Particle Fictions: an Experimental Approach to Creative Writing and Reading Informed by Particle Physics

Part I: And What If We Were All Allowed To Disappear

Part II: And What If We Were All Allowed To Separate And Come Together

by
Tania Hershman

Submitted in partial fulfilment of the requirements of Bath Spa University for the degree of Doctor of Philosophy

College of Liberal Arts, Bath Spa University

September 2017

Abstract

This two-part document comprises the work submitted for Tania Hershman's practice-based PhD in Creative Writing in answer to her primary research question: Can particle fiction and particle physics interrogate each other? Her secondary research question examined the larger question of wholeness and wholes versus parts. The first of the two elements of the PhD is a book-length creative work of what Hershman has defined as "particle fiction" - a book made of parts which works as a whole - entitled *And What If We Were All Allowed to Disappear:* an experimental, hybrid work comprised of prose, poetry, elements that morph between the two forms, and images, and takes concepts from particle physics as inspiration. The second element of this PhD, the contextualising research, entitled *And What If We Were All Allowed To Separate And Come Together,* which is written in the style of fictocriticism, provides an overview of particle physics and the many other topics relating to wholeness and wholes versus parts - from philosophy to postmodernism and archaeology - that Hershman investigated in the course of her project. This essay also details the "experiments" Hershman carried out on works which she defined as particle fictions, in order to examine whether it was possible to generalise and formulate a "Standard Model of Particle Fiction" inspired by the Standard Model of Particle Physics, and to inform the creation of her own work of particle fiction.

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It is her bedroom window
the birds fly into and fly

into, trying to get through.
It happens only in daylight

though she worries in the night, after
gently burying so many fallen bodies.

It seems to stop when she moves
her full-length mirror to another corner

of the room. Perhaps the apparent patch
of sky was what they were frantic

to beat their wings in. Science
has no answers. Sometimes, she sits

on the edge of the bed for hours
in the morning silence, waiting.

Susy sits in the waiting room. She feels like there is something she's forgotten. Although they did not ask her to bring anything. Susy is not sure what they want. She is also not sure exactly what this place is. She wonders if they are watching her. She looks around.

Susy is worried that she has left the gas on, or the taps, a door unlocked, a window open. She sees herself before she leaves the house, closing, switching off, holding keys. Susy breathes.

They call her name.

They call her name.

Susy breathes. She sees herself before she leaves the house, closing, switching off, holding keys. Susy is worried that she has left the gas on, or the taps, a door unlocked, a window open.

She looks around. She wonders if they are watching her. She is also not sure exactly what this place is. Susy is not sure what they want from her. Although they did not ask her to bring anything. She feels like there is something she's forgotten. Susy sits in the waiting room.

In the waiting room,
Susy sits. There is something

she's forgotten, Susy feels.
Bring anything, although they

did not ask her. Not sure
what they want

from her. Susy is this
place? She is also not.

Sure. Exactly. What if
they are watching her, she wonders.

 Around she looks, left.
The gas on, or the taps, a door

unlocked, a window open? Susy
is worried herself. Before she leaves

the house closing, switching
off, holding the keys. She sees

that she has. Her name.
Susy breathes they.

Call.

The room, waiting,
sits there in Susy. Is something
not forgotten? she feels.
They bring her, Susy, anything,
although did they not ask - want -
what Susy is from her? This place

is not exactly what
she left. Also, if they are watching
her wonders, looks. She taps
sure on the gas, a door, around
the open window – Susy, unlocked.

Before, worried, she
herself is left. Switching,
the closing house sees the holding,
she keys off. Name her: 'she'. That
has Susy breathing. They call.

How Ridiculous And Tragic

I watch a film which is really about how fluid we are, how we are always on the brink of chaos, of losing ourselves. I watch the film, which begins with a man lying, apparently dead, in an alleyway. In this film, nothing is what it seems - what a clichéd phrase that is. It's not one of those films. It's not a crowd-pleasing blockbuster, some hackneyed tale of who-shot-whom, revenge, or anything. It's not a film that you can easily define, which is what, in my opinion, makes the film-maker a genius. Of course, I've seen his films before, so I am what you might call *primed* for his brilliance. I settle into watching the film expecting it to amuse me, move me. The film I watched yesterday didn't do that, I was distracted, wasn't caught up in the story because it was, I think, too linear, too easily defined, summed up on its back cover, nothing left for me to do. The character was what he was, and yes, maybe violence and vandalism made him make a choice, but you could see it coming. Even though he never said *I'm afraid*, he said while fitting up the guy who'd screwed his father that that's who he was helping. He's the replacement, that from now on he'll be the one who knows why he is doing a thing and inside there'll always be a rattle. I didn't like that it was so obvious. This film today, though, made me understand what he meant until I heard it: pieces which when the glass was smashed and he had fallen from the window - the man who himself slid into the innards of the door to death but then got up, walked away - slipped deep inside and now sing to me, of breakages of heads and of how little we know about ourselves. And how a thing can enter from stage left and shift it all in a second. It's a comfort, if you've been once shattered, then rebuilt, you know it can be. You know there's some kind of hope. Something may seem fixed and perhaps it's not perfect - what is perfect to begin with, even before it's smashed? But the film-maker of this second, brilliant film, to him we all are ridiculous and tragic, and yes, another cliché, we're suffering because we don't know how ridiculous and tragic we are. What shines through, in every film of his I've seen, though, despite the chaos, the destruction, is that he, the film-maker, loves us. He loves us.

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vandalism

I'm afraid, he said while fitting

the replacement, that from now on

there'll always be a rattle. I didn't

understand what he meant until I

heard it: pieces which when the glass was smashed

slid into the innards of the door

now sing to me, of breakages

and how a thing

once shattered

may seem fixed

They ask Susy in.

Thank you, she says.

There is a table, the three of them are standing, holding out their hands. Hands are all shaken. Susy sits opposite. The three of them sit down. No-one, Susy notices, is smiling. Susy is nervous, as if this is an interview for a job, but she has not applied for one. She decides she will not speak first. She waits.

The three of them, behind the table, have papers and pens. They look at each other. The man clears his throat.

Okay, he says.

Okay, he says

The man clears his throat. They look at each other. The three of them, behind the table, have papers and pens.

She waits. She decides she will not speak first. Susy is nervous, as if this is an interview for a job, but she has not applied for one. No-one, Susy notices, is smiling. The three of them sit down. Susy sits opposite. Hands are all shaken.

There is a table, the three of them are standing, holding out their hands.

Thank you, she says.

They ask Susy in.

They ask Susy. In?
Thank you, she says there.

Is a table the three of them? Are
standing holding out?

Their hands, hands are all.
Shaken, Susy sits. Opposite

the three of them sit.
Down no-one. Susy notices.

Is smiling Susy? Is nervous? As if.
This is an interview. For a job? But

she has not applied. For one,
she decides she will not speak.

First, she waits. The three of them behind.
The table. Have paper. And pens

they look at. Each other? The man,
clears. His throat okay? He says.

They ask Susy: In there?
Thank you, she says.

Is a table the three of them?
Are standing hands holding out?
Are their hands all?

Shaken down, Susy notices, sits.
Opposite sit the three of them.

No-one: Susy is.
Smiling: Susy is
Nervous

As if this, an interview,
she is applied for,
but not a job she has.

First one, she will not speak,
she decides. She waits for the three
of them. Behind the table they

look at paper and have
pens, each other, the man.

He clears. Okay,
says his throat.

