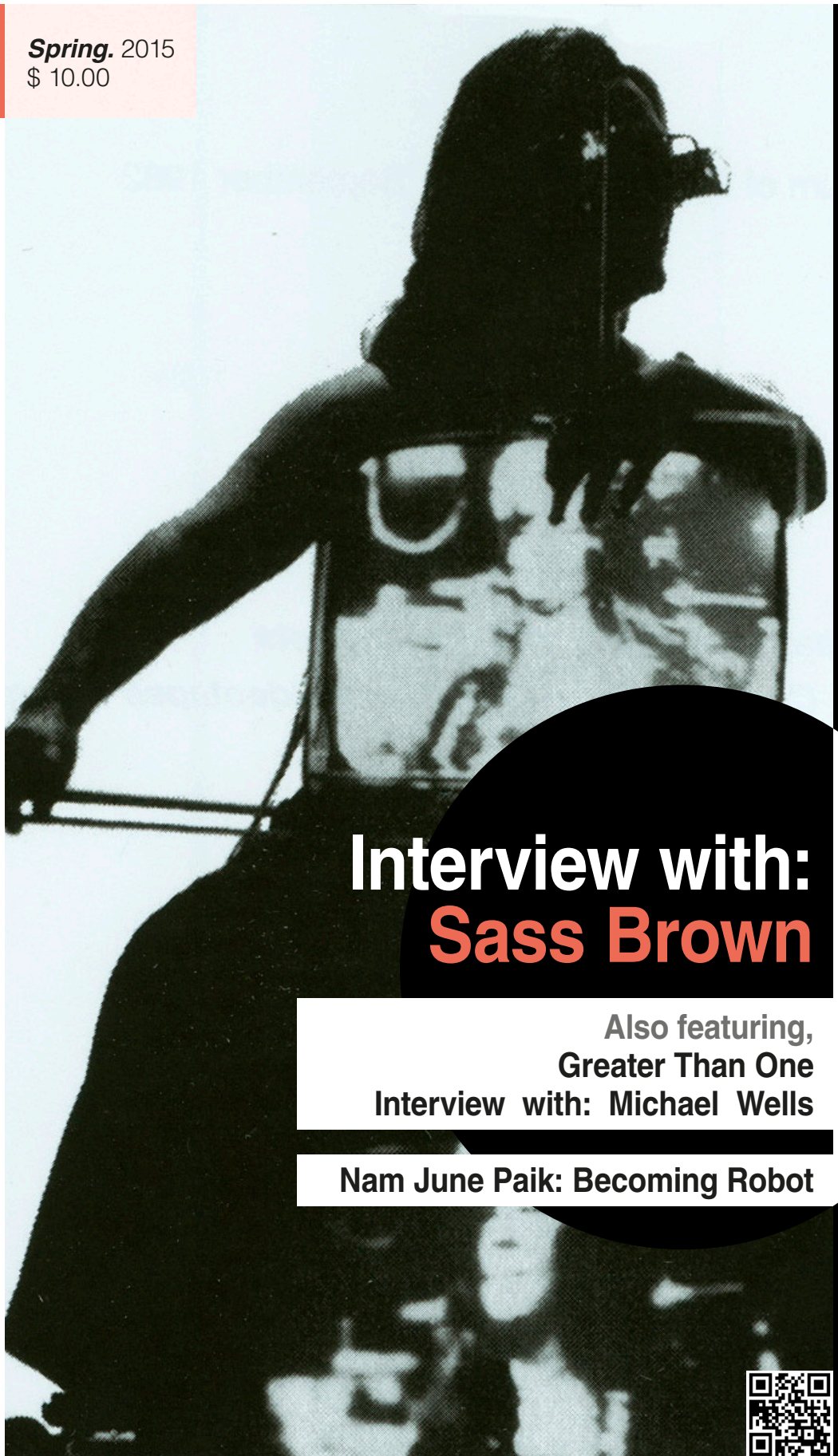


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Interview with: **Sass Brown**

Also featuring,
Greater Than One
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Nam June Paik: Becoming Robot



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Life Hacks: *Reduce, reuse, upcycle*

By Frank Lillig on October 5, 2014

Most people have various items they don't want to get rid of because they hope to find an alternative use for them. From tin cans to plastic bottles to old ladders, bathtubs and TVs, upcycling allows old items to be revitalized with new and more awesome purposes.

