the comprehension of a cultural phenomenon of incidentally displaced matter that is automatically rendered meaningless and serves no purpose whatsoever. Based on the perception of material impurity, this paper will attempt to encompass the generative potential of obsolete objects and spaces, or in other words waste material that is displaced culturally or functionally from either its previous or its original identity.

The cultural fabric for this paper revolves around the material ramifications of unprecedented technological evolutions in communications that have irreversibly shifted our production and consumption modes during the past two decades [figure 2]. The technological evolutions in computer software and hardware that have been producing novel tools have been in parallel producing immense quantities of 'techno-junk', tons of purposeless and indestructible matter, almost impossible to dispose of. The past decade though, concerns related to waste streams have slightly shifted in their orientation. Waste is no longer an issue that relates solely to quantity. It now also relates to the intricacy of the waste matter and its material composition. With the advent of highly advanced manufacturing methods and processes, many products that are displaced from their original roles and reach quickly and unexpectedly the end of their useful lives, are highly complex in form and material composition, containing in parallel high amounts of embodied energy [figure 3]. Electronic waste, known as e-waste, is the largest growing industry of waste in a global scale. The rates of computer obsolescence are so extreme that "in the year of 2005, one computer will become obsolete for every new one put on the market"[4] [figure 4]. Alongside the numbers, a personal computer "contains over 1,000 different substances, many of which are toxic, and creates serious pollution upon disposal"[5].

Side by side to the waste derivative from the electronics industry, a mundane reality of big defunct objects – building displaced parts- is overwhelming the contemporary city. Techno-junk is an emerging city-born condition; Defunct oil tanks, air-conditioning tubes, advertising billboards, containers and other apparatuses articulate a new urban language that violates the building enve-

lope or attaches itself to it as an outgrowth. If one identifies in the city fabric, a stratum of buildings that can be easily mapped due to their longevity, equivalently he could identify a stratum of mechanical appendages that cannot easily be mapped due to their 'ephemerality'. The significantly different lifetime of the two strata is the cause for an erosion of the outer building shell that cannot adapt to the change, taking place in it or around it. The unmappable urban condition of this "floating matter" in the city has been yet unexplored by contemporary architecture. The necessity of such a discourse is not only driven by the formulation of an ecological awareness, but also by the need to manipulate this kind of raw material. Potentially, it could lead to an alternate practice of recycling, based on questions of matter, rather than on questions of representation.

The question arising is to what extent this phenomenon affects architectural design and in what manner. Obsolete and 'nondisposable matter' is influential in diverse scales of reference such as the scale of an object –defunct computers-, this of a room –oil tanks, air conditioning tubes, containers etc.- and that of a building –partially abandoned buildings, 'brownfields' etc. The content of this paper engages 'obsolete matter' in various scales of reference, or 'techno-excrements' as an emerging city-born condition, derivative of the urban system's internal erosion.

01 >> RE-GENESIS OF DIVERSE MATTER _ A DESIGN POST-PRAXIS

> "... We think of Picasso's bicycle seat (Bull's Head) of 1944:
>
> You remember that bull's head I exhibited recently? Out of handle bars and the bicycle seat I made a bull's head, which everybody recognized as a bull's head. Thus a metamorphosis was completed; and now I would like to see another metamorphosis take place in the opposite direction. Suppose my bull's head is thrown on the scrap heap. Perhaps some day a fellow will come along and say: 'Why there's something that would come in handy for the handle bars of my bicycle...' and so a double metamorphosis would have been achieved."[6]

By engaging a strategy of irony as a legitimate method of approaching phenomena, Colin Rowe & Fred Koetter assert that there is no social or constructed reality "that we have to accept in toto,"[7] but a composite present realm consisted of fragments. A discourse of collaging fragments is ironic, because it resists utopia. It recognizes a "loss" in objects, buildings or urban domains that have misplaced their previous fixed identity and encompasses this condition as a generative potential. The significance of this citation, resides in its unique interpretation of meaning. Here, meaning is not an inscribed, static quality, embedded in objects. Conversely, it is a tacit, malleable status perpetually redefined, as the object is appropriated and reused, as it undergoes a metamorphosis. In this sense, the tactics of reuse is not solely an environmental strategy directed to the utopian idea of the world's salvation. When dealing with meaning, reuse "fuels a reality of change, motion, action."[8]

