Thanks!

Please let me know about the strange sounds you create in strange places!

You can download a pdf of this book at
http://robray.net/strangesoundsstrangeplaces/

Also visit http://StrangeSoundsStrangePlaces.tumblr.com

Special thanks to:
folly, Cornerhouse and FACT Liverpool!

Ruth McCullough, Lisa Burke. Gabby, Jo Williams
and all the Abandon Normal Devices, Manchester crew!

Katie Horgan, Forestry Commission

Christopher Wilkinson, Bury Council

Cornerhouse chefs and baristas for the fuel!

Jen Hofer and Deborah Stratman.

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# Welcome!

This booklet is divided into three sections.

**OUTDOOR INTERACTIVITY:** Booby Traps and 4'33" as Sources of Inspiration.

**GOING OFF THE GRID. SOLAR AND WIND POWER:** Examining at a 5-watt solar setup.

**GRID? WHAT GRID? THE OUTDOORS AS CREATIVE COLLABORATOR:** Making a tin-can resonator.

Always remember water, a snack, and proper clothing.
Never trample, destroy, or litter.

**Everywhere is a great place to challenge people's expectations.**



Let your clear acrylic dry fully. Now at the bottom of the can tie a short piece of string between the two holes you punched. Then attach a longer piece to the center of this string. This way when you pull it taut it will form a "triangle" holding your can steady.

You know have a can ready to spray with clear acrylic varnish! Before you do that you will want to poke a hole in each opposing side of the bottom of the can. This is where our string will thread through. Once that is done you're ready to spray the paper with clear acrylic. You will want to do this at least twice, with about 30 minutes of drying time in between coats. Each time you spray the can make sure you are fully coating all the paper. This acrylic helps turn the paper into more of a "drum-head" type thickness and rigidity.



## OUTDOOR INTERACTIVITY: Booby Traps and 4'33'' as Sources of Inspiration.

When making interactive art outside its important to think about your **audience** — your *unwitting* audience. They're probably walking the dog, on their way to work, or on the phone. **Sound** can be an effective tool in making the "normal" a lot less normal. Sound provokes the imagination in really great ways and is less likely to be explained away as an advertisement by those encountering your work.

Electronic transmission of sound, though, requires **electricity** — a precious resource in the middle of a park, on the bank of a river or in an abandoned building.

**Batteries** are often your only option and are problematic. They never last as long as you like; they are heavy; they are expensive and they aren't so good for the environment. Interactive triggering of your electronics when someone is nearby can save that precious energy in your batteries.

**Monster in the water.**
**Troll under the bridge.**
**Hoodlum in the alley.**
**Thing in the swamp.**
**Axe Murderer in the forest.**



Now place the can on the paper so it is centered around your wooden disc. We will be folding the edges of our paper around the end of the can. I use a rubber band to help hold the paper in place while I wrap a piece of string around the end of the can. Then I take a piece of string about 3 feet and wrap it tightly around the lip of the can. This will hold our paper onto the can. Use a bit of glue around the edge to keep the string adhered to the paper. Once this is dry use scissors to trim the extra paper from around the can.

Now place the can on the paper so it is centered around your wooden disc. We will be folding the edges of our paper around the end of the can. I use a rubber band to help hold the paper in place while I wrap a piece of string around the end of the can. Then I take a piece of string about 3 feet and wrap it tightly around the lip of the can. This will hold our paper onto the can. Use a bit of glue around the edge to keep the string adhered to the paper.



**Okay. This is where Boobytraps come in.** I'll wait here a bit while you put on your combat boots, shave your head, tape a large knife to your shin and get real paranoid... We're not to blow anything up of course, but we're going to think about boobytraps as a way surprise, amaze and trigger your work only when someone is nearby to experience it!

The U.S. Army FM 5-31 Field Manual, creatively titled "BOOBY-TRAPS" can be an incredibly weird and rich source of inspiration when thinking about interactive electronics. (http://www.scribd.com/doc/13302519/Booby-Traps-FM-531) It is, tragically, a booklet severely pre-occupied with maiming and killing people but if you can block that aspect out — try substituting the word "explosives" with the phrase "rainbows"— the candy bar detonator diagram can really get you thinking about interactivity and surprise in a new way!

