ecologies

POLYTECHNIC #01

ecologies

Polytechnics year long programme 'Ecologies', discussing, adapting, transforming and modifying through; participation, performance, open, f{l}oss and collaborative methods; as live & dead aural, visual and data-led experimental interactions.

Artists, scientists and ecologists undertake investigations into the ecology of material in systems, as information economies, as face-to-face discussions and as the archive through the connected issues of our wider environmental context.

'Ecologies' engenders the fertilisation of information, technology, media and art through methods which reverse engineer and crack open new systems of information, old economies of ownership and revisit the aged and existent yet unseen materialist phenomena of our wireless world.

We got our hands dirty with ancient computing at the Chip Tracker Lab, making sweet pop music whilst re-distributing redundant computing paraphernalia to techno-junkies, curious newbies and eco-pragmatists at the Computer Jumble Sale. We performed the de- and re-coding of a biological soup alongside growing test-tube greens in the Bio Art Lab. We sat and chatted with Hans Steiner on the hacked transmutation of the other and the expected, continuing the thread at Datarama as the open and unexpected. The death of the author prompts the Open Music Archive to step into the otherside, slipping out of time into another time to re-surface at Ghost Trace Stellar with an archive of rich melodies for all-to-use and free-to-use. The Shredder modifies the literal death of the author to a caffeinated version resulting in an edible melangé of shitake, oyster and lions-mane fungi. The infinite cycle of energy now shifts its discourse to the wave particle duality in Spectral Ecologies where the courier avoids tragedy whilst the wave-length is receiving at full prominence.

Taking process, method and nature into account, 'Ecologies' back-dates and downgrades ready to oscillate through a cycle of waste, death and re-invention in the parallel dimension of the present upgrade and update economy of the new and improved.

Sneha Solanki
Polytechnic 2009 - 2010

ecology . economy . environment . nature . systems . method . process . interaction
information . investigation . technology . science . media . data . art . performance
code . aural . visual . archive . participation . collaboration . democracy . open source
f{l}oss . free . value . creative commons . attribution . copyright . copyleft . ownership
duality . proprietory . authorship . re-use . hacking . re-appropriation . reverse engineering
adaptation . transformation . modification . remix . versioning . re-animation . material
materialist . immateriality . matter . live . dead . trash . redundant . out-dated . waste
revival . time . past . nostalgia . re-invention . home-grown . diy . dna. citizen science
hardware . software . wetware . culturing . bio-art . mycology . synthetic biology
test tube food . caffeine . upgrade . update . downgrade . back-date . spectra
wave-length . phenomena . wireless . free-to-use

HARDWARE & BITS: computer jumble sale

Linux boxes. Mice; usb, serial, PS/2. Keyboards; usb, serial, PS/2. Monitors. Digipos till screen. Stylewriter. Lexmark Z515. HP Deskjet 870c. HP Laserjet 4L. Epson LX400 roll printer. Epson TM-T88 receipt printer. Phillips LC44 data projector. Canon IXUS 70. Digital Dream L'espion mini web cam. Microtek Photon 330 flatbed scanner. Cipherlab hand scanner. 3Com 54Mbs USB adapter. 10 base-T Multiport hub. CentreCom 4 port ethernet hub. ADDON arm8100 4 port modem. Netgear cable model RT311.10 port Hub, coax. Artech SB-165 serial port network. 20 port router. Global Village 56k modem. Motorola pager memo express. TV/ FM isolator . AV Phono cable. USB & Firewire leads. Network cables; RJ45, RJ11 & adapters. AUS power 4-ways. Mixer CAM GMX4. Sony cassette walkman WMEX194. Skytronic stereo headphones. PC microphone. Delta series breakout box, M audio. Floppy discs. Parts; CD drives; RAM- PC 100, PC133, floppy drives, sound cards, motherboards & logic boards. Copper wire. Circuit boards. MUIO devices. Seismograph. Rolls Automatic 8mm camera, Eumig mini3 8mm camera. Eumig P88 automatic novo b projector. Aldis, slide projector. Raynox Raynette super 8 & 8mm editor. Electronic Art vision mixer. VGA 4 port splitter. VGA, phono & Scart leads.