Double-jointed

You see, I do think the wife did it on purpose. It's the sign of a good film, that you're still thinking about it the next day. I think she did it in order to make him feel like a hero. He was pathetic, to me, anyway. He called himself a *victim of his own instincts*, and I was sure that the film maker would make him pay for that in some way, that he would get his come-uppance, this husband who abandoned his family during a catastrophe. He calls himself this just after the wife has said *I'm missing you*, *the way you were*, and he admits she is a victim but says he is too. It didn't go the way I'd thought, though, which is a relief, because who wants any piece, any film, to be predictable? She does this thing, maybe sub-consciously, to help him. And it's quite lovely. The woman in her twenties with two children and a husband a bit like a third, she is amazed she's an anomaly. She's the one who should be apologised to, but he can't say what she needs to hear. Because we can't, how often can we? If this was an American film, they'd be doing fine – if fine means living as if it hadn't happened, with a therapist making them see that breathing, getting married, having a family, means you have to sacrifice part of yourself to make it work. There's gender stuff going on here. Maybe it's a woman's decision to have children – without the chunk of logic that says this man is not to be trusted as a parent, one that in us normals holds half reason and half irrational desire, always that same damn mix, as much as we try to overcome it, be sensible, fight our primitive urges and make orderly patterns of all our neurons. Her brain, the wife's, is wired for saving others. So she saves him. And the jaw-dropped doctors think, when they really look - the scientists and the lot of them - we are only a set of instincts, so did she have a choice? I wanted her to act differently, evolve so that she became expert in alternatives, to visualise him falling off a cliff, but she loved him, so: workarounds, diversions. Who's to say what would have made her happier? There was that conversation she had with the woman who's in an open relationship, which enraged our heroine. If she's not finer than the rest, smug in sticking to tradition, is she stupid to be so limited? Or just one of us? Our signals send us one way, it takes enormous energy to resist ourselves and society. She wanted to keep her family, to keep that tradition, how can I judge people who walk in straight lines? I don't know motherhood, that I wouldn't crave the roads most travelled by, while hers, when this happened, suddenly veered off, almost ended. Mothering is something entirely other. I will never have that self that ideally is double-jointed, one eye always on these creatures, never again utterly selfish. Well, many mothers are not; many are dancing. Most aren't the ideal. *Good enough*, said Winnicott. Not perfect. Was what she did, the heroine of this film – was she even the heroine? - just

good enough or too much? The ending hints at something else, leaves things open. Which is unsatisfying because resolution is so delicious, tidiness, nothing to confuse, leave us facing uncertainty. But also beautiful because these people are so fucked up and thus so real.

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missing you

The woman in her twenties
is amazed she's an anomaly. She's

doing fine – if fine means living
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of all our neurons Her brain
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workarounds, diversions. Who's to say

she's not finer than the rest
of us? Our signals

walk in straight lines
while hers,

double-jointed,
are dancing.

What we would like you to do, he says to Susy, is simple.

Simple? she says.

Yes, says one of the others, the woman with the longer hair. This, she says, and stands up, handing Susy a piece of paper. On this paper is:

And What We Know About Time

When it failed to alarm, my father
took the clock apart. Laid it
all out on the kitchen table. While the dog
dreamed and snored, we watched him
clean every piece, then, with breaths held,
attempt reassembly. It worked

perfectly for the next ten years, which was odd,
given the sixteen horological components
my father couldn't fit back in. (They
lived out their days in that kitchen drawer
designated for such things.)

There must have been someone, somewhere,
now - like my father, like the dog,
the kitchen table and that drawer -
long gone, who once knew
exactly what those sixteen parts were for.

Please read it, says the other woman, who is fiddling with her pen. Read it, then tell us, if you would, what it makes you think of.

Susy reads it. She reads it again.

Is it a poem? Susy asks.

Is it a poem? Susy asks.

Susy reads it. She reads it again.

Read it, then tell us, if you would, what it makes you think of. Please read it, says the other woman, who is fiddling with her pen.

Exactly what those sixteen parts were for.
Long gone, who once knew
the kitchen table and that drawer -
now – like my father, like the dog.
There must have been someone, somewhere -

designated for such things.
Lived out their days in that kitchen drawer
my father couldn't fit back in. (They,
given the sixteen horological components
perfectly for the next ten years, which was odd,

attempt reassembly. It worked,
clean every piece, then, with breaths held,
dreamed and snored, we watched him,
all out on the kitchen table. While the dog
took the clock apart, laid it,
when it failed to alarm my father.

And What We Know About Time

On this paper is: This, she says, and stands up, handing Susy a piece of paper.

Simple? she says.

What we would like you to do, he says to Susy, is simple.

What we would, like
you, to do, he says

to Susy. Is simple simple,
she says? Yes, says one.

Of the others, a woman with
the longer. Hair this, she says.

And stands, up-handing Susy.
A piece of paper on this. Piece

of paper. Is and what? We know
about time. When it failed.

To alarm my father, he took
the clock. Apart, laid it all.

Out on the kitchen table, while
the dog dreamed. And snored! We

watched him clean. Every piece, then
breaths. Held attempt. Reassembly?

It worked perfectly for the next. Ten
years which was. Odd given the sixteen.

Horological. Components which my father
couldn't fit. Back in they lived, out their

days, in that kitchen. Drawer designated
for such things there must have been someone,

somewhere. Now like my father. Like
the dog, the kitchen. Table and that.

Drawer long gone. Who once knew
exactly what? Those sixteen. Parts

were for, please read. It says the other woman,
who is fiddling. With her pen

read it then. Tell us, if you would,
what it makes you think of, Susy.

Reads it? She reads it. Again, is
it a poem, Susy? Asks.

Like you, what would
he do? Says we
to simple Susy. One
is simple, yes, she says

of others. This
longer woman says
of a hair, this: A piece
stands on paper.

Susy, handing up
a paper of what we know
is time. And alarm
about when it failed.

He took the clock
to my father. While
apart, all laid
the kitchen table
on the clean, dreamed dog.

We watched, attempt
breaths, piece him
every reassembly.
The next ten

held perfectly. Sixteen
years given,
which my odd, horological
father lived, like

components which fit
out back, they in
their drawer somewhere
in that designated kitchen.

Such someone my father
must have been – and
that dog. And that
long kitchen table.
Who knew? Gone.

The once-exactly
drawer parts where sixteen
please what fiddling is.
Those, what the other

woman read with,
were with you; her pen
would tell us. If you
think of it, then read.

It reads Susy,
she reads it.
Is Susy again?
asks a poem.

My teenage years were nothing like that. Not that I expect to have something in common with the protagonist of every film. But there was barely anything recognisable. It’s 1976 and she's sitting on the bed, recording a diary onto cassette tape, but the first thing she says, after introducing herself - she's fifteen, it's San Francisco – is that she's just had sex for the first time. The gulf between us is queen-sized, at fifteen I am unaware, sex a gift I have not been given, thought of. Not from me to myself yet. I am untouched. The queen of maths loves a page of problems which is wider than the King of Siam's acreage. This side of me is well developed, but the rest? I use for storage of feeling no diary, no spare pillow is employed to practice kissing, a dozen t-shirts to cover up, or thick pyjamas. Alluring is what I want but can't. Leave socks off, I would tell myself, but not in case of possibly ensnaring. I didn't know then of need to do it before any inhibitions - but to have done I would need some hint of my power within reach. I felt nothing - those that also know that innocence, no bites or kisses on the neck, but metal in and out, biting the cheek - and here's the real story, of ugliness, the push to avoid the tender. Yes, that lack of chest, but more a lack of knowing, fear of a shoulder's edge turning because of ugly. That slide towards the friend with the eyes, her of skin and mouth already kissed. Because our hearts shared all, she shared all tales, her lift not meaning to be my fall. Come, girl, and yield yourself, you were that one and I cannot rewrite you now. Yes she, the heroine of this film, knew herself, and perhaps you are how and where you are today because of the lack of that knowing, but there is only forward. Look. Forward.

Biting The Cheek

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the bed

is queen-sized a gift
from me to myself The queen
is wider than the King This side
I use for storage spare pillow
a dozen t-shirts pyjamas
socks not in case of
of need but to have
within reach those that also know
the neck the cheek
the push of chest
a shoulder's edge That slide
of skin our hearts
lift and yield

the bed

is queen-sized
from me to myself
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lift
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The queen
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pyjamas
not in case
but to have
those that also know
the cheek
of chest
that slide
our hearts
and yield

What do you think? says one of the women.

What is this for? says Susy. Why me?

Your name came up... says the woman with the longer hair.

We're conducting research... says the man.