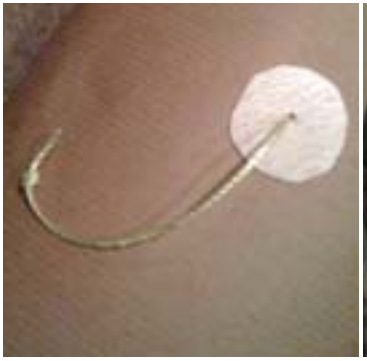
If you're already experienced with interactive electronics, I'll suggest skimming forward, Consider, though, what would happen if you took all of your current interactive electronics and threw them in the washing machine, then took them out and put them in the oven for 8 hours. Then smeared them with bacon grease and fed them to a **Rottweiler**. This is some of the ways outdoor electronics projects will differ from your current work.

**Nobody's happy when the forest makes sounds it's not supposed to make.**

**Well, maybe some people.**



Now place the can on the paper so it is centered around your wooden disc. We will be folding the edges of our paper around the end of the can. I use a rubber band to help hold the paper in place while I wrap a piece of string around the end of the can.



Cut a piece of brown craft-type paper to about 2 inches larger in diameter than your can. We need to reinforce where the string attaches to the paper. So we do this by gluing a small piece of thin wood to the center where our string will feed through. I use very thin balsa wood, the thickness of a small coin, and cut it with about the size of a 1.5" circle. Once it is dry use a nail to poke a hole through the center of the wood and paper. Now string the end of your long your string (about 40 feet) through the back of the paper, knot it and put a bit of glue on the knot to hold it.



**Improvisation. One thing Rambo and your grandmother have in common.**



**Find the biggest can you can find.** Often cans of crushed tomatoes, wet dog food, and bulk coffee work well. The bigger the better! I've always wanted to try one of those great big cookie tins you see around the winter holidays. If you try it e-mail me and let me know how it goes!

OK. Now remove both the top and the bottom. Sometimes an "old school" can opener works best at removing the bottom lid.

**Woo hoo!** Your string on the right should be **a minimum of 40 feet**. Some people use fishing line. Nylon is best. Your string on the left can be any length. Let's get started!



Interactive sound, for instance can be cantankerous within the comforts of the "white cube" and gets even nastier when outdoors. The example looks pretty straightforward. Trigger a sound when someone walks by. A commercially built MP3 player immediately comes to mind. The little things are a technological wonder. It seems like we could use one to make an interactive outdoor sound art piece in an afternoon's time.

**Our Needs vs. What a Little MP3 Player Can Do.**
Small. Yep!
Battery Powered. Yep!
Plays Digital Audio Files.  Yep!
Rechargeable. Yep!*
Loud-ish. Nope!
Can be Triggered Remotely. Nope!
Weatherproof. Nope!

Well. We're smart! It still seems like we can get it going in a days time. At least that's what I thought when I was trying to make a motion-control-activated-solar-panel-charged iPod Shuffle.

**“If a tree falls in the forest and no one hears it, did it really fall?”**

**— George Berkeley in “A Treatise Concerning the Principles of Human Knowledge.”**

**Yes. I’m just conserving the batteries in my audio amp.**



## GRID? WHAT GRID? THE OUTDOORS AS CREATIVE COLLABORATOR:
Making a tin-can resonator.

Sometimes the best source of power is one that requires no conversion to electricity at all! A tin can resonator can turn a steady breeze into a creepy theremin-like drone.

**The wonderous wind can be a cantankerous beast!** Sometimes it blows, other times it doesn’t. Sometimes it blows too much, other times too little. But if you’re willing to trade precision and reliability for simplicity and majesty, a wind powered tin-can resonator is the thing for you!

**There is no perfect tin can resonator.** Wind direction and strength will drastically effect your results. Your best bet is to hang many tin can resonators in many different configurations and see what happens! **Best results come from lots of steady wind**, so you’re likely to have success in a tunnel, alley, or window of an abandoned building.