**... of old, new, re-used, redundant, obscure & ancient hardware.
In good working order, good for parts, broken, trash, salvageable or a mystery**

BBC Basics, R.B.Coats, Edward Arnold,1984. ZX SPECTRUM micro guide, Century Communications, 1984. Amiga Machine Language, Stefan Dittrich, Abacus, 1991. Concise Guide to MS-DOS Batch Files, Kris Jamsa, Microsoft Press, 1994. DOS 5.0 / 6.0 / 6.2 with Windows 3.1. Harry L. Phillips, Course Technology, 1994. Being Digital. Nicholas Negroponte, Coronet Press, 1995. Just JAVA. Peter van der Linden, Sun Soft Press, 1996. Power Macintosh 4400 series system software. PC- ditto, Euro Version. IBM & Atari ST, Avant-garde Systems,1987. Multisound synthesiser, Commodore 64. The music studio. Techno Sound turbo. Flight Simulator II, SubLOGIC. F-19 Stealth Fighter, Microprose. Tower of Babel, Rainbird. E-Motion, Amiga, U.S.GOLD. Datastorm. Amiga, Visionary Design Technologies INC. Music construction set. Activision home computer Soccer, Amiga 9, MicroProse. Monster, Amiga 4, Rainbow Arts. Power Play: Game of the Gods.Amiga 6. Arcana. RVF Honda, Amiga 7, Micro Style. Shufflepuck, Amiga 8, DoMark. Dungeon Quest, Amiga 2, Gainstar. Kid Gloves, Amiga 5, Millenium. Top Gun, Spectrum. The Hit Squad. Armageddon, zx Spectrum, Ocean. Back to the Future, Spectrum 48/128, Firebird. Space Walk, Spectrum 16/48, Mastertronic. Hong Kong Phooey, Commodore 64, HiTec software. Stainless steel, Amiga 48 -128k, Mikro Gen. Frontier Elite II, Amiga, GameTex. Nintendo; Nintendo Entertainment System (NES) + pistol, Super Nintendo Entertainment System (SNES), Super Mario Bros, Super Mario World, The Simpsons, Duck Hunt, Street Fighter, Tennis, Tetris & NES Cartridges. Gameboy & Gameboy MK1. Adman grandstand color TV game 3600MK II. MicroTen Deluxe colour TV game, Prinztronic. Sinclair ZX Spectrum. Compaq Pressario Notebook MOD 1260. Apple Macintosh; G4 Power Mac OS9, Power Mac 7100/ 66, Power Mac 8600/200+owners manual, Power Mac 4400, LC, LCII, & , Performa 630. Commodore; Amiga A1200, Amiga A600, Amiga 64, Amiga Model 500 boxed, Powerpack floppy disc drive 1541 -II, cassette loader x 2 & keyboard. Atari; ST Mega 2 + keyboard, SM124 Monitor, Atari Mega 1 + keyboard & owners manual. Pentium; III, II & I. Various PC'S.

POLYTECHNICS MEDIA LAB. 2010

GHOST TRACE STELLAR: OUT-OF-COPYRIGHT

The music industry views the public domain as a wasteland of material with no value. The Open Music Archive however see the potential in these collectively owned recordings. By activating this public resource the archive brings together a constellation of neglected melodies and lyrics to re-animate the ghosts in the archive and build a new resource - *free for re-use* in the future.

GHOST TRACE STELLAR

cc by sa 3.0

Bands, musicians, producers and DJs perform covers, versions, remixes or interpretations of the 1920s and 30s **out-of-copyright** *folk, blues, jazz and music hall* from the Open Music Archive