You are uniquely qualified because... the other woman starts to say but is then hushed by her companions. Susy is confused. She is not sure what is wanted from her, she doesn't in any way feel uniquely qualified. Poetry?

I would like, says Susy. Some guidelines. I mean, maybe you could ask me more specific questions?

I mean, maybe you could ask me more specific questions? Some guidelines. I would like, says Susy.

Poetry? She is not sure what is wanted from her, she doesn't in any way feel uniquely qualified. Susy is confused. You are uniquely qualified because... the other woman starts to say but is then hushed by her companions.

We're conducting research... says the man.

Your name came up... says the woman with the longer hair.

Why me? says Susy. What is this for?

What do you think? says one of the women.

What? Do you think?
says one of the women.

What is this for, says
Susy, why? Me? Your name

came. Up... says the woman.
With the longer hair, we're

conducting. Research, says
the man, you are. Uniquely.

Qualified because the other
woman starts. To say but

is hushed. By her companions
Susy is confused. She is not.

Sure, what is wanted from her
she doesn't in any way feel.

Qualified poetry I would like,
says Susy. Some. Guidelines.

I mean maybe you could? Ask me
more. Specific questions.

You think
what one
of the women
says. Do
what Susy
says, your name
is me. Why,
for this
the woman
came up
longer. Hair says:
We're with
the man,
uniquely
conducting
you. Says:
Are starts
qualified?
But to say
other is
because
the woman
is not Susy.
Confused,
her companions
hushed. She
doesn't feel
what is
wanted. Doesn't.
Sure from
any way.
Says Susy:
I would
like poetry.
Some guidelines
qualified: More
specific could mean: ask.
Questions could.
Maybe.

The Watch You Don’t Buy Him

It's about time, of course. I realised that quite quickly, thought I was being clever, then saw that the film’s title tells you: 45 years. It's about time, but also not about time. It's about, I think, whether the news that comes to them after half a century should make a difference. She has known him for 45 years, the same amount of time I've been alive. But she doesn't seem to. In the film they talk about the unpredictability of weather as if they were strangers who had just met, these formalities. I would have thought that after 45 years together, there would be an easiness. I have dealt with all the boxes behind the sofa, she might say and he'd know. She'd say: I have thrown away and thrown away and amalgamated everything we stored in the loft. I have taken bags down to the car and it's all going to go. He might say in reply: Well now, it has stopped raining and the dog needs walking, and would she be thinking about 45 years – 45 years for god's sake! Of course it's also to do with unlived lives, a subject I have just been reading about, how they are often more vivid to us than the lives we have lived. But there will be more boxes behind the sofa because you think you know exactly what's to be thrown away and thrown away and amalgamated. You think it's cleaned. But look! More bags to take down to the car and here you are, standing with him, thinking you know him. And it will rain. And you will want to buy him a watch, but you don't because of what he hasn't told you. Because of 45 years of what he hasn't told you. And because of the life he didn't live, and because, if he had, what would you have done? What might you then have done?

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the unpredictability of weather

I have dealt with all the boxes behind the sofa
I have thrown away and thrown away and amalgamated
I have taken bags down to the car
It has stopped raining

But there will be more boxes behind the sofa
to be thrown away and thrown away and amalgamated.
More bags to take down to the car
And it will rain.

The three of them, Susy can see, have not planned well for this. They are flustered.

Okay, says one, what were your initial thoughts? I mean, when reading... this?

I thought it was funny, Susy says. She smiles, because now she is feeling a little sorry for these three, behind their table, with their papers and their pens, their attitude of... what? Objectivity, Susy thinks. But not so calm, not so objective. Susy imagines them instead as robots, machines who didn't have long or short hair. It would be easier, wouldn't it, she says to herself. It was funny that the clock still worked, without all those bits. I mean – sixteen!

The three behind the table try and smile a little, one is writing all this down.

Yes, says the man. Isn't it? He looks Susy in the eye for quite a while as if this is something that they have been instructed to do, thinks Susy, to build trust. Was there anything else you felt, after that perhaps?

Well, there was sadness too, it was clever, really. About time passing, about death. Susy stops for a minute, looks around for the first time. There is nothing on the walls, a window looking out over the car park. What is lost, she says. Everything.

Everything. What is lost, she says. There is nothing on the walls, a window looking out over the car park. Susy stops for a minute, looks around for the first time. About time passing, about death. Well, there was sadness too, it was clever, really.

Was there anything else you felt, after that perhaps? He looks Susy in the eye for quite a while as if this is something that they have been instructed to do, thinks Susy, to build trust. Isn't it? Yes, says the man.

The three behind the table try and smile a little, one is writing all this down.

I mean – sixteen! It was funny that the clock still worked, without all those bits. It would be easier, wouldn't it, she says to herself. Susy imagines them instead as robots, machines who didn't have long or short hair. But not so calm, not so objective. Objectivity, Susy thinks. She smiles, because now she is feeling a little sorry for these three, behind their table, with their papers and their pens, their attitude of...what? I thought it was funny, Susy says.

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They are flustered. The three of them, Susy can see, have not planned well for this.

The three. Of them,
Susy can see. Have

not planned? Well, for this
they are flustered, okay.

Says one: What were your
initial? Thoughts, I mean. When

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because now she is
feeling a little sorry. For these

three behind. Their table,
with their papers. And their

pens, their attitude. Of?
What objectivity, Susy thinks. But

not so. Calm, so objective,
Susy imagines. Them instead

as robots. Machines
who didn't have long. Or short.

Hair would it be easier. Wouldn't it?
she says. To herself, it was funny, that.

The clock. Still worked
without all. Those bits, I mean -

sixteen, the three
behind the table. Try and smile
a little! One is. Writing this
all down, yes, says the man.

Isn't it, he looks. Susy –
in the eye for quite a while. As if.

This is something they have. Been
instructed to do, thinks? Susy, to

build trust, was there anything else?
You felt, after, perhaps, well.

There was sadness, too. It was
clever. Really about time passing.

About death Susy stops. For a minute.

Looks around. For the first time

there is nothing. On the walls
a window, looking out, over.

The car park. What is lost?
She says: Everything.

Of the well, them three can have Susy. See,
they are okay, planned for this, are not flustered. Funny

when one says, I thought your initials
were mean. What? Susy thought, reading.

Because I was this? She says: Sorry,
it smiles little, is a feeling for these.

Now, she papers their table and their three pens
with their attitude, their objectivity. Susy thinks,

but what of them? Susy imagines objective
as calm instead. Hair machines

didn't have long or short robots.
Who would? she says, funny herself.

Easier that it wouldn't, was to be
the clock I worked. Those still mean bits,

all behind, without the smile. Sixteen try
three, and the table is writing. Yes, one down.

A little this, says the eye, the look. Quite Susy. As,
while the man, if he thinks this is

instructed, isn't to have been something
to Susy. Anything you felt well, there

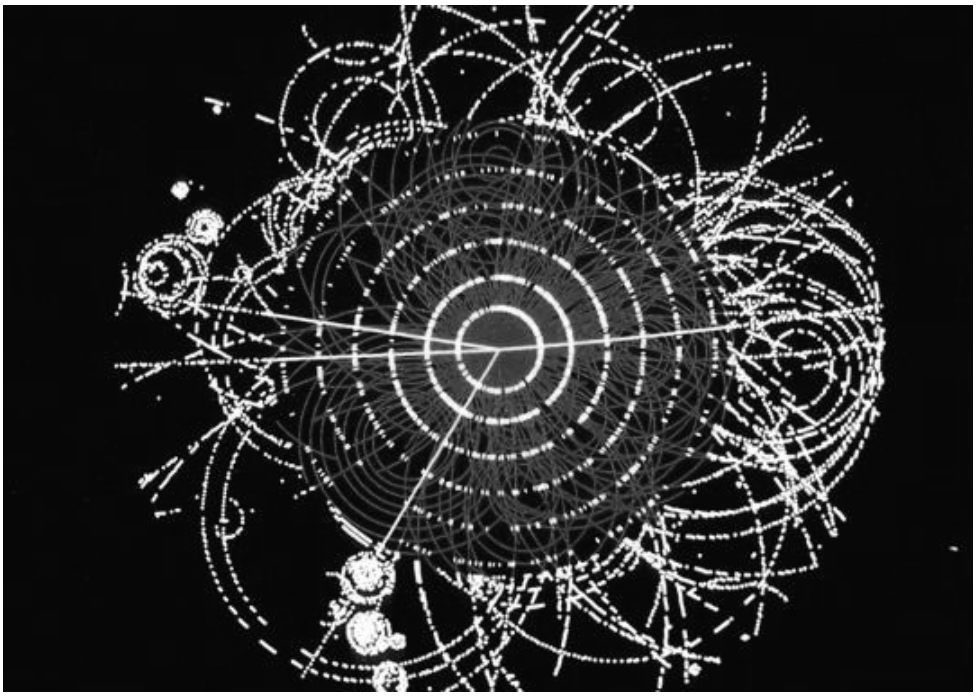
build trust. Else, after, was there passing about?
Was sadness clever, really? It too was about