Then, the argument of reuse is not bonded merely to ethical and practical concerns. It is about manipulating the material aspect of an unprecedented flow in the urban fabric. Along the same lines of thought, the condition of flow and unremitting transformation is characterized by Kepes as a fundamental reorientation of the 20th century. He explains that "the dominant matrix of nineteenth-century attitudes was the use of Marx's term 'reification'; relationships were interpreted in terms of things, objects or commodity values. Today a reversal of this attitude has begun to appear; there is a steadily increasing movement in science and in art toward processes and systems that dematerialize the object world and discredit physical possessions. What scientists considered before as substance shaped into forms, and consequently understood as tangible objects, is now recognized as energies and their dynamic organization."[9]

Extenuating the strategy of appropriation, reuse and transformation, dross praxis does not begin from scratch, but from the reality of an existing inoperative component; therefore, meaning is inevitably shifted. It can no longer be located in the process of representing an abstract concept, but in the act of manipulating matter and bonding new functions to objects that have lost their previous, fixed identity. Instead of a genesis of meaning,

there is a regeneration of meaning and identity. A dross_ post-praxis dwells conceptually in what one could consider as the counterpart of parthenogenesis -the phenomenon of virgin birth. It emerges as a germinal creative drive, through the desire for transformation of existing information, concepts and physical entities; it engrafts a copiousness of thought or "a transformative vision,"[10] defying pure, virginal creations. If we assume that nothing emerges 'out of zero', a post-praxis aims to retain the energy induced in creative systems and exploiting the accumulative effect of knowledge and materiality.

Leaping to the pragmatics of the domain of material reuse, new issues have emerged in the past two decades, yet unresolved to a great extent. The case of a bottle, which would be the consumer by-product of the 70s, and that of a personal desktop are largely dissimilar as waste streams. Despite the fact that objects belong in the same category of scale, the material composition of a computer makes it recycling an excruciating and elusive task of shredding and segregating into constituent components and materials before the actual recycling process takes place. Consequently, there seems to be a necessity to use defunct circuitboards for instance, as larger ready-made complexes or components for entirely new uses. Such a practice is supported in few cases through the production of materials by recombinant methods and assemblies. Within this framework of thought, waste materials can be inserted within new materials, either as reinforcement or as ready-made components, yielding particular local behaviors relative to the performance of the new materials. In light of this technique, the notion of 'downcycling' becomes relevant to the next use and ceases to depend on the 'performative' properties of the new material. Recombinant assemblies stipulate material cross-breeding as a strategy for 'upcycling'. Along the lines of this argument Sheila Kennedy remarks how "secondary and tertiary methods of post-industrial production produce recombinant materials: materials within materials... The most inexpensive pressboards are made from the waste scraps of the rarest woods. These claddings products confound the representational hierarchies of front, back, exterior and interior, and are equally acceptable as substrates or finish materials."[11] Recycled ground cover [figure 6] and Alkemi constitute such examples of 'recombinant assembly' materials. The former is a "loose-fill groundcover derived from 100% recycled vulcanized rubber from whole passenger and/or truck tires... held in place due to the interlocking properties of rubber"[12]. The latter is a "solid surface material made by blending salvaged aluminum chips or other non-ferrous metal waste with a silica fiber and pigments, bonded with a polyester resin"[13].

02 >> HISTORIC SYNTHESIS _ COLLAGE AND MOLDING OPERATIONS

Material reuse is certainly not a new territory of exploration. Locally found materials in nature and materials recovered from deceased animals, such as whale and mammoth bones[14], were used directly for shelter and weaponry in prehistoric times. Up to the twentieth century, recycling was more of a technical exploitation of recourses or an incidence, rather than a cognitive strategy of material reuse. The falls of empires often succeeded recycling of the materials of buildings; this act was bonded to the disconnection of buildings from their cultural and monumental significance that were consequently used as 'quarries'. Alongside acts of 'quarrying', in the construction of tombs in ancient Rome, entire objects were reused, such as pots and carafes, in a repetitive manner to form shells or vaults. A characteristic example is the "fourth century Roman tomb on the Via Apia, which was dubbed 'pigna terra' in honor of its dome built of clay pots... We are familiar with the dome of hollow jugs of the orthodox baptistry in Ravena which was begun in 400 BC and finished 50 years later" [15]. In the cases of these tombs, construction was instigated by an assembly line of ready-made components, which discloses ground for a different perspective of material reuse, potentially not directly linked to technical parameters of recourse extractions.

