Tuula Närhinen

Plastic Ocean

Mermaid Tears (2007)
Installation 400 x 90 cm. Materials: A neclace made of plastic waste from the seashore, 4 sieves, 5 shelves, 1 c-print on aluminium.

Among clumps of seaweed or flotsam washed up on the shore it is common to find 'mermaid tears,' small plastic particles, some resembling fish eggs.

Some particles are plastic resin pellets, the raw materials of the plastics industry spilled in transit to processing plants. Some are domestic waste that has fragmented over the years. Both sources have spread widely across the world's seas. These mermaid tears remain everywhere and are almost impossible to clean up. Whether plastics present a toxic challenge to marine life and subsequently to humans is one of the biggest challenges facing marine scientists today. Plastic is ingested by seabirds and various marine organisms, and its adverse effects on the food chain are a concern.

Plastic Ocean: mermaid tears (2007), details

Frutti di mare (2008)

The installation consists of 36 c-prints on aluminium (70x50 cm each) and 36 floating sculptures in plastic boxes partly filled with water (49x25x29cm each box). Boxes containing the floating sculptures are placed on metal shelves on the floor and illuminated with fluorescent tubes. The c-prints on aluminium hang in long rows on a wall in the vicinity of the metal shelves.

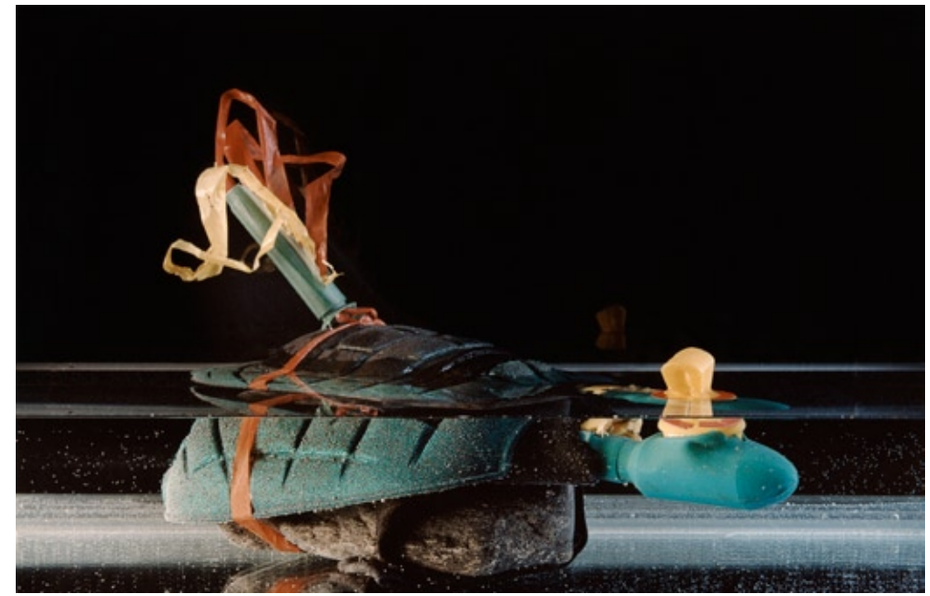
The sculptures are made of plastic waste washed up on the seashore in Helsinki. They represent new kind of marine species from a previously unknown sea called Plastic Ocean.

Plastic Ocean: frutti di mare (2008), detail

Plastic Ocean (2007-2008), installation at Forum Box, Helsinki, January 2008

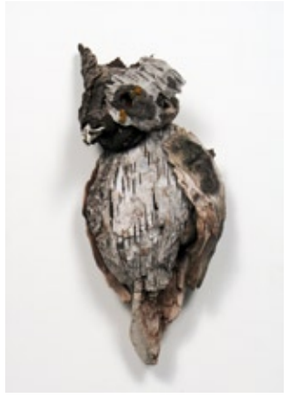
Plastic Ocean: frutti di mare (2008), detail

Plastic Ocean: frutti di mare (2008), detail



Paul Kahn

Detritus Art and Plastic Science



Imaginary extinct bird, Oulu project, 2006 (above); photographic image taken by Ladybirdcam from The Landscape Seen Through Animal Eyes, 2000-2003 (below).