Listen, download & burn the cd cover & tracks from Ghost Trace Stellar at:
http://www.openmusicarchive.org/ghosttracestellar
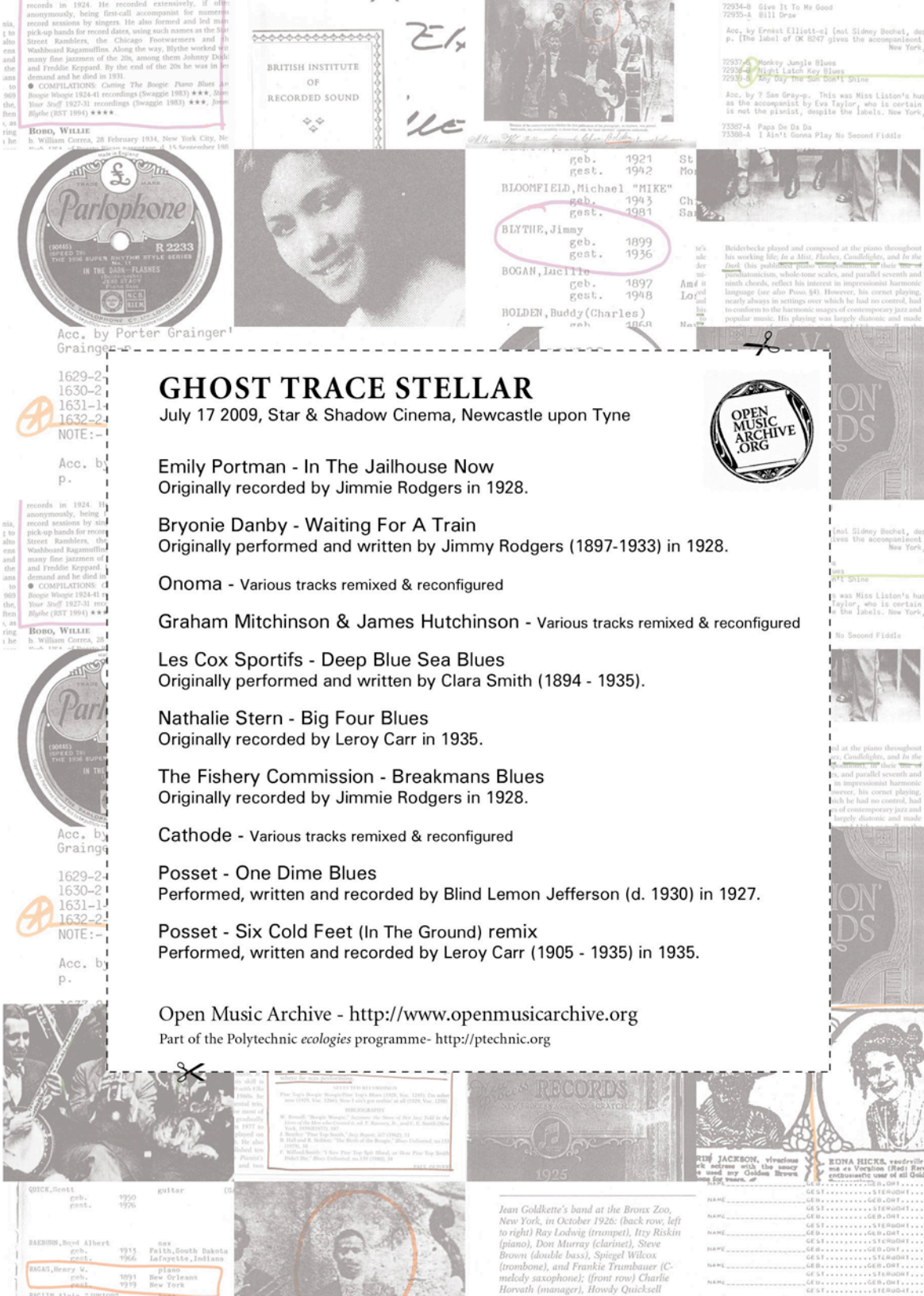
GHOST TRACE STELLAR
July 17 2009, Star & Shadow Cinema, Newcastle upon Tyne

Emily Portman - In The Jailhouse Now
Originally recorded by Jimmie Rodgers in 1928.

Bryonie Danby - Waiting For A Train
Originally performed and written by Jimmy Rodgers (1897-1933) in 1928.

Onoma - Various tracks remixed & reconfigured

Graham Mitchinson & James Hutchinson - Various tracks remixed & reconfigured

Les Cox Sportifs - Deep Blue Sea Blues
Originally performed and written by Clara Smith (1894 - 1935).

Nathalie Stern - Big Four Blues
Originally recorded by Leroy Carr in 1935.

The Fishery Commission - Breakmans Blues
Originally recorded by Jimmie Rodgers in 1928.

Cathode - Various tracks remixed & reconfigured

Posset - One Dime Blues
Performed, written and recorded by Blind Lemon Jefferson (d. 1930) in 1927.

Posset - Six Cold Feet (In The Ground) remix
Performed, written and recorded by Leroy Carr (1905 - 1935) in 1935.

Open Music Archive - http://www.openmusicarchive.org
Part of the Polytechnic *ecologies* programme- http://ptechnic.org

CHIP TRACKER LAB:

returning outdated hardware to useful music making

using protracker- version 3.1 on a amiga 600
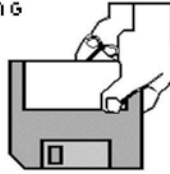
Playback and note entry
- Right amiga key plays current pattern
- Space bar stops playback
- Right alt key plays whole tune
- Shift left and right keys move through patterns
- Return plays current row

- ctrl and number = skip mode (jumps the number)
  i.e. ctrl+4 jumps 4 positions on each note entry

- Press shift to jump to the notes of next track
  shift + tab goes backwards

Pattern data - the six 000000s to the right of the note
- 0 - ignore
- 00 - instrument
- 000 - effects

Effects
- f - speed command
- c - volume
- 3f - note slide
- 0 - arpeggio
  i.e 058 = starting note followed by a note five semi tone up then 8 semitones up
  playing in a fast loop.
- c - cut
- 4 - vibrato following 2 numbers control speed and depth
- a - volume slide 0 up then 0 down
- 1 & 2 note cut effects
- d00 - jumps to row 0 next pattern
  (can be used as a workaround for default 64 step pattern length)

Set-up
- Disk op - df0 default floppy
- Click read dir - refreshes current directory