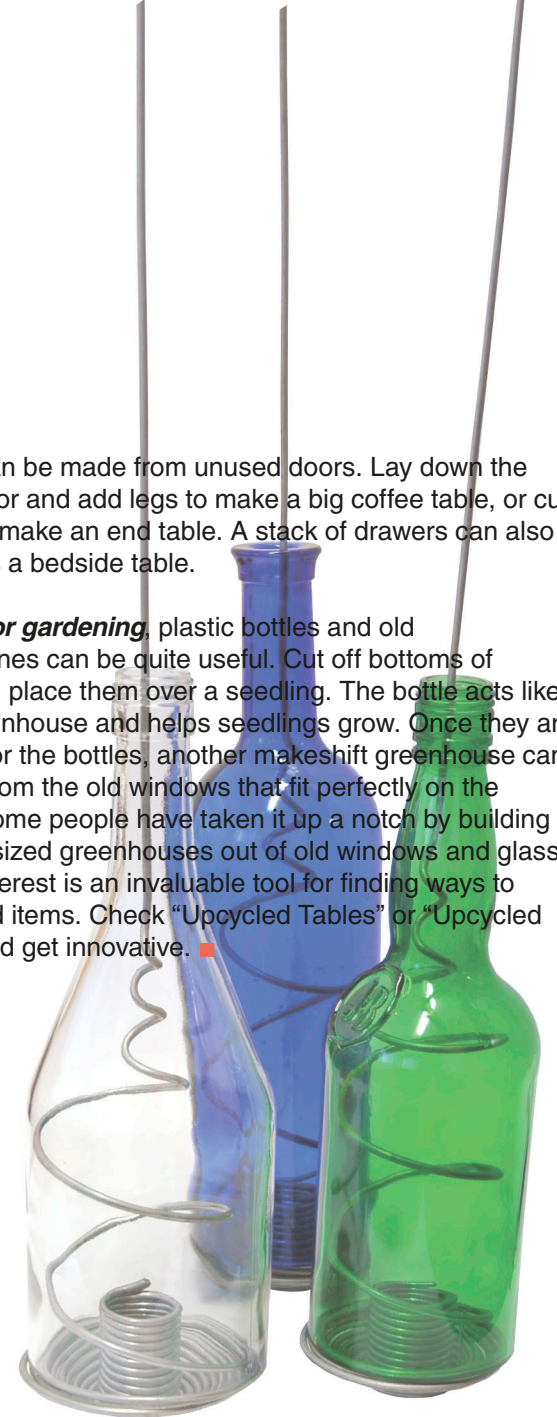
• **For little desk storage units**, use tin cans and plastic bottles. Wash them out, cut off the bottoms and ornament them accordingly. For little craft pieces, egg cartons also work well.

• **Shelves** can be made from all kinds of things. Old wooden ladders can be hung sideways on the wall, or can simply be leaned against a wall for a rustic bookshelf. Drawers from an unused dresser can be hung on the wall to create a floating shelf.

• **Benches or chairs** can be made from old drawers, coffee tables and even rigid suitcases. Cover with foam and upholstery and add legs.

• **Tables** can be made from unused doors. Lay down the unused door and add legs to make a big coffee table, or cut it in half to make an end table. A stack of drawers can also be used as a bedside table.

• **For indoor gardening**, plastic bottles and old window panes can be quite useful. Cut off bottoms of bottles and place them over a seedling. The bottle acts like a little greenhouse and helps seedlings grow. Once they are too large for the bottles, another makeshift greenhouse can be made from the old windows that fit perfectly on the counter. Some people have taken it up a notch by building whole full-sized greenhouses out of old windows and glass doors. Pinterest is an invaluable tool for finding ways to upcycle old items. Check "Upcycled Tables" or "Upcycled Chairs," and get innovative. ■





Greater Than One: Michael Wells Interview

I was studying art in London at the Royal College of Art, doing a fine art degree, and that's when I started getting interested in music and performance art, and that's how it all came about. Lee would come in a hang out at the bars and the art studios, and it was a fun time because we used to make experimental films and cut-ups of all different things. Then when I left college, I thought "well, I've had it with doing art."

The original idea of Greater Than One - that I had - was that it was going to be something which would be almost like a collective involving lots and lots of different people, which never sort of came about. We did some video installations, had some exhibitions - paintings that we did under the name Greater Than One - but at the same time we were putting together small, cassette packages, selling them ourselves to the shops. At the time, England was a very, which it still is, macho place. Lots of loud, young people, and if you walked down the street dressed in a certain way you got shouted at! Lay Your Penis Down was like "lay your gun down." We did 50 of them, and we sold all so we thought "Oh! Well let's make another one!" so we just did Kill The Pedagogue, and we sold a lot more. It seemed everything we did sold a lot better. It was a snowball effect.

Lee would come in, hang out at the bars and the art studios, and it was a fun time because we used to make experimental films and cut-ups of all different things. Then when I left college, I thought "well, I've had it with doing art."

Somehow, someone picked up on it, and we ended up doing a record on Side Effects Records, which was SPK's label.

We dumped off the first thing we did, and we sort of hired a little bit of equipment and recorded this album in one go, and we liked it! It was really nice, we could design the record covers, make music, and really have fun with it. So somehow, I think it was one of the guys from the Thrill Kill Kult picked up one of the records or one of



the packages and let Jim Nash hear it at Wax Trax and he said "We should do something with these guys, it's funky, it's industrial, it's samples..." And they liked it so they were the ones who, especially Jim, really got us enthusiastic enough, maybe to think about making music more of a full time thing. We listened to a lot of reggae, a lot of hip-hop, a lot of industrial music, and a lot of orchestral music, all at the same time, as well as using the concept of cutting a lot of ethnic influences in there along side of this new technology. That, to us, was quite appealing. It was very much like a collage of what was around us. I think that's how we saw it. I mean, if a Janet Jackson record came out, we'd run out and sample from there, then there might be a distorted hip-hop loop and an orchestral sample mixed with something off the TV - a commercial or something. Sometimes I get offended by consumerism - people pushing messages to you - so it was a way of taking other peoples messages, taking it away from them, and presenting ourselves out of their commercial message. It's almost like when you go to MacDonalds and you buy the burger and the chips, but you take it home and you make something different out of it. The funniest thing is some of the samples on the records, when put in the context of the music playing with it, become totally different with totally different meanings - almost like a poke at them. Like the Christian DJ sample on the Index EP, when the DJ does his little spiel after "Dubkiller," him talking about playing "the best Christian music."