Tuula Närhinen sent me images of a large project she had done in Oulu in northern Finland in 2006. She had sculpted dozens of imaginary birds, mounted in cases along the stairwells and hallways of the school. Many of the imaginary creature were classified with Latin names, as one might expect to find in a natural history museum. But the collection of complete creatures, skeletons, sets of beaks, nests, feathers, embryos and eggs carefully mounted and displayed in glass cases and jars were made largely from materials found around her island studio or in local flea markets and hobby shops. The owl-like creature is composed of birchbark, driftwood and fragments of a mole's skull. On close examination, the mounted skeletons are a collage of animal, bird and fish bones, held together with silver wires.

Images derived from scientific investigation are the core of Närhinen's art, along with a dry sense of humor. She has built cameras that produce images of what she imagines the world looks to a fly or a bear, developed methods for letting trees trace the shape of wind on their branches, and found techniques for using cold winter air to create patterns on paper and glass. She is an investigative artist, inventive and methodical.

My first view of *Plastic Ocean* was a set of two composite photographs, prepared for a group exhibition at Forum Box, an artist cooperative in Helsinki. She had decided to investigate the problem of plastic in the ocean. *Mermaid Tears* was an elaborate necklace fashioned from plastic particles she had separated from the flotsam around her island studio. The series of sieves, similar to tools used by archeologists, as well as a photo and samples of the debris were also part of the work. *Frutti di mare* was thirty-six sculptures set in aquarium-like containers along with colorful photos of each creature. Her brief text states that the creatures were "made of plastic waste washed up on the seashore in Helsinki. They represent a new kind of marine species from a previously unknown sea called Plastic Ocean." The photos of the half-submerged creatures made them look colorful and charming, not unlike the wonders we see floating by behind the glass of the local aquarium. But viewed in their white plastic cases on metal shelves, they looked more like organized trash.

The work is visually impressive and makes you think. The point was somewhere between the artist's response to her environment and the viewer's response to the art. And I asked myself, in the spirit of an investigative writer looking at the work of an investigative artist, what made her notice the plastic? And how did little bits of plastic trash come to be known as "mermaid tears"?

A little searching on the Internet produced an answer: the BBC. In December 2006, a science program in a series called "Costing the Earth" was broadcast on BBC Radio 4 and published as an article on the BBC website. The title of the program was "Mermaids' Tears". The report begins:

> *Microscopic particles of plastic could be poisoning the oceans, according to a British team of researchers. They report that small plastic pellets called "mermaids' tears", which are the result of industry and domestic waste, have spread across the world's seas.*

http://news.bbc.co.uk/2/hi/science/nature/6218698.stm

This report summarized the research of marine ecologist Dr. Richard Thompson at the University of Plymouth. His research had slowly filtered into news after his group published a one-page article with the provocative title "Lost at Sea: Where Is All the Plastic?" in *Science* in 2004. This was the first scientific report of "the abundance of microplastics" in the marine environment around England. But there are no *mermaids* or *tears* to be found in the language of his report. I quote a bit of the methodology section:

http://www.sciencemag.org/cgi/content/full/sci;304/5672/838

DOI: 10.1126/science.1094559:

> *To quantify the abundance of microplastics, we collected sediment from beaches and from estuarine and subtidal sediments around Plymouth, UK (Fig. 1B). Less dense particles were separated by flotation. Those that differed in appearance to natural particulate material (Fig. 1A) were removed and identified with Fourier Transform infrared (FT-IR) spectroscopy . Some were of natural origin and others could not be identified, but about one third were synthetic polymers (Fig. 1C). These polymers were present in most samples (23 out of 30), but were significantly more abundant in subtidal sediment (Fig. 1D). Nine polymers were conclusively identified: acrylic, alkyd, poly (ethylene:propylene), polyamide (nylon), polyester, polyethylene, polymethylacrylate, polypropylene, and polyvinyl-alcohol. These have a wide range of uses, including clothing, packaging, and rope, suggesting that the fragments resulted from the breakdown of larger items.*
>
> Science, *Vol. 304. no. 5672, p. 838*