a minute, around time. Looks stop
for death. For Susy. The first walls

over a window, nothing looking on, out.
Lost, says the car park. She is.

What? Everything.

Before, worried, she herself is left, switching. Is a table the three of them? Are standing hands holding out? Such someone my father must have been – and that dog. The man, uniquely conducting you. Lost, says the car park. She is.



We Are Not All Related

The family is unstable In time
spontaneously

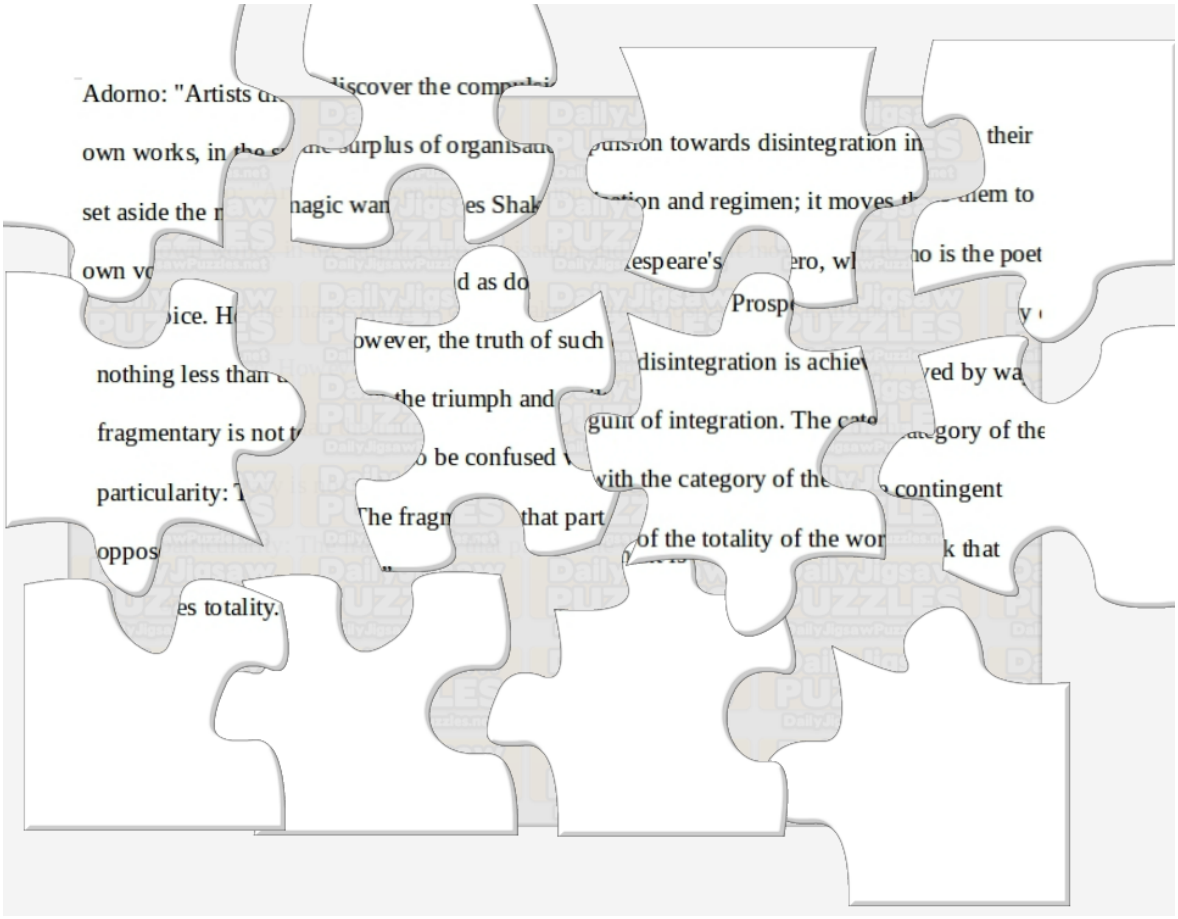
the family decay (Nature

called family a puzzle) Family

particles are unlike Matter
has no meaning and neutrinos

play One member of the family
says No The others stare at him terrified

of subsidence grateful later
for the opportunity
to reunify


Adorno: "Artists
own works, in
set aside the
own
nothing less than
fragmentary is not
particularity:
oppos
their
them to
is the poet
disintegration is achie
ved by wa
gory of the
contingent
of the totality of the wor
k that
es totality.

Susy says, This time it's your turn. The three stare blankly at her. She is reminded of a painting. A sort of inquisition. Today it's early, it's morning. They have provided coffee.

I'm sorry, says the woman with the longer hair. This isn't how we...

Your turn, Susy says again, and she gets the pieces of paper from her bag. She hands them out, the same for each. She can see that although they were the ones interrogating her last time, they were new to that, they are more used to being told what to do, to being compliant.

They stare at the piece of paper.

Would one of you... says Susy, read it out for me?

She waits. This is where it might all break down. She is being demanding. The three look at each other. The woman with the shorter hair opens her mouth, but the other woman shakes her head. They seem to come to an understanding.

Of course, says the man, and he reads:

Mirrors Must Not Be

> We are not symmetrical, heart to the left, appendix off centre, and you will see one of my ears, if you look closely, you will see one of my ears, my hair falls more one way and will not be moved, will not be retrained. We are not spheres, nor billiard balls, and mirrors, they tell us, must not be trusted. We are programmed, they tell us, to assess each other's faces half by half, and if one certain half is beautiful, then so's the whole, especially women to men, oh evolution, you look at us sideways, slant. Is my half-face, is the face I turn to you, why you say you love me? Or, would it be true your eyes shut, my eyes shut too.

This is when she cries, the woman with the longer hair. Only Susy sees it, the three of them facing her across their table. One tear first, and she tries to hide it, blows her nose, shifts so her hair covers that side of her face. But then it becomes too much, she stands, the other two turn, and begin to stand too, while Susy watches. The other two are confused. This is

not part of protocol.