## Finish.



**First let's look at the rechargeable requirement.** I put "Yep!" by this one, but with an asterisk because it depends on what kind of MP3 player you have. If you're like me, you trying to go cheap. I had an iPod Shuffle and I loved the small form factor and long battery life (about 8 hours). After spending a full day probing the Shuffle's four wire charging/listening port I figured out that Apple actually requires the charging source to be completely disconnected before playing anything. So if you'd like your playback device to be able to charge from a solar panel connected to a large battery pack while it's playing don't use a iPod Shuffle. Check out the Sansa Clip, or if you're in the UK the Sweex MP312 Clipz is a pretty nice player and available at Maplin for about 15GBP. They both will playback while charging via USB and 12volt -> 5volt USB cigarette lighter-style adapters are cheap so a 12volt solar panel will work! Before going out and buying one of these, though, read on to see why they could also not be the droids you're looking for.

LOUD also makes things hard. Most portable MP3 players don't have enough amplification to make the addition of unamplified speakers worth much. So if you want to be heard you'll need to get an audio amplifier. There's a few paths to take. The first path could be a little battery powered audio amp such as the very nice sounding stereo Roland Microcube (around $150USD)

**A nice hidden low drone will freak out even the toughest looking person.**



**Wind turbines can be quite expensive, noisy and extremely dangerous!** Most wind turbines start around $500USD. The spinning blades and large amperages the turbines generate can easily cause you a lot of harm. Make sure if you are experimenting with wind power you install your setup in a safe way. Wind turbines should be mounted well out of reach. **They can severely maim or even amputate!** Your charge controllers and batteries should also be properly wired, fused, and kept away from the general public.

## Change the day.



or a small battery powered mono amp used by guitar players. Another option is trolling thrift stores for battery-powered boomboxes that have an auxiliary 1/8" mini-jack or RCA input you can use to plug your MP3 player into. Both of these solutions, though, share a flaw. The batteries don't charge while inside the amp or boombox. This means you must go out and swap out the batteries before they fail. This is a giant pain. The silver lining for these amps is the type of transformer they use. The transformer is typically an external black "brick" or "wall-wart" transformer. This means you have a jack on the back of the speakers that accepts DC power! You can use a solar panel and large external battery to keep your amp rocking out for quite some time! Just make sure you are using the correct voltage and amperage. A spare set of computer speakers lying around that use a "brick" or "wall-wart" transformer can also be used.

There are many small guitar amps and amplified speakers that have 110v/220v power inputs on the back. This internally housed transformer drastically limits their utility out in the field. You would have to use a 12-volt deep cycle battery or a pair of 6-volt "golf cart" batteries then connect an inverter so the speaker internals can switch back to DC. You can imagine all this conversion is incredibly inefficient and really increases the weight and expense of something that all seemed easy.

**How can you make someone's wait to cross the street totally memorable?**



When **installing your solar panel** always remember to mount it at a 45 degree angle facing southwest or wherever you get the most "full sun." Whichever is most prominent day-to-day.
Also consider mounting your solar panel onto a fence post or some other type of post high up in the air where there is less risk of vandalism and fewer shadows. Also remember to put a fuse on the positive wire running from your panel to the charge controller. This way your charge controller and battery will stay safe if something happens to your solar panel.

With a 5 watt panel you are most likely going to want to use a small 12 volt Nicad-type rechargable battery. You could use something bigger like a deep cycle marine battery but your little 5 watt solar panel would take forever to charge a battery that big! If you are running electronics off this battery that require other voltages (ex: 1.5, 3, 5, 6, or 9 volts) you will need to use an adapter between the battery and your electronics. Cigarette lighter style adapters work quite well for this.

**Wind power setups** are very similar except they tend to be used in more permanent situations where the wind generator can be affixed in a high and safe location.