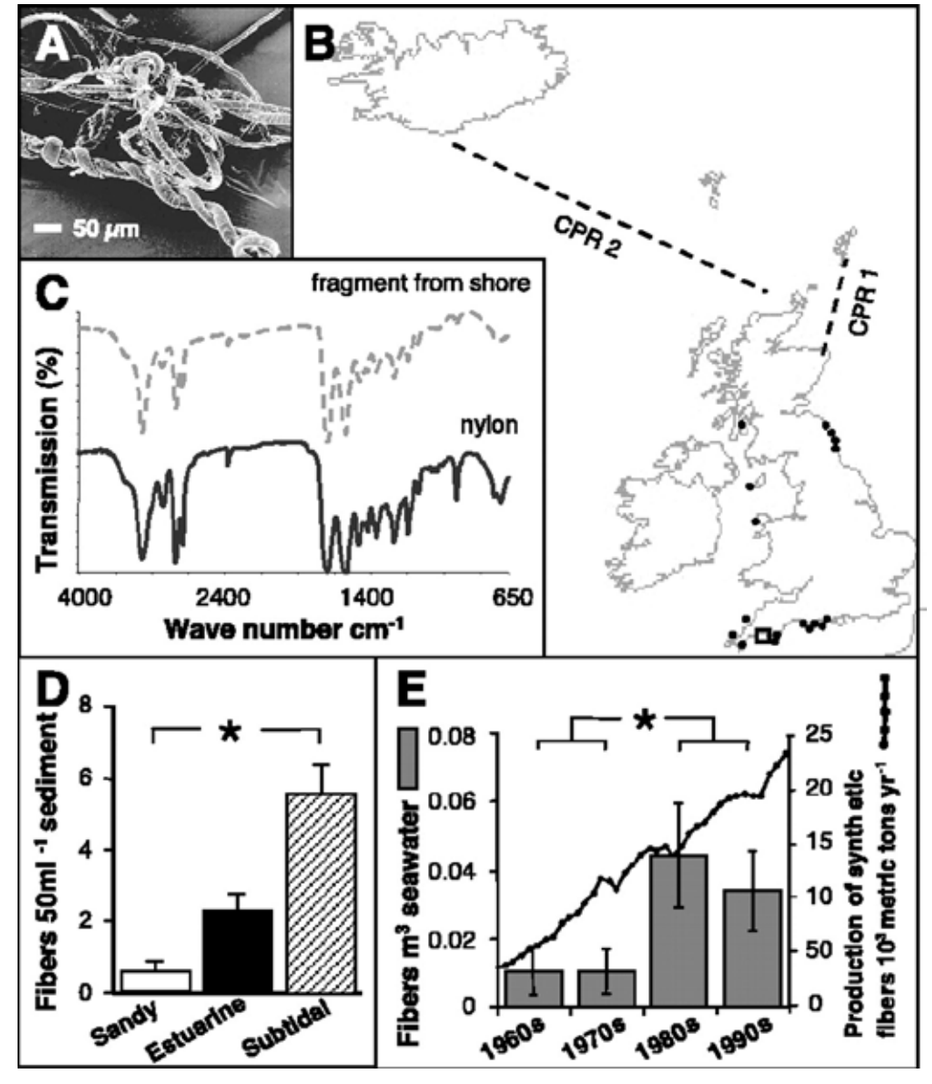


Figure 1. (A) Fragment of microscopic plastic from shoreline. (B) Sampling locations in North-East Atlantic, showing Routes (CPR 1 and 2) sampled by Continuous Plankton Recorder (CPR) since 1960 and used to assess changes in the abundance of microplastics in the water column (see Fig. 1E). Shores around the UK where similar fragments were found (●) and the location of sites near Plymouth (□) used to compare the abundance of microscopic plastic among habitats (see Fig. 1D). (C) Example showing how FT-IR spectroscopy was used to identify fragments from the shoreline and the water column. Here an unknown fragment is identified as nylon. (D) There were significant differences in abundance of microplastics between sandy beaches and subtidal habitats (ANOVA on log10(x + 1) transformed data, $F_{2,3} = 13.26$, $P < 0.05$, * = $P < 0.01$), but abundance was consistent among sites within habitat type. (E) Accumulation of microscopic plastic in CPR samples revealed a significant increase in abundance when comparing the 1960's and 1970's to the 1980's and 1990's (ANOVA on log10(x + 1) transformed data, $F_{3,3} = 14.42$, $P < 0.05$, * = $P < 0.05$). Approximate figures for global production of synthetic fibres overlain for comparison. Microplastics were also less abundant along the oceanic route CPR 2 than CPR 1 ($F_{1,24} = 5.18$, $P < 0.5$). Reproduced from Thompson et al. (2004), with permission.