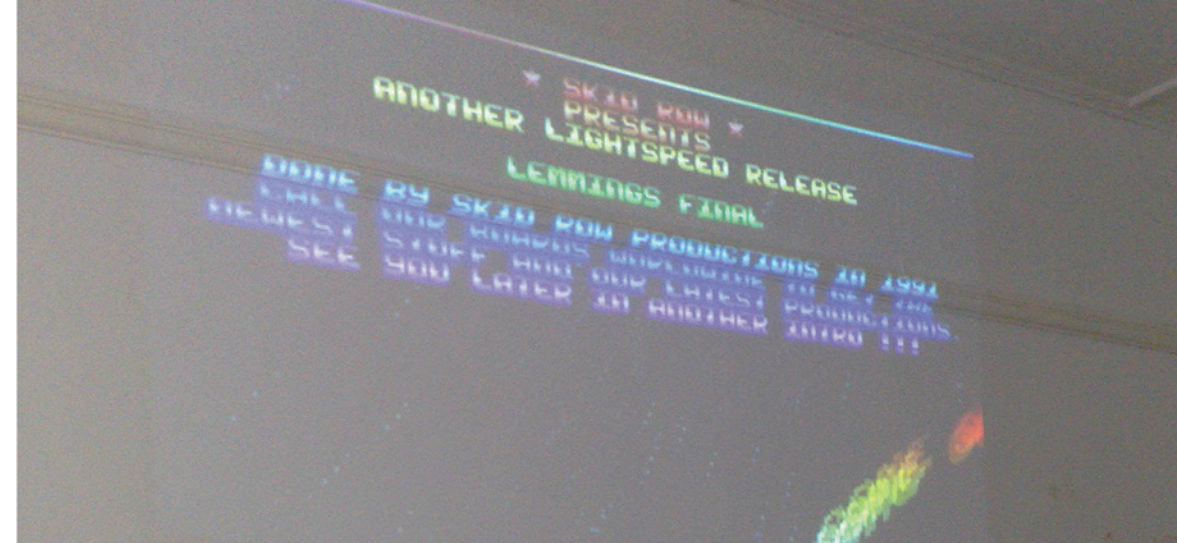## Sampler menu - press alt s or click sampler
- Hit note key to hear it

Notes by D. Smith from the 'Chip tracker lab'.

Brendan Ratliffe
Newcastle Upon Tyne. 2010
http://syphus.net

images: chip tracker lab. D.Smith

SHREDDER: v.02 + v.01
returning outdated software manuals to useful organic matter

V.02: Polytechnic | mycology version

Fruiting oyster mushrooms on a compost of shredded computer manuals and coffee grounds for the Feral Trade Café, AV10 Festival, Newcastle upon Tyne.

Method:

- Collect software manuals and used coffee grounds.
- Shred and mix the manuals with coffee grounds to make a compost
- Sterlise / pasteurise the compost in a pressure cooker
- Mix the compost with mushroom spawn in a substrate bag
- Once the compost or medium becomes white, cut holes in the bag and place in a safe growing environment.

  For this version we used a base of perlite and covered it with a cloche to grow the mushrooms. Inside the cloche we placed an aquarium air-stone in a glass of water to ensure good air exchange.

  Instructions by Dominic Smith

V.01: Geekosystem shredder | original version

Growing vegetables on a compost of shredded proprietary software manuals and coffee grounds.

Method:

- We got a load of proprietary software manuals
- Shredded them
- Mixed them with used coffee grounds from local cafés
- We built a crate and lined it with black plastic
- We then put the mixture into the crate, watered it and left it to rot
- Once rotted down we filled old floppy disk cases with the compost to use as mini-incubators
- We planted silver beet seeds harvested from my garden in the cases
- Once the plantlets were big enough we transfered them to a crate outside

  Instructions by Julian Priest, Geekosystem

Dominic Smith
Newcastle upon Tyne. 2010

v.02 http://ptechnic.org/ecologies/shredder
Dominic Smith. http://dominicsmith.info
consultancy by John Robinson. http://www.micro-science.co.uk
a feral trade commission. http://feraltrade.org

v.01 Geekosystem. http://geekosystem.org/theshredder

image: mycology v.02. growing shitake mushrooms. D. smith.

spectral ecologies: the couriers tragedy

Albion rose from where he laboured at the Mill with Slaves.
Giving himself for the Nations he danc'd the dance of Eternal Death

Then shall the realm of Albion
Come to great confusion

We were transfixed in the lengthening shadows of Albion House.
Having stopped for a few minutes, ostensibly to check and to set up
equipment, it quickly became evident that this was a point of
compression, capable of both containing and revealing the events and
the walk to come; an extraordinary case of time axis manipulation.