With a massive time gap, the issue of reuse has reemerged, monumentally appealing, as an offspring of rapidly advancing industrialized processes. Mechanical reproduction was critically questioned by artists and literary critics of the beginning of the twentieth century, such as Walter Benjamin and Fernard Leger. Marcel Dunchamp's declaration of the urinal as a work of art, emancipated a syllogism that disconnected the reminiscence an object was carrying along with it from its materiality. The object could then be viewed as 'raw material' utilized for further spatial deploy-

ments. In parallel, one of the main representatives of the Dada movement, Kurt Schwitters, gathered material from the street and collaged it to make artifices in the interior of his apartment, in order to create the compelling work of the Hanover 'Merzbau' in Germany [figure 7]. Schwitters' declaration was to build out of nothing –merz-, meaning out of displaced material that experiences a loss of identity. The importance of Schwitters' artwork extends to the techniques of deploying the material he collected. He did not simply put it together in an additive manner. Instead, he created a second smooth membrane that sealed the realm of collage. Eventually, the compositions of the prosthetic art became latent building material, where points of local interest revealed through openings called 'grottos'.

Schwitters' wrapping of his collected waste material depicts two fundamentally different principles that constitute simultaneously bipolar and inherent drives in creative praxis. These principles are collage and molding, where the first denotes an additive logic of juxtapositions and superimpositions and the latter denotes a procedural, evolving logic of transfusion.

In many cases of reuse, disparate obsolete parts were added either to different contexts or to other obsolete components. This syllogism of bringing fragments together and interrogating their newly formed relationships in new assemblages constitutes a prime artistic revolution for the twentieth century. Collage embeds the notion of reuse in an elemental sense. As a line of thought, it is founded on the acknowledgment that meaning fluctuates and cannot be resolutely engrafted into the physicality of objects at a specific moment in time. In this sense, collage is a practice that "violates 'property' in every sense; it is a kind of theft.[16] Although molding also involves the appropriation of existing objects and contexts, its case is vitally different. The obsolete matter is interrogated for its textural and formal potential and successively used either as a matrix or as material that can be plastically manipulated. Then the matrix is subjected to a process of many stages; a process that essentially feeds itself as molds and casts change roles in and out without a definitive ending. As Beatriz Colomina points out, "casting is an interrogation of space: violently pulling evidence out of it, torturing it, forcing a confession."[17] By putting the two principles of collage and moulding, in opposition, one can draw the following assumptions: If collage signifies the change of context, then molding signifies a material transfer; if collage's scope is a syntax change, then molding's scope is a substance change; if the intrinsic principle of collage is prosthesis of parts, then the intrinsic principle in molding is fusion of parts; if collage is about transformation, molding is about transmutation [figure 8].

For decades now, collage has been dominating the conduits of imagination; it has been applied in parallel as a prime conceptual tool in architectural design, through the appropriation of obsolete spaces and objects, their imbuing with new functions and their addition to new contexts [figure 9]. Sporadically though, alternate paradigms have emerged, through the use of obsolete matter as a mold or a matrix, or in other words a reproduction device for new material. Molding becomes prominent in such quests as an interrogative tool of spatial production [figure 10].

03 >> METHODOLOGY FOR COMPOSITE REUSE

The methodology engages with two vital strategic decisions or methods; composite graft and plastic matter.

The first principle for composite grafting denotes the combination of actual obsolete with their molded by-products. Here, the term 'by-product' does not connote obsolete objects of the utilitarian waste stream; instead it adverts new 'artificial' objects that can be formed by using an obsolete component as a reproductive matrix, or a mold. By using found objects as molds and casting on them different materials than the ones they were made of, the occurring by-products will retain partially characteristics of the original object, but will have different properties, creating assembly lines of materials with local behaviors and properties according to the material synthesis of the by-products. Composite materials make a useful analogy to the strategy of a composite graft; they are composed of elements that work together to produce material properties that are different to the properties of those elements on their own. The method for also touches on some of reuse's most deeply rooted conventions; such a convention is the dogma that reuse should be structured as a

precise analogue of the way that natural systems deal with their waste. By considering the production of new components out of casting on found objects, artificiality becomes part of the equation for manipulating waste streams.

The second principle of plastic matter refers to a condition of material indeterminacy, where material is malleable and deformed slightly from its original status, while retaining some of its primary characteristics. In reality this condition occurs in a wide variety of thermoplastic polymers when heat is applied to them and they reach a mesophase where they are neither liquids nor solids. Heating is a method that is considered distinct from any tools linked to the architectural design process; however the effects of heating in materials such as thermoplastic polymers could be described as physical conditions that immediately relate to digital tools -currently available 'deformers' in 3d modeling environments, such as twist, tapper, spherify, bend etc.