The accompanying figure is a small masterpiece of scientific illustration collage, a form motivated by the paucity of space permitted in scientific journals for visual explanation. We see the familiar outline of the British Isles with some ominous dots along the coast, lines connecting it to Iceland and the Shetlands, a microphoto, and some bars and lines.

I wrote to Thompson, attaching some images of Närhinen's *Plastic Ocean*. He thought her work was "fantastic" and made the time to answer our questions and talk at some length about his own work. As to where the name "mermaids' tears" came from, he was quite certain it "is a US phrase", and in any case only appears in news stories. The genesis of his research comes from supervising Marine Conservation Society beach cleanups as a graduate student. As he led groups of 170 volunteers to clean dozens of beaches around the UK, he noticed that the volunteers, particularly the young men, were attracted to large debis such as tires, but people generally ignored the small fragments strewn about in the seaweed and sand. He became interested in the fact that these small fragments were not being fully recorded in the surveys that, along with bags of trash sent to landfills, were the results of these cleanup efforts. Once he became a marine biologist, he set off with a graduate student of his own to gather up and analyze "the small stuff". They found strange-looking fragments, but it took several years before he was able to team up with Andrea Russell in the chemistry department of the University of Southampton. Russell had the technique for identifying what they found, the Fourier Transform infrared (FT-IR) spectroscope, an instrument that can analyze the composition of the smallest particles.

http://www.mcsuk.org

The lab methodology that Thompson and his team developed to analyze the samples was time consuming and labor intensive. The grains of sand were first sorted, then grains that appeared to be plastic were visually selected. These grains were run through the FT-IR analysis. The technique depends on a known library of wave patterns given off by compounds. A plastic, such as nylon, has a predictable wave pattern, metaphorically called a "fingerprint" (the wavy line in Figure 1C). When Thompson ran a fragment through the process, he could "see" that it was plastic.

The materials that Närhinen found in the Helsinki by sifting through beach flotsam are much larger than the plastic fragments Thompson calls “the small stuff”. Looking at the uniform size of the beads in the photo, he guessed that most of what she found are the plastic resin pellet shipped between plastic producers and factories where plastic products are extruded or molded. These pellets are called nurdles, a word that must have a British origin, as it comes from the sports jargon of cricket. To close the loop, a recent “nurdle” entry in Wikipedia, the virally evolving Internet encyclopedia, states that a nurdle “may be called a mermaid’s tear, a term which may also refer to pollution in the form of degraded plastic.”

http://en.wikipedia.org/wiki/Nurdle

Thompson’s research has also raised nurdle consciousness in the environmental movement and the popular press. Nurdles were first found in the Bristol channel in the 1970s, and there was a freighter spill of several containers of the material off the English coast. An awareness of the problems that result from improper handling of nurdles during transport is a recent phenomenon, he said, a polite way of saying that for decades no one paid attention to spills and shrinkage from pallets and containers during shipment. Like dandelion seeds on the wind, nurdles blew into the river estuaries and marine environments of the world.

Thompson is now one of the leading experts on the touchy subject of measuring how much of the sand beneath our feet on every seashore and riverbank is plastic. A 1987 study he cites in a recent conference presentation states that 70% of all marine debris is plastic. But plastic is not DDT or plutonium. It is your mobile phone (used for one year), your shampoo bottle (used for one month) and your grocery bag (used for one hour). The plastic in each of these items will probably maintain its structural properties for hundreds of years. But we don’t know. Plastics have been mass produced only since the 1950s. We now have studies indicating that plastic materials are distributed throughout the oceans, but no one has developed models of what will happen over hundreds of years as the production and dispersal of plastic continues to increase. In his writing, Thompson advocates a decrease in the use of disposable packaging and an increase in the development of closed-loop recycling “so a bottle can become a bottle once again”.

In April 2008, *Plastic Ocean* was part of *Changing Matters – The Resilience Art Exhibition* at the Swedish Museum of Natural History in Stockholm. Närhinen's plastic sea creatures were featured in *Svenska Dagbladet*. General interest in the topic of plastics in the ocean has been growing in the press, in part due to the work of another man, Charles