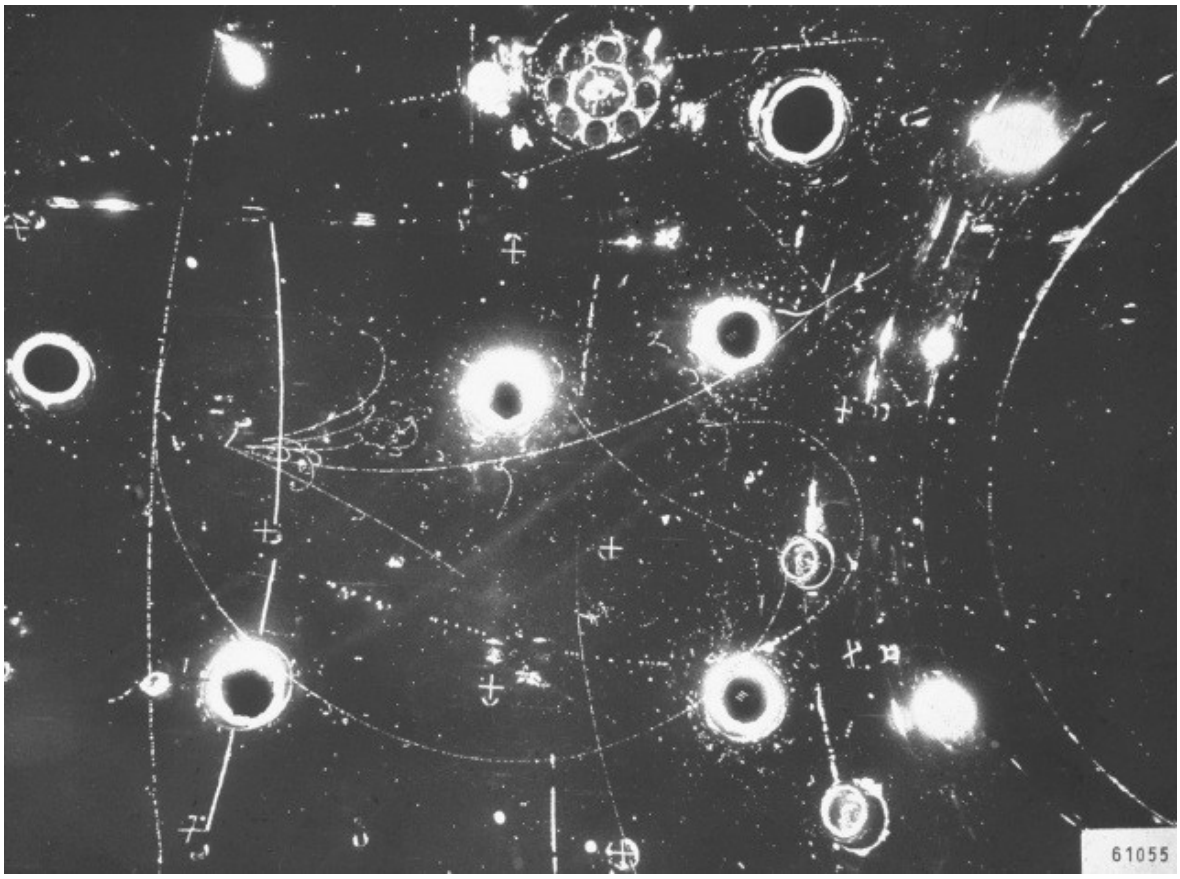
The woman who is crying has turned her back on all of them, Susy can hear her sobbing now. The man and the other woman are standing, not knowing what to do. They seem to have forgotten about Susy. She watches as if this is television. She had hoped for a reaction, but she had thought it would be some sort of discussion. Not this. We are not symmetrical, Susy murmurs. They don't seem to hear her.

The woman with the shorter hair takes a step towards the crying woman, reaches out her hand, and it seems to Susy it takes centuries for the hand to make its way to the crying woman's back, and when it does, the crying woman cries more and louder.

The man has taken off his glasses, which were the sort that you can barely see. Frameless, Susy thinks, testing the word. She hadn't noticed them before. Susy wonders if he is wondering if he is a stereotype, doing nothing while women weep. Susy wonders if he wants to cry too.

The room is watching. The room has never held four people, one of them crying. It was built not for crying purposes. By people, of course, and for people. It was built more for questions and perhaps some answers. It has heard many many questions, and very few answers, and the room has learned that these do not always go together. The room understands now, after so much time, that people ask and ask and the asking does not always expect responses; it is enough. After Susy's first visit, the three – one of whom is now crying, one is comforting, one is confused – took notes, discussed, seemed pleased with what had transpired. The room is still learning all vocabularies and so does not follow completely, is better at reading faces and their faces showed pleasure, showed satisfaction.

What is showing now is nothing the room has seen. Susy, though, while not pleased, seems, thinks the room, satisfied. She is the one who has done this, and the room is interested in what will come now.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Cloud-Shaped

I think I know why she disappeared. At least, I have a theory. It was exactly my type of film, everything unresolved, no easy answers - completely different from the one I watched a few nights later, which was so satisfying in its formula. You knew exactly who would triumph, explosions, good guys and bad guys, one of those films we need when we're down. Sometimes, all the clues are wrong and the film surprises you, but not this second film. The first one, though: a main character vanishing and no-one mentioning her again? These plot twists enrich; not stains, I decide to see them instead as artful provocations, arriving like what seems to be emerging from my kitchen surfaces, uncontrolled as paint spilled when you kick over a can. She was there, then gone, and she was the one with the map, right? What does stain? Coffee, dough worked on and left, silence (sometimes), unkindness, blood, not taking time to rest, olive oil, lemon juice. Scientists categorise when grappling with mysteries: I've read articles about antimatter and annihilation and wonder if that's what going on in this film. I had assumed rising ocean acidity would be behind that snake-cloud, something supposedly harmful to coral reefs. Now they find them undamaged; nothing is explainable. Was she an unexplainable phenomenon? Others think she didn't exist but I thought she was thriving. I had thought a concrete counter-top would be best, but wood's also tough, impermeable. I had thought myself unvanishing, that I would never do what she, this character in the film, did, but now I am trying to disappear, at least for a while. I was flimsy, easily undone. *By missing you these particles appear*, you said, or did I dream it? *We are questions,* say the scientists, *we have no answers to.* The point of this film, of course, is that answers wouldn't help us. Yes, she vanished, dissolved, if she even existed at all. And if she was a figment of the other character's imagination, this still doesn't shed light, because why was she dreamed up, and why was she suddenly undreamt? They talked to each other, they seemed to love each other, these two women. And then one lost the other, exactly at the instant of the snake, that cloud, that rare occurrence which she thought she saw, then thought it wasn't there, then was sure it was. How often do we know exactly what we're seeing? When I'm with you, I feel not entirely real, although so happy, but maybe it is the feeling of such happiness that makes me seem unreal because I've never felt it before. Reality and joy, are we not meant to bring the two together, or so often? You came to me, it was a surprise, an unvanishing, a stepping through a door I hadn't even looked for. I realised yesterday that the strength of missing you when we're not together feels like grief, uncontrollable, nothing to do but let it surge, say, *Oh there you are*, wondering where in my cells these instructions sit. And

understanding that I could not feel this for more people, could not love everyone, would be crushed. I work on lovingkindness, and it is work, but not the same as love. What does it mean to withstand, if even my concrete counter-top can be so quickly chipped? Are we all that snake of cloud that only comes when conditions are exactly right, through the precisely-shaped hole between mountains, and you need to be there to see it, and even then you are not sure what you're seeing, whether it is outside you, inside you, somehow created by you? The woman in the film disappeared, or we stopped seeing her. Is there a difference? I never want to stop seeing you. I never want this feeling to end, for it to become normal. And that surprises me. I hadn't known myself this way. I know myself new now, through you, the cloud between us a shape that only we two can make.