Gradually exposed in signs which would themselves impose the direction
for the future, the white lodge, Albion House, looking like a stage-set, a
blank fake or feint, stuccoed and pale with cardboard pediment, clearly
advertises its duplicitous intent as a site of transmission, as a handy
double for a certain Villa Alba, another white villa, a white island radio
station. Just as a small rainbowed or prism disk, protecting the car park,
both promoted the former inhabitant's capabilities (printing in full colour,
rather than black and white) and now signals the core spectral purpose.

As if in phonographed dictation, Whitby-style, of that which was to come,
a gothic novel stegged in grafitti shorthand with pediment now standing
in as a signpost, an arrowed triangle pointing in one direction to be
followed, the triangle replacing the letter A in Albion, the letter a in
tagged death, a dark spewed rabbit hole of exhaust fumes for spiders
(to eat flies and to be eaten by cats). A city of mined lead holes, exposed
underground, leaking through and rising to the surface, a signal block
(data monolith) revealed by the first signs of psychogeophysics; a
Viterbi signal path traced from one point of compression, a tightening
around the Tyne.

MARTIN HOWSE
OUSEBURN, NEWCASTLE UPON TYNE. 2009

HTTP://1010.CO.UK/ORG

00000090   4E 65 74 77 6F 72 6B 43   61 6D 65 72 61 57 69 74
000000A0   68 50 61 6E 54 69 6C 74   2D 30 30 30 32 44 31 30
000000B0   33 33 33 33 33 46 0D 0A 4E   54 53 3A 20 73 73 64 70
000000C0   3A 61 6C 69 76 65 0D 0A   53 45 52 56 45 52 3A 20

NETWORK CAMERAWI
THR ANTILT -0002D1
03333F..N TS: SSDP
:ALIVE.. SERVER:
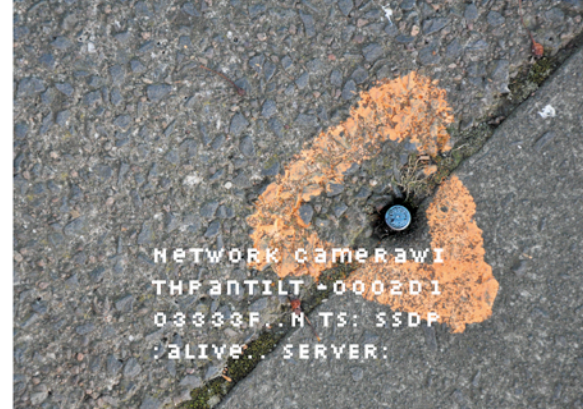
IMAGES: WILL SCHRIMSHAW

spectral ecologies: wave-length

We set out to construct a series of simple physical studies at the crossing point of sound and radio, of light,

pursuing the clue of wave length,

the extent of any supposed wave, the chalked diagram which haunted a workshop space more dominated by experienced phenomena. *Wavelength*, a property of distance, of space, architecture became apparent in the domed observatory, within its size and scale, a structure for observation at a distance, a cold and fogged moon telescope on the last evening.

A wave length walked and staked out in the long, wet grass surrounding the observatory, to be later wired up and activated, amplified and observed, the five of us sharing a single pair of headphones. This lengthy earth antenna was perhaps able to pick up the jerked-rope sparks generated by our car ignition coil apparatus and transmitter, the very first experiment. The contrast with the indoor pickup, a plastic tube of iron powder constructing itself as the most simple receiver when the signal hits, is evident, forming a program for the three day workshop; experiments formulated and assembled in the interior were brought outside the dome for further play.

Simple hand made oscillators were hung from elements of exterior metal structure, a wheelchair ramp, in this experimental garden, resonances of these handled tubes indicating scales and ears. Circuits were introduced outside to tree sap, a squealed singing, and inside to exotic fruits at higher frequencies. A small piece of Iceland spar picked up from the friendly Mill's shop refracted a double play with carriers, voices, the light hitting corn starch smearing Lissajous figures across the walls and ceiling of the room, mirroring the mechanical, pierced light planetarium set up in the back room; a junk shop speaker on a diet of salt and sines vomiting orange-dyed standing waves.

Martin Howse
Mills Observatory, Dundee. 2009

images:
Lindsay Brown & Magnus Lawrie

BIO ART LAB: hardware . software . wetware

DNA from kiwifruit

ingredients:

- Kiwi fruit
- Lysis solution-
    - 12gm / 1 tbsp salt
    - 40ml / 3 tbsp detergent
    - 450ml / 1 pint water
    - 20ml isopropanol or rubbing alcohol
- Bowl of hot water - pre-boiled
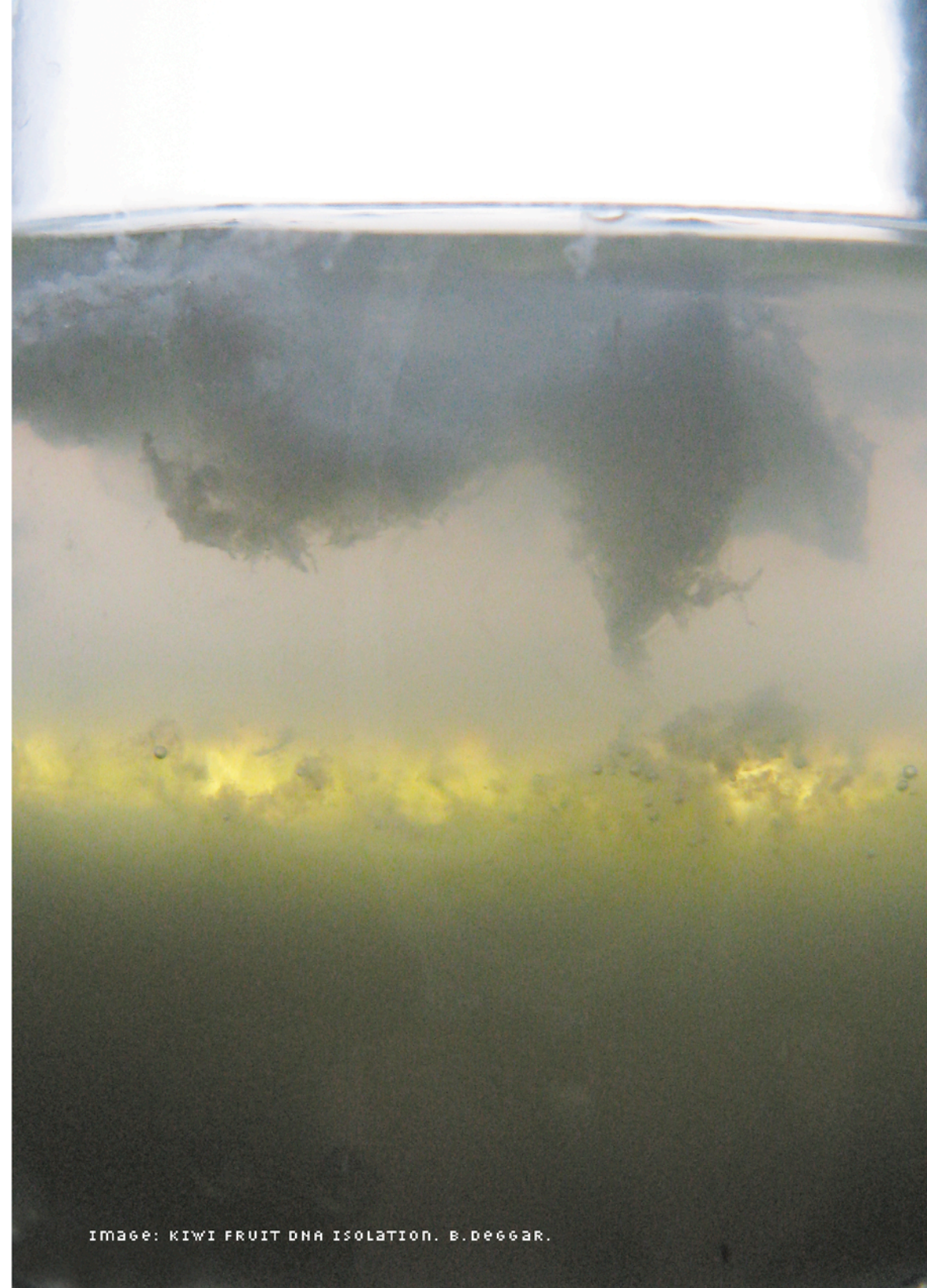
materials & equipment:

- Measuring tool
- Large jug or bowl
- Mixing bowl
- Pyrex bowl
- Sieve
- Knife
- Fork
- Glass jar or shot glass
- Tooth pick
- Gloves (for adding the methanol)

method:

1. Dissolve the salt in 450ml of water, then gently stir in the detergent, allowing minimal foaming.
2. Remove the skin of the kiwi fruit and chop the flesh into small cubes.
3. Place the flesh into a bowl and mash down with a fork for a minute.
4. Add 100ml of the lysis solution to the mashed kiwi fruit.
5. Place and pour hot water in the pyrex bowl. Stand for 15 minutes.
6. Strain the mixture using a sieve and retain the green liquid.
7. Pour 50 ml of the green liquid into a small glass jar or a shot glass.
8. Dribble isopropanol down the edge of the glass to reveal the DNA.

The visible floaty white blob in the solution contains the DNA.
Pick out some of this stringy DNA with a tooth pick.

IMAGE: KIWI FRUIT DNA ISOLATION. B.DEGGAR.