One of the reasons for us to get more involved in sort of dance/club techno was because a lot of people wouldn't play us in clubs and radio DJ's were very limited. The college network would play us, but it was very difficult to break into any other market. At the same time acid house came into its own, also with electronic body music. It seemed like a natural progression to veer off into that, a way to widen our audience. There was a hardcore body of DJs who would constantly play it and push it. They were the DJs who were quite eclectic anyway who would play maybe a Cure track, then a Front 242 track, then a Greater Than One track. So they were quite open-minded people anyway. The funny thing about the music business is that people think it's really a creative business, but most people in it - DJs, writers, radio people - are really quite conservative.



Sometimes it boils down to the money. We always got much more response from the U.S. and more response from Holland and Germany. But in the U.K, we made the mistake of saying we were artists, and that was a real bad mistake, because people hate that word in music. So if the people at NME hear the word art, they sort of reach for their revolvers! All of those little papers didn't want to give us any column space because to them it was this arty, self-indulgent stuff. It's like saying you're a comedian, and people expect you to be funny, so if you're not funny, why call yourself a comedian? It's like writing down on a piece of paper "this is a joke," and that's not funny. You have to let the thing speak for itself really.

I still have difficulty with lots of people in the press anyway because I work under a lot of different names doing lots of



different things, so they can't pin you down. That's the thing. Because you're not a face to it. I'm not a personality wanting to be a big face in front of it all. They really don't like that. They almost get insulted by it! They want to own you. They want to know everything about you, and if you don't tell them and you're not forthcoming with your personal life or your ideas or you're very abstract about it, they really don't focus much of their time on you. Again, which was a part of doing something that was image based, using imagery instead of using photographs of ourselves. ■



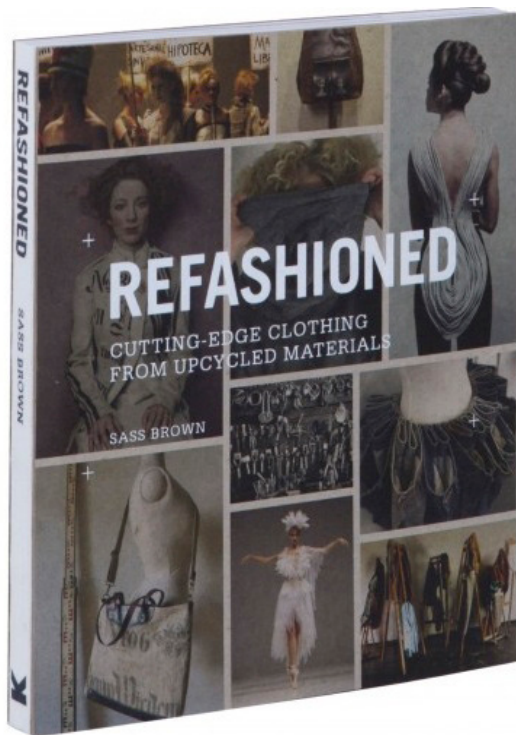
- **Michael Wells**; July, from a phone interview with David Bellard.

INTERVIEW: **Sass Brown** on the cutting-edge world of upcycling

Cow-nipple corsets, hairy jewelry and prison coats – willkommen to the wonderful world of upcycling.

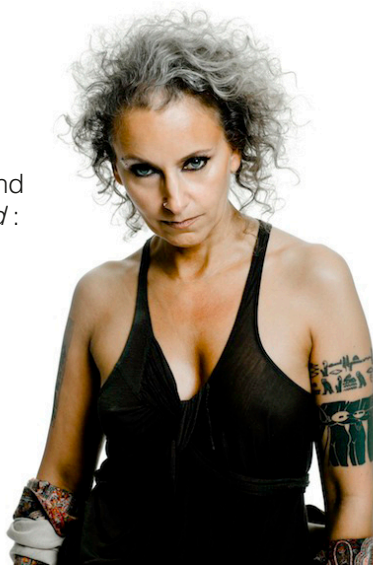
We caught up with author and fashion activist Sass Brown, who (quite literally!) wrote the book on upcycling, to discover some of the ground-breaking sustainable trends that are changing the face of fashion. Rachel Freire SS12 dress made from upcycled cow nipples that critics dubbed “disgusting.”

A trailblazer in the world of eco-fashion, Brown’s latest book *Refashioned: Cutting-Edge Clothing From Upcycled Materials*, published by Laurence King last month, spotlights 46 designers from all over the world that embrace upcycling.



Born in London, Brown is currently based in New York as Acting Assistant Dean for the School of Art and Design at FIT. She is also the voice behind ecofashiontalk.com – an

Sass Brown, Travelor, Editor, Blogger at Ecofashiontalk.com and Author of *Refashioned*: Eco Fashion.



online resource for susty style news (and a firm favorite with the la leaf team!). In the wake of the book’s release, we talked cow-nipples, hair necklaces, and the future of upcycling with the doyenne of eco fashion.

la leaf: Can you tell us how your book *Refashioned: Cutting-Edge Clothing From Upcycled Materials* came about? What prompted you to write it?