04 >> EXPERIMENTATION _ 3 DROSS PROJECTS

In order to test my selected methodological operations, I have created a matrix [illustration 1] of objects escalating in scale that can serve as a pool for design exploration. The items of this matrix are a circuitboard, a helmet, a plastic container, a bikelid, a watertank, a partition wall and a building part. The selection did not entail a scientific methodology, however a number of parameters were considered. Such parameters were the complexity in texture and form of the obsolete objects, notable hindrances in their disposability, frequency of finding the particular obsolete objects, material composition and other factors. In this paper, three of the aforementioned objects –helmet, circuitboard, watertank-, will run through different digital molding processes. Consequently, the objects themselves along with their by-products will be used in three design experiments, each in a different site and location. In this sense, the matrix plays the role of a generating device for new material, new images and new concepts. Each obsolete object delivers innumerable and variable by-products that can either open the imagination through an apocalypse of the material plasticity in each case, or they can be directly used in new assemblages [illustrations 2 - 8].

The first selected site is part of the MIT main building, the basement infinite corridor. This location has become in time a pick-up point for obsolete electronics, such as outmoded computers and machinery. The space has become a depositor for obsolete matter, acquiring a dross function. My intention in this experiment was to use some of the discarded items, circuitboards in specific, to create a pocket device that accommodates within it the obsolete matter and also registers its flux in and out of the corridor. The installation is conceived as a second skin on the wall double, where stripes can open up, in order for materials to be placed within them [illustrations 9 - 13].

The second selected site is the generic condition of a partition or a blind wall, an anomaly of the continuous building systems in urban environments and at the same time a meager structural point of the city in the case of earthquakes. The intention in this project was to create a device of obsolete components that would be attached to the blind wall and have a twofold cause; the augmentation of the wall's structural capacity and the provision of provide an earthquake registration device, or a seismograph structural appendage. Towards this cause, obsolete helmets were applied as capsule appendages, releasing adhesives when an earthquake would occur; in parallel, helmet by-products were utilized to create a fabric, or a safety net that would withhold any damages and register the effect of the earthquake [illustrations 14 - 18].

The third selected site is the Boston Fire Museum, a historic landmark, which curiously operates only two hours per week as a museum. Therefore, beneath the historically significant facade of the building, lies a condition of programmatic dross. Interestingly enough, there is a notable waste stream of watertanks in the same area of South Boston. The intention in this project was to insert an obsolete watertank within the width of the building's exterior wall adjacent to the urban void beside it. The implementation of the watertank was intended to create an additional space, allowing peeks through the building and partial access to the public. In other words, wrapped around the space of the watertank emerges a miniaturized museum that corresponds to the function and the space of the interior. This space, while working parasitically to the building, creates a museum within the museum for these times that the origi-

nal is in a dross state. More specifically the obsolete watertank itself is converted into a projection space that displays electronically in its interior, information about the building and the history of fire [illustrations 19 - 23].

FIGURES & ILLUSTRATIONS

Figure 0 >> in abstract

Credits to the author

Figure 1 >>

Antony Gormley's Coconut Lead Shell contaminated by an incidental, undefined material that originated from the lead's interaction with the coconut _ In Heuman Jackie & Deighton Sandra, "Natural Selection. Antony Gormley" in Heuman Jackie (Ed), Material Matters. The Conversation of Modern Sculpture, (London: Tate Gallery Publishing Ltd., 1999).

Figure 2 >>

Best Buy Advertisement _ In Wired Magazine; Step in to Liquid, August 2004, p.81.

Figure 3 >>

Between Cinema and a Hard Place, viewers left back view of nine modified Panasonic 13-inch color monitors which attached circuitboards on pedestal. Bill Viola & Gary Hill Art work _ In Heuman Jackie (Ed), Material Matters. The Conversation of Modern Sculpture, (London: Tate Gallery Publishing Ltd., 1999), p.113.

Figure 4 >>

Amount of E-waste exported in Asia yearly _ In Puckett Jim, Byster Leslie, Westervelt Sarah, Gutierrez Richard, Davis Sheila, Hussain Asma & Dutta Madhumitta, "Exporting Harm. The High-Tech Trashing of Asia", Prepared by The Basel Action Network (BAN) & Silicon Valley Toxics Coalition (SVT SVTC), (February 25, 2002), http://www.svtc.org/resource/pubs/pub_index.html

Figure 5 >>

Recycled Groundcover material _ Material without Boundaries. Material ConneXion Catalogue, (New York – Milano: Material ConneXion Publication).

Figure 6 >>

Schwitters Hanover 'Merzbau' _ In Gamard-Burns Elizabeth, Kurt Schwitter's Merzbau: The Cathedral of Erotic Misery, (New York: Princeton Architectural Press, 2000).

Figure 7 >>

Collage Image >> Detail of a Cathode Ray Tube_ Collage Method _ In Heuman Jackie (Ed), Material Matters. The Conversation of Modern Sculpture (London: Tate Gallery Publishing Ltd., 1999), p.114.