BIO ART LAB: Hardware . Software . Wetware
RECIPE #01B: PLANT TISSUE CULTURING

MATERIALS & EQUIPMENT

- Plant matter for explant cutings
- Micro boxes / test tubes / baby jars
- Cooker / hotplate
- Pressure cooker / autoclave - for sterilising
- Pan & spoons
- Air Purifier with hepa filters.
- Sterile transfer chamber / cabinet / fishtank
- Clean sterilse surface - tile, sterilised paper ...
- Scalpel / scissors
- Forceps / tweezers
- Burner - use ethanol for burning
- Alcohol - ethanol at 70%
- Hand / skin disinfectant
- Bleach - 1/4 dilution
- Detergent / washing up liquid
- pH indicator tape: pH balance 5.0 - 6.0

MEDIA FOR PLANT TISSUE CULTURING

Culturing media
- Sugar- 100 grams for carbon energy
- Water soluble fertiliser - 200ml: 1/2 tablespoon of all purpose 10:10:10 - N.P.K in 1L of water
- Inositol tablet (500 mg)- 1/2 tablet
- Vitamin tablet with thiamine - 1/2 tablet

  or use Murashige & Skoog salts (M&S)

- Agar flakes - 100 grams
- Distilled water - 400ml
- Sterile water

Rooting and Multiplication media
Use the above media + variations of the below
- Coconut milk - 125ml
- Malt - 5ml
- Citric acid
- Bicarbonate of soda
- Orange juice
  These are growth regulators and encourage cell enlargement and division.

STAGE 1 : CULTURING

a. Prep all areas to make sterile as possible.
- Sterilise the cabinet by spraying alcohol (70 % ethanol), allow to dry.
- Sterlise all tools needed for culturing by dipping with alcohol or spraying then flaming.
- Sterilise water in baby jars or microbox in the pressure cooker.
- Sterlise seeds and plant material by washing in a diluted domestic bleach solution- *1/4 bleach to 3/4 water + 1 drop detergent.* Wash for 10 - 20 minutes, agitate frequently then wash in sterilised water 2 - 3 times.

b. Mix the basic media recipe over heat and then add fertiliser.

c. Pour about 2cm in depth into microboxes or the baby jars. Cover or close the vessels and and process in a pressure cooker for 15 mins once pressure is reached.

d. Carefully place one small sterile piece of plant stem or shoot with tweezers into the agar solution in the baby jars or microboxes. Work on one side of the cabinet. Make sure not to touch the top and sides. Close lids and keep in a warm and light place for about 4 weeks.

STAGE 2 : MULTIPLICATION

The explants can be multiplied once grown. This can take place every 4 weeks and the plants can be multiplied indefinitely.

a. Prepare culturing media with the addition of malt and coconut milk. Work under sterile conditions.

b. Take cuttings from the growing explants and transfer to new microbox or baby jar.

STAGE 3 : ROOTING

a. Once there are enough shoots transfer to a rooting medium. Add an extra 100ml of coconut milk with 1/2 teaspoon of malt to the basic media. Ensure that the pH of medium is always between 5 and 6 pH. Adjust pH if necessary with acid e.g. citric acid or bicarbonate soda. Roots will show between 2 - 4 weeks.

STAGE 4 : POTTING

a. Once roots have grown to 2cm, transfer to a potting mix. Keep in a warm covered area and out of direct sunlight.

DATARAMA: #05 - #10

1. **Tom Scott**
   Performance of 'Mob: a near-future science fiction story' based on flash mobs and social networking.
   http://www.tomscott.com/

2. & 9. **Joseph Scully**
   Global news data visualisation demonstration.
   http://dm.ncl.ac.uk/joescully

3. & 4. **Peter and Katy Merrington**
   Show the sewing machine which does all the talking.
   http://www.thecompalgalaxie.co.uk/

5. **Alistair McDonald**
   Demo of a real-time metro train simulator.
   http://www.agm.me.uk/metrosim/

6. & 7. **Cathal Garvey**
   Talk on DIY biology and a home-made 'Dremmel-fuge'. A centrifuge constructed from a dremmel and a 3-d printed attachment.
   http://letters.cunningprojects.com/

8. **Open Music Archive**
   Ben White and Eileen Simpson make a remote call for participation and play music from their archive.
   http://www.openmusicarchive.org/

10. **Mitch Altman**
    Talks about his electronic engineered device 'TV-B-Gone', a universal remote control which switches of most televisions.
    http://www.cornfieldelectronics.com/

11. **Dominic Smith**
    Introduction to the Shredder project.
    http://ptechnic.org/ecologies/shredder/index.html

12. **Steve Noble**
    Introduction to a new a culture blog- kyeo.tv- 'keep your eyes open'.
    http://www.kyeo.tv

13. & 14. **Pete Barnett and Martin Guy**
    Demo of the 'Sim.One' or 'Simplemachines One', an open hardware project which aims to provide a €99 flexible computing interface.
    http://simplemachines.it | http://martinwguy.co.uk/