Sass Brown: I am always writing about eco fashion, whether for one of the magazines I write for, my own website or my books... In many ways *ReFashioned* is an outgrowth of my first book *Eco Fashion*, as I just had too much great information on designers working with wasted materials than I was able to squeeze into one chapter. The impetus behind all of my writing however, is always to honor the groundbreaking work that is being done in eco fashion, in this case, with unwanted materials. As designers we are trained to believe that luxury design requires luxury materials, but the range of designers I feature in the book working with materials that others have deemed worthless and valueless. They manage to create beautiful, desirable fashion and accessories, not despite their material choice, but because of it.

Refashioned: Cutting-edge design from Upcycled Materials - book on sustainable upcycling fashion by Sass Brown

la leaf: The book features 46 designers. How did you decide who to feature?

Brown: It’s always difficult to make that decision. First I like to showcase a wide global spread of design talent to highlight that this is a global movement. I also like to showcase a range of styles and tastes, so although I focus on cutting-edge and fashion-forward designers, within that there are cerebral designers, architectural designers, conceptual, playful, romantic, and dark designers. As far as criteria for

Released: Austrian brand km/a coat fashioned from a prison blanket





consideration is concerned, for the purpose of this book, it was simply that they work with pre- or post- consumer waste and produce great designs.

la leaf: What's the most outrageous upcycling product you've ever seen?

Brown: There are some really great, and truly artistic and cerebral upcycling experiments and explorations. In *ReFashioned* I feature the work of Rachel Freire who produced a beautiful, delicate collection of rosette covered corsets, made from cow nipples, a normally discarded part of the cowhide. Or Kerry Howley who juxtaposes the conflicting emotions of attraction and disgust by fashioning delicately patterned filigree necklaces from discarded human hair. Both of these designers deliberately evoke and question our cultural responses to material choice.

la leaf: You've traveled extensively during your career. What's the most fascinating upcycling example you've come across during your travels?

Brown: I could answer this differently on any given day, dependent upon my mood, but today I'd say km/a's coats made from Austrian prison blankets. Each one is different with the prison's graphic name emblazoned down the length of a sleeve or across the back. Austrian brand k/ma make coats from former prison blankets

la leaf: Technically speaking, upcycling can be difficult – can you identify one project in your experience where the designers had a particularly innovative way of dealing with a technical problem?

Brown: Austrian brand MILCH produce a narrow range of women's wear designs upcycled from thrifted men's suits. The combination of the narrow range of styles they produce, and the limited variation in traditional men's suits, allows them to duplicate their designs exponentially. Scaling production is an ongoing issue for most upcycling designers; with their materials varying each time, necessitating their creative solutions must also, but MILCH have found a way of scaling their production through careful consideration and a creative solution.

la leaf: What do you think the world of upcycling and eco fashion has to do so that it can continue to grow and compete on an international level?

Brown: It has to scale up to include high street retailers upcycling their own waste. The larger the manufacturer, the greater the amount of waste. What a wonderful challenge to find creative solutions to utilize your own waste? I have been challenging the high-street giants for a while to partner with a high-profile designer to produce a capsule collection produced entirely from their own leftovers and damages.

la leaf: How would you describe your own personal style? How does upcycling affect / influence your own personal style?

Brown: My own personal style is highly eclectic... I consider design an investment, so I don't buy high-street clothing, instead, I invest in emerging designers who produce quality garments that I can love for a long time. I wear a lot of muted colors that all work together, never color match and cherish the upcycled pieces I have in my own wardrobe: my Tamara Fogle flour sack bag, my km/a prison blanket coat, and km/a jersey scrap jacket, all featured in my book.

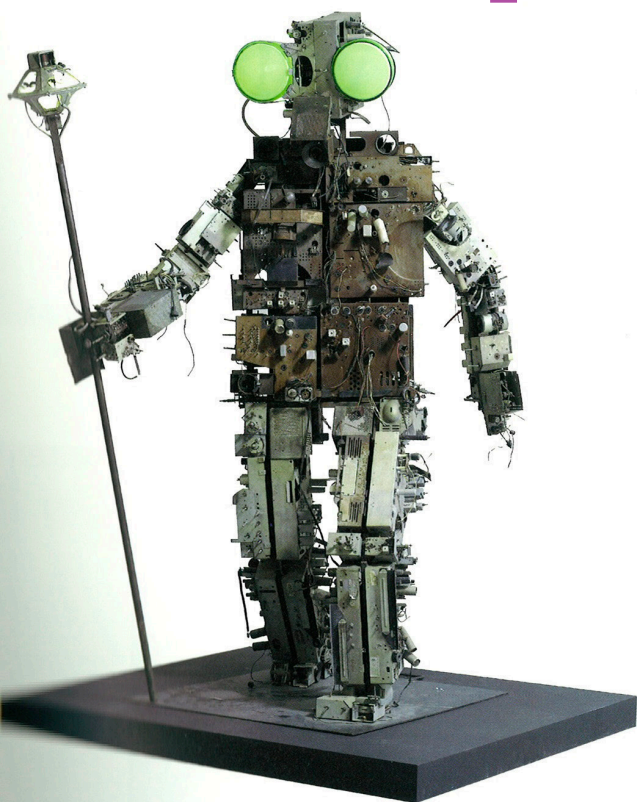
"You can transform any material with your creativity, your labor and your love."
– Sass Brown

la leaf: We're a new eco-fashion blog based in Berlin, Germany. Have you any connection with Berlin or stories about Berlin's upcycling scene to share?!