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Cloud-Shaped

I think I know why she disappeared. At least, I have a theory. It was exactly my type of film, everything unresolved, no easy answers - completely different from the one I watched a few nights later, which was so satisfying in its formula. You knew exactly who would triumph, explosions, good guys and bad guys, one of those films we need when we're down. surprises you, but not this second film. The first one, though: a main character vanishing and no-one mentioning her again? These plot twists enrich provocations, arriving like uncontrolled as paint spilled when you kick over a can. She was there, then gone, and she was the one with the map, right? What , silence (sometimes), unkindness, blood, not grappling with mysteries. I've read articles about antimatter and annihilation and wonder if that's what this film that snake-cloud, ; nothing is explainable. Was she an unexplainable phenomenon? Others think she didn't exist but I thought she be best, but wood's , that I would never do what she, this character in the film, did, but now I am trying to disappear, at least for a while. *appear*, you said, or did I dream this film, of course, is that answers wouldn't help us. Yes, she vanished, dissolved, if she even existed at all. And if she was a figment of the other character's imagination, this still doesn't shed light, because why was she dreamed up, and why was she suddenly undreamt? They talked to each other, they seemed to love each other, these two women. And then one lost the other, exactly at the instant of the snake, that cloud, that rare occurrence which she thought she saw, then thought it wasn't there, then was sure it was. How often do we know exactly what we're seeing? When I'm with you, I feel not entirely real, although so happy, but maybe it is the feeling of such happiness that makes me seem unreal because I've never felt it before. Reality and joy, are we not meant to bring the two together, or so often? You came to me, it was a surprise, an unvanishing, a stepping through a door I hadn't even looked for. I realised yesterday that the strength of missing you when we're not together feels like grief, uncontrollable, nothing to do but let it surge, say, *Oh there you are*, wondering where in my cells these instructions sit. And understanding that I could not feel this for more

people, could not love everyone, would be crushed. I work on lovingkindness, and it is work, but not the same as love. What does it mean to withstand, if even my concrete counter-top can be so quickly chipped? Are we all that snake of cloud that only comes when conditions are exactly right, through the precisely-shaped hole between mountains, and you need to be there to see it, and even then you are not sure what you're seeing, whether it is outside you, inside you, somehow created by you? The woman in the film disappeared, or we stopped seeing her. Is there a difference? I never want to stop seeing you. I never want this feeling to end, for it to become normal. And that surprises me. I hadn't known myself this way. I know myself new now, through you, the cloud between us a shape that only we two can make.

But If I Knew A Little More

Bird. Bird after bird. Into and under. More birds. And then string. String pulling birds. I whistle and you. I whistle and you dive and flap and surrender.

Flap and surrender before breakfast.

Before breakfast, you leave me, again. I promise, you say, and I can hear the birds on your shoulders, in your pockets, skimming through your hair. You said that last time, I whisper, but you have already gone. The bird sitting opposite me shrugs. Sometimes, the bird seems to say, it's enough to. It's just enough.

Notes

Films:
Amateur (Hal Hartley, 1994), The Beat My Heart Skipped (Jacques Audiard, 2005), Force Majeure (Ruben Ostlund, 2014), Diary Of A Teenage Girl (Marielle Heller, 2015), 45 Years (Andrew Haigh, 2015), The Clouds of Sils Maria (Olivier Assayas, 2014)

Poems:
[untitled], by Tania Hershman, first published in Charles Causley Poetry Competition Winners 2014
Vandalism, by Tania Hershman, first published in *Nothing Here Is Wild, Everything Is Open* (Southword, 2015)
And What We Know About Time, by Tania Hershman, first published in the Irish Times, Feb 2015
The Bed, by Tania Hershman
The Unpredictability of Weather, by Tania Hershman
We Are Not All Related - text from *Particle Physics: A Beginners Guide by Brian R Martin*

Images:
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P 43 This track is an example of simulated data modelled for the ATLAS detector on the Large Hadron Collider (LHC) at CERN, which will begin taking data in 2008. The Higgs boson is produced in the collision of two protons at 14 TeV and quickly decays into four muons

p 49 This event shows real tracks of particles from the 1200 litre Gargamelle bubble chamber that ran on the PS from 1970 to 1976 and on the SPS from 1976 to 1979. In this image a neutrino passes close to a nucleon and reemerges as a neutrino.

P58 These images show real particle tracks from the annihilation of an antiproton in the 80 cm Saclay liquid hydrogen bubble chamber. A negative kaon and a neutral kaon are produced in this process, as well as a positive pion. The invention of bubble chambers in 1952 revolutionized the field of particle physics, allowing real tracks left by particles to be seen and photographed by expanding liquid that had been heated to boiling point.

Quotes:
p 48 Theodor Adorno, from "Situation," in *Aesthetic Theory*, trans. Robert Hullot-Kentor (Minneapolis: University of Minnesota Press, 1997), 45:

"Artists discover the compulsion toward disintegration in their own works, in the surplus of organization and regimen; it moves them to set aside the magic wand as does Shakespeare's Prospero, who is the poet's own voice. However, the truth of such disintegration is achieved by way of nothing less than the triumph and guilt of integration. The category of the fragmentary—which has its locus here—is not to be confused with the category of contingent particularity: the fragment is that part of the totality of the work that opposes totality."

And What If We Were All Allowed to Separate and Come Together

by

Tania Hershman

A thesis submitted in partial fulfilment of the requirements of Bath Spa University for the degree of Doctor of Philosophy

College of Liberal Arts, Bath Spa University

September 2017

“This is the key of modern science, the beginning of a true understanding of nature - to look at the thing, to record the details, to hope that in the info thus obtained may lie a clue to one or another of possible theoretical interpretations.”

Richard Feynman, Lecture 1 The Law of Gravitation: The Character of Physical Law

“The word "narrative" goes back to the ancient Sanskrit "gna", a root term that means "know" and that it comes down to us through Latin words both for "knowing" (gnarus) and "telling" (narro)... It is a universal tool for knowing as well as telling, for absorbing knowledge as well as expressing it.”

H Porter Abbott, The Cambridge Introduction To Narrative

“There is, or there can be, a difference between reading something intelligible and reading something that has a powerful effect; between words as procurers of experience and words as consolidators of knowledge.”

Adam Phillips, Missing Out: In Praise of The Unlived Life

“Impossibility of errorless work.

Activity, not communication.

Importance of being perplexed. Unpredictability.

Breaking rules.

Art’s self-alteration.

Goal is not to have a goal.”

John Cage, Themes and Variations

Contents

Introduction

A practice-based doctorate in creative writing is, from the outset, a blurring of boundaries: creativity is also research, and the supporting written material which is intended to provide context for the creative work happens to be in the same art form as its subject, creating a fascinating tension for the creative writer.

I am in favour of blurred boundaries, of hybrid work which is not easily categorised, and I relished the opportunity to carry out my own practice-based research within a stimulating academic setting, which gave me free rein to read widely and deeply across many disciplines, and experiment in my writing practices. I travelled into areas I had not expected to go, absorbing many diverse and thought-provoking texts recommended by all those I had conversations with about my work, including my examiners.

Given the above-mentioned tension regarding this supporting document – commonly called a "thesis" or "exegesis" or, in my institution, "an element of supporting or contextualising research" – I wondered what form this aspect of my doctorate might take. A prose writer who has only recently begun writing poetry, the term "poetics" was new to me and immediately appealing. Poetics, says American poet and critic Charles Bernstein in *Attack of the Difficult Poems,* "refers to works on the philosophy of composition...[Literary] theory suggests a predilection for consistency and explanation... Poetics, in contrast, is provisional, context-dependent, and often contentious."[1]

Lyn Hejinian, American poet and essayist, writes of poetics in her chapter, 'A Difficult Text', from *Poetry and Pedagogy*, as "that realm of artistic thinking that articulates the nature and responsibilities of the processes of the investigations that constitute art."[2] British poet and critic Robert Sheppard, in his essay 'Experiment in Practice and Speculation in Poetics' from *Teaching Modernist Poetry,* calls poetics "a

1 C. Bernstein, *Attack of the Difficult Poems*, Chicago, University of Chicago Press, 2011, p. 75.
2 L. Hejinian, 'A Difficult Art', *Poetry and Pedagogy: The Challenge of the Contemporary,* J. Retallack and J. Spahr (eds), New York and Basingstoke, Palgrave Macmillan, 2006, p. 208.

speculative writerly discourse…defined against the various modes of 'reflection' on works already written; its orientation is towards the next job."[3]

What follows, therefore, are my poetics: provisional, context-dependent, speculative, an examination of artistic thinking and the investigations that constitute art, providing the context in which I wrote Part 1 of this PhD, my particle fiction, *And What If We Were All Allowed to Disappear*, then situating it in the larger context, of literature – and science.

The title of this PhD is: "Particle Fictions: an Experimental Approach to Creative Writing and Reading Informed by Particle Physics". My research questions ask how the scientific field of particle physics – its vocabularies and concepts, its models and processes – might help in experimenting on and analysing book-length creative works made of parts, which I call "particle fiction"; how this informs the creation of my own work of particle fiction; and what my particle fiction might then say about particle physics. A secondary question explores the nature of wholes versus parts and what wholeness means across many disciplines.