## Change the day.



REMOTE TRIGGERING is also a hard problem to solve. The first problem is your typical MP3 button is expecting a FINGER, not some other bit of electronics. You could use a solenoid for simple button presses, but not for sliders. But this is extremely "**kludgey**" (link: http://en.wikipedia.org/wiki/Kludge) and not recommended.

To get around this button problem we are forced to either do some cosmetic and electronic surgery on a typical MP3 player or look at some other types of audio players.

We also have to consider the interactions between all the components of our system — best done with an example. Let's say you want a motion detector to detect someone walking by and trigger the play button on your MP3 player and then 10 minutes later you want audio to stop and wait for the next person to walk by.

**A good way to think about all the steps that are needed to do this is to imagine what you would do if you were hiding in a washing machine box performing all the tasks the electronics should be doing.**

**Laughter....**
**from the trees.**



**The most important piece in this setup is the charge controller**. The charge controller regulates the voltage and amperage flow from the panel to the battery. It keeps your battery from getting too many volts. Charge controllers also work like an automatic shut-off valve on a gas pump. Without a charge controller you would inevitably over-charge your battery. Not good!

**Now is not the time to short the battery leads with the tip of your screwdriver.**



**We'll break it out into steps.**

**1.** Person walks by.
**2.** Motion sensor goes "Oh! Oh! Got one!" and throws its relay to start a timer.
**3.** Timer starts and ignores any other motion sensor activities for 10 minutes - as it is already running.
**4.** Audio amp power button is turned on or power is applied in order to automatically turn it on (this will depend on the type of audio amp you have.).
**5.** MP3 player is turned on or power is applied to it in order to automatically turn it on (this will depend on the type of MP3 player you have.).
**6.** "Play" is pressed on the MP3 player.
**7.** 10 minute timer expires and must
**8.** Trigger "Stop" and/or "Off" on the MP3 player
**9.** Trigger "Off" on the audio amp
**10.** Timer then becomes re-sensitive to input from motion sensor so it can all start over again.

This is a lot of steps!

**It is only a matter of time until your art will be stolen or peed on.**



## GOING OFF THE GRID. SOLAR AND WIND POWER:
Examining at a 5 watt Solar Setup.

To the artist familiar with working indoors, solar and wind power can feel like **an extra-ordinary source of variability and difficulty**. It is! But you're an electronic artist! If you wanted the easy route you surely would of picked a different way to express yourself! What solar and wind technologies take away in expense and frustration they give back in flexibility and self-sufficiency. Your work can now exist in so many more places! Untethered! Mountaintops! Lakes! Sewers! Abandoned Buildings!

**A Brief Tour of a 5-watt Solar Setup.**
A small 5 watt solar setup is great for charging mp3 players, intermittent use audio amplifiers, and intermittent use lighting units.

In a small setup like this you'll have everything you'd have in a larger setup, a solar panel, a small fuse, a charge controller and a battery.

**Self-expression is a bloodsport.**



In order to get around the “no fingers” problem and to address all the complexity of the system it becomes easier to use an audio player that is purpose-built for interactivity. There’s a few worth looking at.

If your audio needs are simple there is an Arduino-based solution called a waveshield. (http://www.ladyada.net/make/waveshield/). If you are already own and can do a few things with an Arduino, the waveshield kit will only set you back $22USD. If this is your first Arduino project you’ll want to also get a “starter kit” which is about $65USD (http://www.adafruit.com/index.php?main_page=product_info&cPath=17&products_id=68).

If you require high quality mp3 playback, track selection, etc., you can interface an arduino with a Daisy MP3 Kit (http://makezine.com/daisy/). The Daisy MP3 is an intermediate-level project and fairly expensive at $115USD.

There is also a pre-built timer/player combo that will play one audio clip for up to 7 minutes. It’s called a Viking DVA-2WA. The audio quality is not great, but it is OK for voice. It is commonly used for things like hold messages and music. It costs about $120USD. (http://www.vikingelectronics.com)

**How can you turn the involuntary act of hearing into the intentional act of listening?**



Things can get complicated fast, but they are also all surmountable! If you have any questions I'm happy to answer them. Just shoot me an email at the address listed in the back of this booklet!