Brown: Berlin is a great center for eco design. The Green Showroom in Berlin, part of Mercedes Benz Fashion week, is an important eco-fashion trade show. Schmidt Takahashi is one of the designers featured in the book that is based in Berlin. They produce a fabulous collection of highly creative designs for men and women from donated clothing. I have an abiding love for the MAYER Peace collection also located in Berlin and featured in *ReFashioned*. They produce an incredible collection of tailored jackets and coats from vintage flour sacks, and they have a brand new line from upcycled quilts from Pakistan. Atelier Awash, produce a men's wear collection, also featured in the book used to be based in Berlin, but recently relocated to Italy. I also just came across Atelier Akeef myself for the first time who are based in Mitte, but haven't yet had an opportunity to visit them.

We hope Sass Brown makes it to Berlin soon to scope out the latest sustainable fashion hotspots and to share a signature la leaf cocktail with us! The depth of her knowledge and her genuine excited earnestness for the topic at hand makes her book a must-read. Pick up a copy of *Refashioned: Cutting-Edge Clothing from Upcycled Materials* at Laurence King publishers. – Sorcha ■

Nam June Paik: *Becoming Robot*



As technology becomes a part of everyday life, it begins to play an integral part of our lives. Technology begins to influence, or at least, affect how we think and function, this happens in art as well. Nam June Paik, a groundbreaking performance artist has a place in history, and a legacy the contemporary art world should not forget, or be overlooked.

Currently featured at the Asia Society Museum, is the

thematic exhibit *Becoming Robot*, which showcases Nam June Paik's experimentation with the robotic theme (humanoid sculptures created from various hardware parts, as well as ready-made of collected toy robots) and video art installations. Through this exhibit, we find that Nam June Paik approached art scientifically, with his own thesis on how technology relates to us in our lives. Paik was an artist of the Avant-garde; he did not fear technology, and foresaw how much of

an importance it was going to be in society, so he chose to use it as a reoccurring theme in his work.

If Modernism In the late 20th century exploited convenience, and the application of technology, then the Avant-garde twisted things around, and expanded on how we use technology, and how it could relate to us each individually, on a personal level. *Becoming Robot* is not Post-Modern simply because it is fundamentalist or that specific thrilling moment when technology is introduced. There was no rebellion in Paik's work, he was simply communicating his love for these new and exciting ways to make conceptual art, and by consciously taking advantage of these new platforms, he was (in result) being experimental.

Nam June Paik's concept was technology for what it is exactly, and not being overtly-confident in it, as he knew it was something that would evolve. Paik accepted the imperfections that came along with working with computers, wires, building frames for robots out of collected junk piles, as his approach was like working in a laboratory: getting the most out of whatever was available, while pushing everything a little further each time.

Upon entering the exhibit, the first thing that will get anyone's attention, is the clunky mechanical robotic sculpture (looking something like a skeletal prototype to the character