ECOLOGIES: BIOGRAPHIES

POLYTECHNIC is an independent artists led organisation based in Newcastle upon Tyne with an emphasis on hands-on, open and distributed approaches to working with art & technology. Our current group consists of;

Will Schrimshaw is currently a PhD candidate at Culture Lab, Newcastle University, UK. Built upon circuits, earth and code, Wills work focuses on issues of environmental interaction and sonorous individuation, often realized through technological means in installation and improvised performance settings.
  • http://willschrimshaw.net

Dominic Smith is the co- founder of Polytechnic and is an artist, hacker and musician. Dominics practice extends to music, sound, installation and live performance. Currently Dominic is currently researching open source methodology in new media art practice as a PhD candidate with CRUMB, Sunderland University, UK.
  • http://dominicsmith.info

Sneha Solanki is the co-founder of Polytechnic and works as an artist, educator and producer. Sneha's work aims to interrogate technological determinism in science and technology by methods which is often originate from process-based environments; kitchen, code and culture. Current research includes hypothetical and synthetic biology.
• http://electronicartist.net/solanki

Kate Sweeney is an artist and social educator in lab and workshop environments. Kates work is interested in the relationship between process and production whilst looking into the translation of interchanging information between the existing and disappearing.

  • http:/ptechnic.org

Brian Degger is an art and science researcher with an education in biotechnology. Brian is interested in how the boundaries of art, technology and science can be made permeable through 'speculative' research. This is based on six strands of enquiry: marine conservation; diy kits; micro-climates; biomemetics and robotics; mind-machines and advanced grafting.
  • http://transitlab.org | http://labinabox.co.uk

Martin Howse is an artist, programmer, theorist and film- maker, performing using custom open software and hardware modules for data/code processing and generation. Initiated by Martin in 2006, (Berlin, DE) xxxxx is an independent research centre which examines life and live coding, autodestructive strategy and crash-falsified revelation.
  • http://www.1010.co.uk/org/

The **Open Music Archive** was established in 2005 as a collaborative project situated in the current discourse of authorship, ownership and distribution by artists Eileen Simpson and Ben White. The Open Music Archive reanimates creative works held by the commons and in the public domain by porting them to Free/Libre and Open Source software models.
  • http://openmusicarchive.org

Brendan Ratliff aka Syphus started playing piano, violin and Commodore Amiga in 1989, at the age of 6. After growing up with the demoscene, trackers and chipmusic Brendan started to release his tracker music in chipdisks and demos and now tours internationally as Syphus and is also part of the demo groups 'Up Rough' and 'BDSE'.
  • http://syphus.net

THANKS & CREDITS

Bio.art. lab: hardware . software . wetware
Brian Degger - http://transitlab.org | http://labinabox.co.uk
Sneha Solanki - http://electronicartist.net/solanki
The Star and Shadow Cinema - http://www.starandshadow.org.uk

Chip tracker lab
Brendan Ratliff - http://syphus.net

Datarama
All participants, performers and show-offs.
Jonny Tull, Tyneside Cinema, Newcastle upon Tyne - http://www.tynecine.co.uk

Hardware & bits: computer jumble sale
Clive Jackson - http://sad-mac.co.uk
Marek Gabrysch - http://www.loonmusic.co.uk

Ghost Trace Stellar
Ben White & Eileen Simpson, Open Music Archive - http://openmusicarchive.org
Kate Sweeney - http://ptechnic.org
Lindsay Duncanson - http://productofboy.net
Dave De La Hay - http://canopynewmusic.co.uk
Craig Wilson, Urban & Eastern - http://www.urbanandeastern.com
The Star and Shadow Cinema and volunteers - http://www.starandshadow.org.uk
All the Ghost Trace Stellar artists, performers and musicians.

Shredder
Dominic Smith - http://dominicsmith.info
John Robinson, Applied Micro Science - http://www.micro-science.co.uk
Kate Rich, Feral Trade - http://www.feraltrade.org
Rebecca Shatwell, AV10 Festival - http://avfestival.co.uk
Julian Priest, Adam Hyde & David Merritt, Geekosystem - http://geekosystem.org/TheShredder

Spectral Ecologies
Martin Howse - http://www.1010.co.uk/org
Will Schrimshaw - http://willschrimshaw.net
Lindsay Brown - http://lindsaybrown.wordpress.com
Donna Holford-Lovell, Hannah Maclure Centre, Dundee - http://hannahmaclurecentre.abertay.ac.uk
Dundee City Council, Dundee - http://www.dundeecity.gov.uk
Mills Observatory, Dundee - http://www.dundeecity.gov.uk/mills

Tea with Hans Steiner
Hans Steiner - http://at.or.at/hans
Jamie Allen - http://heavyside.net

with special thanks
Amanda Ritson - Arts Council England North East
Ed Carter - http://modular.org.uk