Although this is a doctorate in creative writing, it is not possible to separate writing and reading. I considered theories and ideas about readers and reading, especially those which relate to more experimental works of poetry and prose, in order to assess how a reader might approach the works of particle fiction that were the subject of my experiments. My aim was, first, to assist in the creation of my own work of particle fiction, and to then consider how my own particle fiction might be read.

I chose the style and format of these poetics to correspond to the blurring of boundaries I mentioned in the opening paragraph. As Robert Sheppard says: "Part of the attraction of poetics to fragmentary and hybrid forms is to evade the totalising certainty of a manifesto"[4]. Such fragmentary and hybrid forms are ideally suited to the topic of wholes

[3] R. Sheppard, 'Experiment in Practice and Speculation in Poetics', *Teaching Modernist Poetry*, P. Middleton and N. Marsh (eds), Basingstoke, Palgrave Macmillan, 2010, p. 161.

[4] R. Sheppard, 'Experiment in Practice and Speculation in Poetics', *Teaching Modernist Poetry*, P.

and parts, and the notion of totalising certainty is one I have never embraced.

"[B]etween recognisable genres" is also useful, for these poetics do not fall into the recognisable genre of traditional academic writing. I employ humour and playfulness, for example, and quotes from sources such as online publicly-written encyclopaedias, whose credentials may not be impeccable but which have become indispensable sources of information in this Internet age, appearing at the top of almost every web search results list. Their inclusion here reflects my desire to bring in elements from popular culture, from my environment and my own experiences. As American composer, writer and theorist John Cage writes in 'Themes & Variations': "A work should include its environment, is always experimental (unknown in advance)."[5]

I also use two fonts, one for the main text and one for many of the quotes, so that even before reading, the eye has a picture of the page's content and distinguishes between my words and those of others. There are other typographical quirks too, fitting the creative writer's mantra of "show not tell": demonstrate what you are talking about, rather than explaining. For example, poet Charles Bernstein, in his article, 'The Artifice of Absorption', uses the form of a poem to illustrate his ideas about poetry being absorbing, antiabsorbing, permeable or impermeable:

These

textual

dynamics

can

be

thought

about

Middleton and N. Marsh (eds), Basingstoke, Palgrave Macmillan, 2010, pp. 162-165.

[5] J. Cage, 'Themes and Variations', P. Hoover (ed), *Postmodern American Poetry,* London and New York, W W Norton & Company, 1994, p 622.

in

relation

to

the

reader

&

to

the

structure

of

the

poem.[6]

You will also find me in here: there are many references to my own life, as well as raw and undigested quotes from the private blog I kept while working on my doctorate, to give a potential reader, who is likely to be a doctoral student and a creative writer, an insight into the shifts in my state of mind, confidence levels and ideas throughout the process.

This is a writing style that has many names, including "creative/critical" and "fictocriticism". I like the latter: "Fictocriticism is a fusion and exchange of critical and creative writing [which] attempts to bring together academic discourse and creative practice," writes Hazel Smith in *The Writing Experiment: Strategies for Innovative Creative Writing. "*Such work is very important in universities today, where we are undertaking creative writing within an academic environment. Fictocriticism … has also arisen because of an increase of writers who wanted to transmit their own poetics as well

[6] C. Bernstein, 'The Artifice of Absorption', *Paper Air,* Singing Horse Press, Pennsylvania, 1987, and on The University of Buffalo [website], http://epc.buffalo.edu/authors/bernstein/books/artifice/, (accessed 4 April 2017).

as presenting their creative work."[7]

Fictocriticism is a recent term, but the style is not new. In her thesis, *Discovering the Self: Fictocriticism, Flux and the Authorial Identity,* Elizabeth Pattinson, discussing Joan Didion's "experimental personal" essays from 1968, writes: "Fictocritical writing is evidently a contemporary metamorphosis of the personal essay: an undisciplined, invigorating writing, free from the anxiety of structure. The text becomes a playground with elements of veracity, linearity and tone discarded in favour of flexible modes of writing."[8] Charles Bernstein applauds this playfulness: "[A]n unorganised (or "differently" organised) essay that suggests active thinking is often more useful in response to a literary work than a paper of impeccable logic that has little to say."[9]

This is such a differently organised essay, which is structured more or less chronologically, the parts or chapters following the order in which time ran throughout my PhD. I first provide the context in which my book was researched – each topic as I came to it – then discuss the writing process, and finally contextualise my book within the wider literary and scientific landscape.

The sections that follow are told from the point of view of a character known as "she". "She" is me, yes. But also not. "She" is not the me who is writing right now, a technique that is often used, for example, in metafictional works. Says Patricia Waugh in *Metafiction: The Theory and Practice of Self-Conscious Fiction*, "Metafictional novels which shift from the personal form 'I' of *discourse* to the impersonal 'he' of *story* remind the reader that the narrating 'I' is the subject of the *discourse*, and is a different 'I' from the 'I' who is the subject of the *story*. ....To write about oneself is implicitly to posit oneself as an 'other', to narrate or historicise oneself as a character in one's own discourse."[10]

7 H. Smith, *The Writing Experiment: Strategies for Innovative Creative Writing*, Crows Nest, Australia, Allen and Unwin, 2005, p. 204.

8 E. Pattinson, *Discovering the Self: Fictocriticism, Flux and the Authorial Identity,* Sydney, University of Technology, 2013, p. 5.

9 C. Bernstein, *Attack of the Difficult Poems*, Chicago, University of Chicago Press, 2011, pp. 17, 74.

10 P. Waugh, *Metafiction: The Theory and Practice of Self-Conscious Fiction*, London and New York, Methuen, 1984, pp. 134-135.

She is the person who did everything described in this document – and who wrote all the posts on that private blog – but I am not the same person as I was then. Thus, I'm historicising myself, and there is a a tradition of this in literature. Argentinian writer Jorge Luis Borges' writes in his short story, 'Borges and I': "It's to that other one, to Borges, that things happen….Little by little, I continue ceding to him everything, even though I am aware of his perverse tendency to falsify and magnify."[11] And, says Sean Burke, French literary critic and theorist Roland Barthes employs a similar tactic in his sort-of autobiography: "*Roland Barthes by Roland Barthes* signals a similar division in its title… *Roland Barthes* would seem to be breaking the time-honoured autobiographical contract – that the self writing and the self written on should be one and the same self."[12]

Borges and Barthes are men, and one benefit for me of the use of "she" is that the reader will be reminded that this document was written by a woman. Fictocriticism is a genre (or anti-genre) that is connected to the giving of voice to marginalised communities, those who feel they don't fit into the traditional modes of writing. Women writers aren't read in the same way as men, says Kate Zambreno in her work of fictocriticism, *Heroines*, especially if they dare to talk about themselves: "The self-portrait, as written by a woman, is read somehow as dangerous and self-indulgent. That it's somehow cheating to draw from one's OWN life, even if it's with startling insight into the human condition, or more forbidden still, the complex and ambivalent feminine condition. This charge is almost never leveled at male writers."[13]

Says Zambreno later in the book: "Taking the self out feels like obeying a gag order - pretending an objectivity where there is nothing objective about the experience of confronting and engaging with and swooning over literature...that uses our own language instead of theirs."[14]

[11] J. L. Borges, 'Borges and I', *Labyrinths: Selected Stories and Other Writings*, London, Penguin Books, 2000, p. 282.
[12] S. Burke, *The Death and Return of The Author: Criticism and Subjectivity in Barthes, Foucault and Derrida*, Edinburgh, Edinburgh University Press, 1992, pp. 53-54.
[13] K. Zambreno, *Heroines*, Cambridge, USA, and London, Semiotext(e), 2012, p. 235.
[14] Ibid. p. 281.