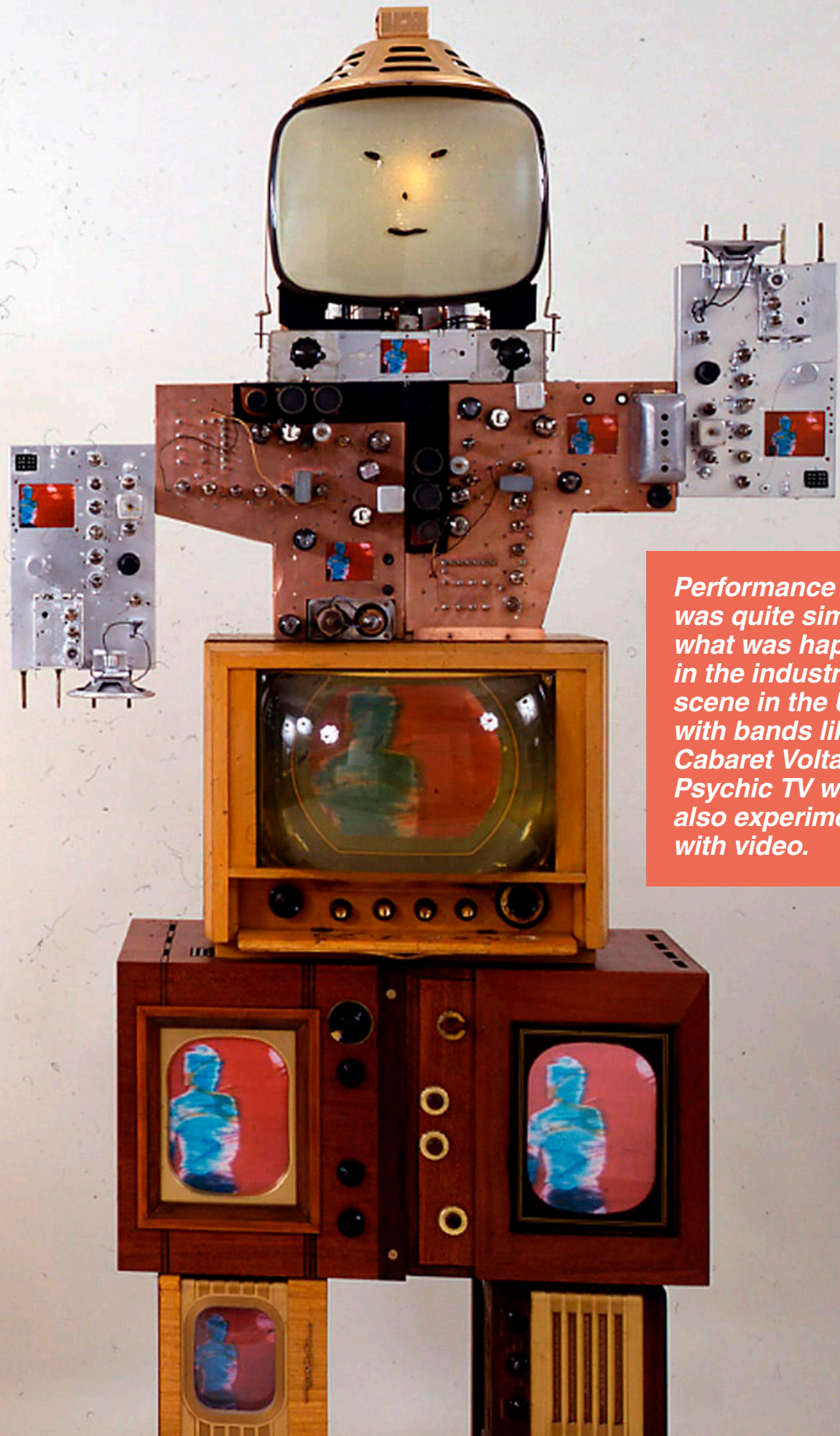
"Johnny-5" from the movie *Short Circuit*.) "Robot K-456" was originally built in 1964. The "robot" is scaled to, and has a humanoid form made from seemingly, anything. Paik was able to get his hands on and make sense out of. Everyday items ranging from what appeared to be women's shoulder pads, to hand gloves, to loud speakers, wires and electric fans, etc. Opposite from the robot figure is a recorded, televised news broadcast from CBS (NY,) back in 1989; featuring the same robot, but this time, Paik had programed it to move on its own, and roam the streets of Manhattan, during business hours! A news reporter interviews Paik while K-456 moves toward a crowd of spectators. Suddenly, a speeding car crashes into the robot from behind while attempting to make a right turn. After a few yells and screams, everyone frantically run to the robot's rescue while it's face down on the ground, in the middle of the street. Early in the exhibit, we learn Nam June Paik accepts technology with all of its flaws, in which he had a sense of humor about it. Paik was more fascinated with the way things worked at the seams.

There are original video art installations, which make up a good sum of *Becoming Robot*. From here we get to see how Paik had been dubbed "the founder of video art." Through experimentation in video collage, live action mixed with animated graphics, and often times a mix-down of audio as a soundtrack; Paik was able

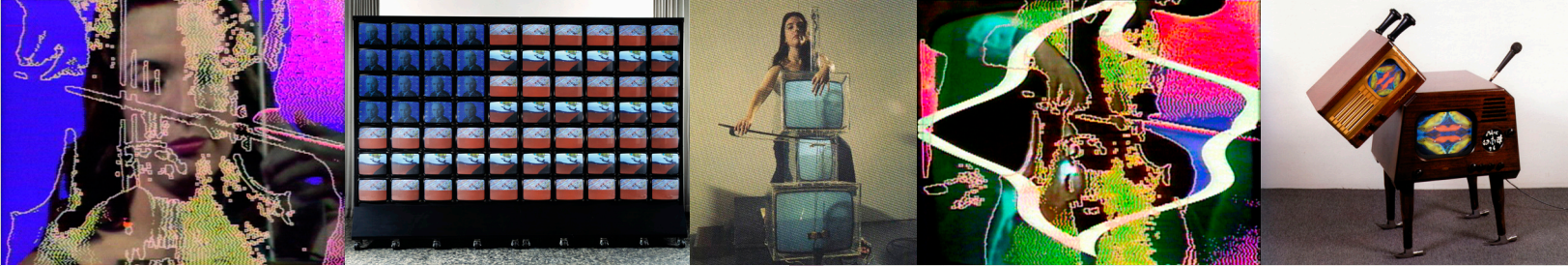
to communicate themes and human emotions in a way that may have been groundbreaking at the time, but in today's world, this kind of media art is not difficult to find if you look around long enough, but with that said, we can trace this style of Avant-Garde all the way back to Paik's era.

For myself personally, many of these videos (judging by the time they were composed) are about the wonder and mystery of technology and being sucked into the concept. Paik captures emotions with the use of computer graphics and film, rather than with paint on a canvas.





Performance art which was quite similar to what was happening in the industrial music scene in the UK, with bands like Cabaret Voltaire, and Psychic TV who were also experimenting with video.