Molding Image >> Chimera No.5 & No.8, by Anthony Aziz & Samuel Cucher _Moulding Method. Art work of metallic screws & components wrapped by human skin _ In Ellen Lupton (Ed.) Skin. Surface, Substance + Design (New York: Princeton Architectural Press, 2002), p.76, 77.

Figure 8>>

Morton Duplex Residence_Lo/Tek, New York 1998 _ In Tolla Ada, Lignano Giuseppe & Nobel Philip, LOT/EK: Urban Scan, (New York: Princeton Architectural Press, 2002), p.99.

Mutant & Silent Architecture_ Santiago Cirugeda Parejo, 2000 _ In Brayer Marie-Ange & Simonot Beatrice (Eds), Archilab's Futurehouse: Radical Experiments in Living Space, (New York: Thames & Hudson, 2002), p.91.

Figure 9 >>

La Vega Community Center by Matias and Mateo Pinto in Caracas Venezuela _ In Verona Irina, "Urban Upgrading: A new Community Center in the Barrios of Caracas. Matias and Mateo Pinto" in Praxis: Journal of Writing + Building 2003, No.5 (Cambridge, MA: Praxis Publications, 2003), p.77.

Lite-Gate Project by Lo/tek_ Hochberg Apartment, New York, 2001 _ In Tolla Ada, Lignano Giuseppe & Nobel Philip, LOT/EK: Urban Scan, (New York: Princeton Architectural Press, 2002), p.68.

Water Tower (1998) & Basement (2001) by Rachel Whiteread _ In Lisa Dennison, "A House is not a Home: The Sculpture of Rachel Whiteread" in Rachel Whiteread: Transient Spaces (New York: The Solomon R. Guggenheim, 2001).

Packaging Experiments by Specht Harpman_ In Harpman Specht, "Hypertexture", Praxis: Journal of Writing + Building 2003, No.5 (Cambridge, MA: Praxis Publications, 2003).

Illustrations 1 – 23 >> All credits to the author

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>> Colin Rowe & Fred Koetter, Collage City (Cambridge, Massachusetts: MIT Press, 1978).

>> Forrest Wilson, “Building with the Byproducts of Society”, AIA Journal, Vol.68, No.8, July 1979.

NOTES

1. Merriam- Webster Online Dictionary, http://www.m-w.com/dictionary.htm .

2. The Etymology of the word ‘dross’ can be found in Cambridge Dictionaries Online, http:// dictionary.cambridge.org/ . Middle English dros, is derivative from Old English drOs DREGS
>> dregs, grounds, settlings – [sediment that has settled at the bottom of a liquid]
>> [a small amount of residue].

3. Donna J. Haraway, Simians, Cyborgs and Women. The Reinvention of Nature (New York: Routledge, 1991), p.149.

4. Puckett Jim, Byster Leslie, Westervelt Sarah, Gutierrez Richard, Davis Sheila, Hussain Asma & Dutta Madhumitta, “Exporting Harm. The High-Tech Trashing of Asia”, Prepared by The Basel Action Network (BAN) & Silicon Valley Toxics Coalition (SVT SVTC), (February 25, 2002) in http://www.svtc.org/resource/pubs/pub_index.html .

5. Ibid.

6.Alfred Barr, Picasso: Fifty Years of his Art, (New York: Published for the Museum of Modern Art by Arno Press, 1946), p.241.

7. Colin Rowe & Fred Koetter, Collage City (Cambridge, Massachusetts: MIT Press, 1978), p.149.

8. Ibid.

9. Kepes Gyorgy, ‘Art and Ecological Consciousness” in Gyorgy Kepes (Ed.), Arts of the Environment (New York: George Braziller, 1972), p.11.

10. Sheila Kennedy’s remark about the creative process in Christoph Grunenberg, “The Appeal of the Real”. Sheila Kennedy, Christoph Grunenberg, KVA: Material Misuse (London: AA Publications, 2001), p.63.

11. Sheila Kennedy & Christoph Grunenberg, KVA: Material Misuse (London: AA Publications, 2001), p.15.

12.Material without Boundaries. Material ConneXion Catalogue, (New York – Milano: Material ConneXion Publication).

13. Ibid.

14. Forrest Wilson, “Building with the Byproducts of Society”, AIA Journal, Vol.68, No.8, July 1979, p.40.

15. Ibid.

16. Ibid.

17. Beatriz Colomina, “I Dreamt I Was a Wall” in Rachel Whiteread: Transient Spaces (New York: The Solomon R. Guggenheim, 2001), p.71.