http://www.resalliance.org
http://resilience2008.org
http://www.mejanlabs.se

Moore. A sailor and not a Ph.D., Captain Moore was lead author of a 2001 article in the *Marine Pollution Bulletin* that first described a dense concentration of floating plastic waste in the Pacific Ocean. In February 2008, *The Independent* in London ran a story with the title “The world’s rubbish dump: a garbage tip that stretches from Hawaii to Japan” with a graphic showing two enormous grey-filled areas labeled *Eastern Garbage Patch* off the coast of Japan and *Western Garbage Patch* swirling between California and Hawaii. Research papers from Moore’s own Algalita Marine Research Foundation refer to the areas as gyres, the meta-flows that carry particles throughout the oceans. In June, the *New York Times* published “Sea of Trash” in which Donovan Hohn describes accompanying members of the Gulf of Alaska Keepers (GoAK) on their mission to gather and remove thirty tons of plastic debris from Gore Point, a stretch of uninhabited coastal wilderness south of Homer, Alaska. Articles about plastic debris on Midway atoll appeared in the *L.A. Times*. An Alaskan collecting plastics on a beach and a wildlife biologist measuring plastics in the bellies of dead birds now know where it is coming from. Curtis Ebbesmeyer, an oceanographer quoted in *The Independent,* personifies it: “It moves around like a big animal without a leash. The garbage patch barfs, and you get a beach covered with this confetti of plastic.”


Sopfynd blir flytande konst

Publicerad: 10 april 2008, 17.20. Senast ändrad: 10 april 2008, 17.35

Det svårtydda begreppet resiliens tolkas i en ny utställning på Naturhistoriska riksmuseet. Resultatet: havsdjur byggda av plastsopor, en Volvo klädd i djurtarmar och ett självporträtt där konstnären är utklädd till George W Bush.

BILDSPECIAL Kategorier: Inrikes Utrikes Sport KulturNöje Resor

Bildspecial: Skräpkonst på museum

Finländska konstnären Tuula Närhinen återanvänder ilandflutna föremål i sina verk. Hennes skräpkonst ställs nu ut på Naturhistoriska riksmuseet. Utställningen handlar om samspelet mellan människa och natur.

Foto: Jurek Holzer (2008-04-09)

Bild 1 av 8 Bläddra automatiskt: Av På Fullskärm

Textstorlek: A A A Skriv ut Kommentarer (1 st)

En svag lukt av koinälvor ligger i luften. När SvD kommer till Naturhistoriska riksmuseet håller de tolv konstnärerna i utställningen Changing matters på att iordningställa sina verk. Papperstussar och sopsäckar ligger utspridda över golvet. I ett hörn tittar Jon Brunberg på sin videoprojektion 19 years, medan finska Tuula Närhinen placerar ut plastskulpturer ovanpå de akvarier där de snart ska flyta omkring.

Utställningen är en del av konferensen Resilience 2008 som inleds i Stockholm på måndag. Forskare, politiker och näringslivsrepresentanter från hela världen ska under fyra dagar diskutera ekologi och samhällsutveckling ur ett ”resiliensperspektiv”. I samband med det har Naturhistoriska och Mejan Labs på Konsthögskolan bjudit in konstnärer för att utforska fenomenet resiliens.

Fakta

Changing matters

Utställningen på Naturhistoriska riksmuseet består av verk från tolv konstnärer och konstnärsgrupper. Bland dem finns svenska Ella Ståfve, amerikanske Todd Gilens och belgiske Angelo Vermeulen.

Changing matters visas till och med den 7 september. Vernissagen är ikväll 17.00.

Sopfynd blir flytande konst
http://www.svd.se/kulturnoje/konst/artikel_1118881.svd

“In Sweden I was almost accused of speaking FOR plastic because some of my creatures look beautiful or funny and thus I made the waste (the bad thing) look positive”, Närhinen wrote on her return. “In this work I wanted to speak about the seashore as a place for imagination and fantasy where you can find surprising things and fantasize about foreign countries and strange animals. Plastic is there among other things. I guess a scientist wants to know what actually is going on but does not necessarily judge it? Would a scientist think in this way? Could there possibly be a marine biologist who would like to participate in the work and give scientific names to these creatures?”

So far, she hasn’t found one.

The world's rubbish dump
http://www.independent.co.uk/environment/the-worlds-rubbish-dump-a-garbage-tip-that-stretches-from-hawaii-to-japan-778016.html

Algalita Marine Research Foundation
http://www.algalita.org

Sea of Trash
http://www.nytimes.com/2008/06/22/magazine/22Plastics-t.html

Plague of plastic chokes the seas
http://www.latimes.com/news/local/oceans/la-me-ocean2aug02,1,7826699,full.story