Larger scaled robots, similar to "Robot K-456" but now, made out of whole television sets, projecting video graphics which become more advanced as we move forward into the exhibit. Displayed computer graphics shows age, (as depicted by it's year in description: 1986,) but are not spoiled by the overall concept Paik has created. How these videos were produced, is a result of a collaborative effort between a studio and the artist; a non-profit organization and collaboration between artists and engineers known as E.A.T. (short for "Experiments in Art and Technology.") The program worked directly with both the artist and the engineer which would result in an advanced collaboration between the two parties.

The most interesting aspect about Nam June Paik's career is his range of talent and interests, which led to many more collaborations. Along with technology, music was another force which played a huge factor in his portfolio. Having worked with many musicians and other multi-media artists such as John Cage, Philip Glass, Yoko Ono, and Joseph Beuys, who are all featured in, almost making cameo-like guest appearances somewhere or other in this exhibit.

From Paik's travels between Germany and New York

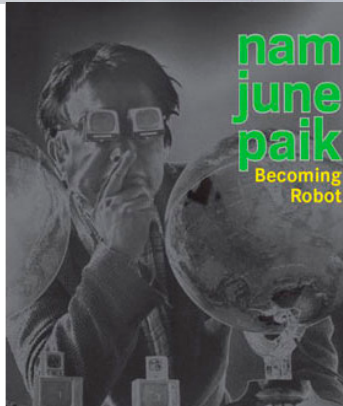
City: these collaborations often resulted in performance art which is quite similar to what was happening in the industrial music scene in the UK, with bands like Cabaret Voltaire, and Psychic TV (who were also experimenting with video.) One thing that is certainly in common was the influence from Beuys, so it would not be so much of a coincidence that any video footage found from this era is in a similar context, since Paik had worked with Beuys firsthand.

Charlotte Moorman was another collaborator, who became a focal part of the Avant-garde group Nam June Paik was involved in. Moorman, a cellist who was often used as a subject in Paik's work, actually had her own shrine within the exhibit in her memory; a series of collected documents and photographs were exhibited on the musician and her career. She can be seen playing the cello while there a small television screens placed on her garment, covering her chest in "TV Bra for Living Sculpture."

There was an incident where Moorman was nude, (or partially nude) while performing with Paik, who are later on, arrested for indecent exposure. It was the antics of the Moorman/Paik duo which made them notorious, particularly Moorman who became dubbed as "the topless



cellist," during her involvement with Paik. I found *Becoming Robot* to be a very memorable, and an extremely educational exhibit. The fact that music and art is so well intertwined, along with the subject of technology and futurism, is what makes this exhibit, and this artist special. Anyone who wishes to study, or use computers as a tool for art, whether it be animation of still graphics should be aware of this artist. ■



Nam June Paik:
Becoming Robot
Published by
Asia Society

Objet Trouvé

Upcycling is the process of converting waste materials or useless products into new materials or products of better quality or for better environmental value.

The first recorded use of the term upcycling was by Reiner Pilz of Pilz GmbH in an article by Thornton Kay of Salvo in 1994.

We talked about the impending EU Demolition Waste Streams directive. "Recycling," he said, "I call it downcycling. They smash bricks, they smash everything. What we need is upcycling where old products are given more value, not less." He despairs of the German situation and recalls the supply of a large quantity of reclaimed woodblock from an English

of useful old items mixed with crushed concrete. Is this the future for Europe?

Background

The upcycling concept was the title of the German book written by Gunter Pauli in 1996, the free translation of upsizing (the opposite of downsizing) book first published in 1996. The German edition was adapted to the German language by Johannes F. Hartkemeyer, then Director of Volkshochschule in Osnabruck.

The concept was later incorporated by William McDonough and Michael Braungart in their 2002 book *Cradle to Cradle: Remaking the Way We Make Things*. They state that the goal of upcycling

is the opposite of downcycling, which is the other half of the recycling process. Downcycling involves converting materials and products into new materials of lesser quality. Most recycling involves converting or extracting useful materials from a product and creating a different product or material. For example, during the recycling process of plastics other than those used to create bottles, many different types of plastics are mixed, resulting in a hybrid. This hybrid is used in the manufacturing of plastic lumber applications. However, unlike the engineered polymer ABS which hold properties of several plastics well, recycled plastics suffer phase-separation that causes structural weakness in the final product.

In developing countries, where new raw materials are often expensive, upcycling is commonly practiced, largely due to impoverished conditions.

Upcycling has seen an increase in use due to its current marketability and the lowered cost of reused materials. Inhabitat, a blog devoted to sustainability and design, holds an annual upcycling design competition with entries coming from around the globe.

Upcycling has shown significant growth across the United States. For example, the number of products on Etsy tagged with the word "upcycled" increased from about 7,900 in January 2010 to nearly 30,000 a year later—an increase of 275%. As of April 2013, that number stood at 263,685, an additional increase of 879%.

The tradition of reusing found objects (*objet trouvé*) in mainstream art came of age

sporadically through the 20th century, although it has long been a means of production in folk art. The Amish quilt, for example, came about through reapplication of salvaged fabric. Simon Rodia's Watts Tower (1921-1954) in Los Angeles exemplifies upcycling of scrap metal, pottery and broken glass on a grand scale; it consists of 17 structures, the tallest reaching over 30 meters into the Watts skyline.

Intellectually, upcycling bears some resemblance to the ready-made art of Marcel Duchamp and the Dadaists. Duchamp's "Bicycle Wheel" (1913), a front wheel and fork attached to a common stool, is among the earliest of these

works, while "Fountain" (1917), a common urinal purchased at a hardware store, is arguably his best-known work. Pablo Picasso's "Bull's Head" (1942), a sculpture made from a discarded bicycle saddle and handlebars, is the Spanish painter's sly nod to the Dadaists.

Throughout the mid-century the artist Joseph Cornell fabricated collages and boxed assemblage works from old books, found objects and ephemera. Robert Rauschenberg collected trash and disused objects, first Morocco and later on the streets of New York, to incorporate into his art works.

The idea of consciously raising the inherent value of recycled



Lemon/Light Bulb
Joseph Beuys



supplier for a contract in Nuremberg while just down the road a load of similar blocks was scrapped. In the road outside his premises, was the result of the Germans' demolition waste recycling. It was a pinky looking aggregate with pieces of handmade brick, old tiles and discernible parts

is to prevent wasting potentially useful materials by making use of existing ones. This reduces the consumption of raw materials when creating new products. Reducing the use of new raw materials can result in a reduction of energy usage, air pollution, water pollution and even greenhouse gas emissions.



objects as a political statement, however, rather than presenting recycled objects as a reflection or outcome from the means of production, is largely a late 20th century concept. Romuald Hazoumé, an artist from the West African Republic of Bénin, was heralded in 2007 for his use of discarded plastic gasoline and fuel canisters to resemble traditional African masks at Documenta 12 in Kassel, Germany. Hazoumé has said of these works, “I send back to the West that which belongs to them, that is to say, the refuse of consumer society that invades us every day.”

Jeff Wassmann, an American artist who has lived in Australia for the past 25 years, uses items found on beaches and junk stores in his travels to create the early Modern works of a fictional German relative, Johann Dieter Wassmann (1841-1898). In “Vorwärts (Go Forward)”, Wassmann uses four simple objects to depict a vision of modern man on the precarious eave of the 20th century: an early optometry chart as background, a clock spring as eye, a 19th-century Chinese bone opium spoon from the Australian gold fields as nose and an upper set of dentures found on an Australian beach as mouth. Wassmann is unusual among artists in that he does not sell his work, rather they are presented as gifts; by not allowing these works to re-enter the consumer cycle, he averts the commodification of his end product.

Max Zorn is a Dutch tape artist who creates artwork from ordinary brown packaging tape and hangs pieces on street lamps as a new form of street art at night. By adding and subtracting layers of tape on acrylic glass with a surgical scalpel, the artwork can only be visible when light is placed behind it, mimicking the effects similar to stained glass window methods. His technique with pioneering upcycling with street art has been featured at Frei-Cycle 2013, the first design fair for recycling and upcycling in Freiburg, Germany.

Upcycling in music

A prominent example is the Orquesta de Instrumentos Reciclados de Cateura in Paraguay. The instruments of the orchestra are made from materials taken from the landfill that Cateura is built around. (See the YouTube video of The Landfill Orchestra)

Upcycling in industry

Many industrial processes, like plastic and electronic fabrication, rely on the consumption of finite resources. Furthermore the waste may have an environmental impact and can affect human health. Within this context, upcycling describes the use of available and future technologies to reduce waste and resource consumption by creating a product with a higher value from waste or byproduct.

In consumer electronics, the process of re-manufacturing or refurbishment of second-hand products can be seen as upcycling because of the reduced energy and material consumption in contrast to new manufacturing. The re-manufactured product has a higher value than disposing or downcycling it.

The use of Brewer's spent grain, a waste product of brewing processes, as a substrate in biogas processes eliminates the need for disposal and can generate significant profit to the overall brewing process. Depending on the substrate's price, a profit of approximately 20% of the operational costs is possible. In this process, the biogas plant acts as an “upcycler”.

Potential technologies and applications

The worldwide plastic production was 280 million tons in 2011 and production levels are growing every year. Its haphazard disposal causes severe environmental damage such as the creation of the Great Pacific garbage patch. In order to solve this problem, the employment of modern technologies and processes to reuse the waste plastic as a cheap substrate is under research. The goal is to bring this material from the waste stream back into the mainstream by developing processes which will create an economic demand for them.

One approach in the field involves the conversion of waste plastics (like LDPE, PET, and HDPE) into paramagnetic, conducting microspheres or into carbon nanomaterials by applying high temperatures and chemical vapor deposition.

On a molecular level, the treatment of polymers like polypropylene or thermoplastics with electron beams (doses around 150 kGy) can increase the material properties like bending strength and elasticity and provides an eco-friendly and sustainable way to upcycle them.

PET could be converted into the biodegradable PHA by using a combination of temperature and microbial treatment. First it gets pyrolyzed at 450 °C and the resulting TA is used as a substrate for microorganisms, which convert it finally into PHA. Similar to the aforementioned approach is the combination of nanomaterials like carbon nanotubes with powdered orange peel as a composite material. This might be used to remove synthetic dyes from wastewater. ■



JOSEPH CAMERON//CD225-15B