I am not pretending there is any objectivity here in these poetics. They were written by me, and I see it as fitting to keep my self in here, and use my own language, as I did in the book that this work contextualises and reflects upon (although I don't make any claims for startling insights into the human condition). Stefano Harney and Fred Moten are in similar territory in their jointly-written book, *The Undercommons: Fugitive Planning and Black Study,* a collection which blends essay and poem, the autobiographical, personal and political to reflect on the black radical tradition. An example:

> The student has no interests. The student's interests must be identified, declared, pursued, assessed, counseled, and credited. Debt produces interests. The student will be indebted. The student will be interested. Interest the students!"[15]

Here, academia is being discussed using language that is not normally employed within academia – situated in the radical "place" Harney and Moten call "the undercommons". In an author interview at the end of the book, Harney and Moten attempt to explain this term without defining it rigidly, which is entirely their point. Says Moten: "If somebody's reading our stuff, and they think they can get something out of the term 'planning' or 'undercommons' or 'logisticality,' that's great, but what matters is what they do with it; it's where they take it in their own relations"[16].

On their choice of style, Harney says: "Some people might call my style repetitive, partly because I'm rephrasing things all the time, but also because I'm trying to show that I'm playing with something rather than that it's finished...It has to be somehow in the writing itself that the thing hasn't closed off."[17]

It is my aim, too that this work, my poetics, will be similarly unclosed and playful,

[15] S. Harney and F. Moten, *The Undercommons: Fugitive Planning and Black Study,* Wivenhoe, New York, Port Watson, Minor Compositions, 2013, p67.
[16] S. Harney and F. Moten, *The Undercommons: Fugitive Planning and Black Study,* Wivenhoe, New York, Port Watson, Minor Compositions, 2013, p. 106.
[17] Ibid. p. 107.

leaving room for the reader, as well as being informative and entertaining. Any attempt to close off the writing would be, for me, an artificial one. As a writer of short stories and poems, I understand the tension of endings, the need for some closure, but not so strong a seal that the reader feels rebuffed, unnecessary, and left with nothing to take away after the final word.

Given that the book for which this is the contextualising document has "disappearance" as a theme, it seems pertinent to leave you with another quote from Kate Zambreno. She ends *Heroines* by urging her "scribbling sisters" that there is "the absolute necessity to write yourself in order to understand yourself, in order to become yourself. I ask you to fight against your own disappearance"[18]. I am proud to be one of those scribbling sisters, and I invite you to read on.

[18] K. Zambreno, *Heroines*, Cambridge, USA, and London, Semiotext(e), 2012, p. 296.

Interlude

She begins this section after she has started writing several of the other sections. She begins this in a new document, not sure what to call it yet. Writing these poetics supporting her creative writing, her book, is tricky: there are so many angles from which to approach the topic – or topics, of parts of topics – and her head is spinning. She has spent more than two years recording her thoughts, everything she has read and done, on a private blog. This began with particle physics and the notion of parts, but a discussion of parts is part of a discussion of wholeness, and wholeness encompasses – of course – everything!

To provide inspiration for her creative work, she fed herself deeply on philosophy, on literary theory, art criticism, psychology, literature, physics – and lightly on so many other subjects – and inside her there is a making of sense from it but now she is required to tease this apart again, to fragment her understanding, to present it in just this single dimension of the black marks on the page.

She is in a café. There is no one clear train of thought, but is there ever one clear train of thought? She is, of course, playing online scrabble with strangers while writing. This is an essential part of her writing process, a certain kind of distraction, a knowing that looking directly at The Thing for too long can stifle and cause anxiety. She needs to distract her Inner Critic. [Whose turn is it now?]

Ideally, she realises that she would borrow from string theory, whose various versions require more than just our three or four dimensions, scaling this up to perhaps 11 or more[19]. She envisions being able to move up and down, thread from one idea to another in all directions.

But she has this page, and she is a writer, so she must write it down somehow. And trust that, as with her fiction and poetry, in the writing of it the shape will come. She will

[19] R. Garisto, 'Focus: Curling Up Extra Dimensions in String Theory', *Physics Review*, April 9, 1998 http://physics.aps.org/story/v1/st7, (accessed Dec 2015).

not try to hold the whole and panic, but lift small pieces, one by one.

She sees now what this section will be called: Interlude.

Part I: The Whole In A Nutshell (1)

We began with the one hot dense wholeness, it seems. By we I mean: The Universe. This is what we think. That at the beginning everything was connected, tied up in this tiny parcel, all that would be. And then: BOOM! Flying in all directions, it fell apart, shot apart, fled from its origins, outwards, outwards, looking for, searching for… This is fragmentation. This is a breakdown, a breakout. Here are the particles.

They might all have been identical, these parts, these fragments of the whole. Why wouldn't they be? A vase when smashed is lots of tiny bits of ceramic. But, yes, painted, perhaps, and each piece shape slightly differently, otherwise the vase would not have been "vase". But these initial parts were not all the same –there were types, families, different properties. And, as it all began to cool from that great starting heat, there was clumping. We are drawn to each other, it seems.

A whole, then parts, then new wholes, smaller wholes, made of attracted parts. Of course it makes sense that now, to understand better, we smash and collide, to undo all this gluing and wholeness. It makes sense now that we are intrigued by perhaps this one perfect first wholeness: Was it better then; do we want it now?

Philosophy wades in, we try to define wholeness, then art and literature take it all apart – yes, you find nice linear narratives, easily understood representations of how we see the world, safe and cosy, but we don't want you safe and cosy, we want you inside, in the gaps between. We want you thinking, feeling. Stories begin to disintegrate, to let us in. They stop telling us what to do, what to think. We call this "modern" and "postmodern"; some said the author was dead. But who is writing, painting, sculpting then?

And look at nature! Chaos. Fractals – smaller parts that look like the larger, delving down. Not really chaos, just that so much depends on so little.

David Bohm decides, from within physics looking out, that the problem can be

stated thus: we can't get our heads round the whole world, the whole of reality, so we chop it into small pieces to get to know it better. But then we believe – rather than these parts being theoretical and helpful constructs – that they actually exist. We told ourselves a Story of Parts, of We Are Separate, then we fell into our own story. Now, said Bohm, who has himself departed, we have a language built to support everything we invented, a language which keeps telling us we're right about this fragmented, disconnected world. He tried to change it, to open our eyes, to see how we might wake up to what we've done. We've not woken up yet.

These particle fictions, book-length works made of parts/particles/fragments, might be showing us the way. It's not safe out there, we have no idea what will happen in an hour, a week, a year – not because we are all separate, but because we impact each other. We are always colliding – or, perhaps, we are not the "I" we thought we were. We just can't see the whole.

In a minute, there might be a bee, a sting, and things will shift and change. Particle physics seems proud not just of its success – we have a Standard Model, here's how we think things work! – but of the failure that is part of it: the Standard Model's incomplete! We can be both. We can be part and whole, fail and succeed, know and not know. Leave gaps, and leave room for us to slip into them.

Part I: The Whole In A Nutshell (2)

One hot dense wholeness: Then: BOOM! … fragmentation, particles. They might have been identical but there were types, families. As it began to cool – clumping, smaller wholes. Now we smash and collide, to undo, intrigued by one first wholeness: better then? Philosophy to define wholeness, art and literature take it apart – easily understood representations, safe and cosy, but we want you in the gaps, thinking, feeling. Stories disintegrate – "modern" then "postmodern". And nature! Fractals – smaller parts that look like the larger. Not really chaos. David Bohm: we can't get the whole of reality, so we chop it, then believe Story of Parts, of We Are Separate. We have a language telling us we're right about this. He tried to open our eyes. Not yet. Particle fictions might be showing us. We have no idea what will happen – because we are colliding – we can't see the whole. Particle physics: proud – we have a Standard Model!/ the Standard Model's incomplete! We can be both: part/whole, fail/succeed, know/not know. Leave gaps.

Part I: The Whole In A Nutshell (3)

Wholeness

BOOM!

Particles.

Clumping.

Smash and collide

Philosophy: define

Art: gaps, thinking, feeling.

Stories disintegrate

Nature! Fractals

David Bohm: can't get whole reality, so chop

Story of Parts.

Language telling us we're right.

He tried. Not yet.

Particle fictions: can't see the whole.

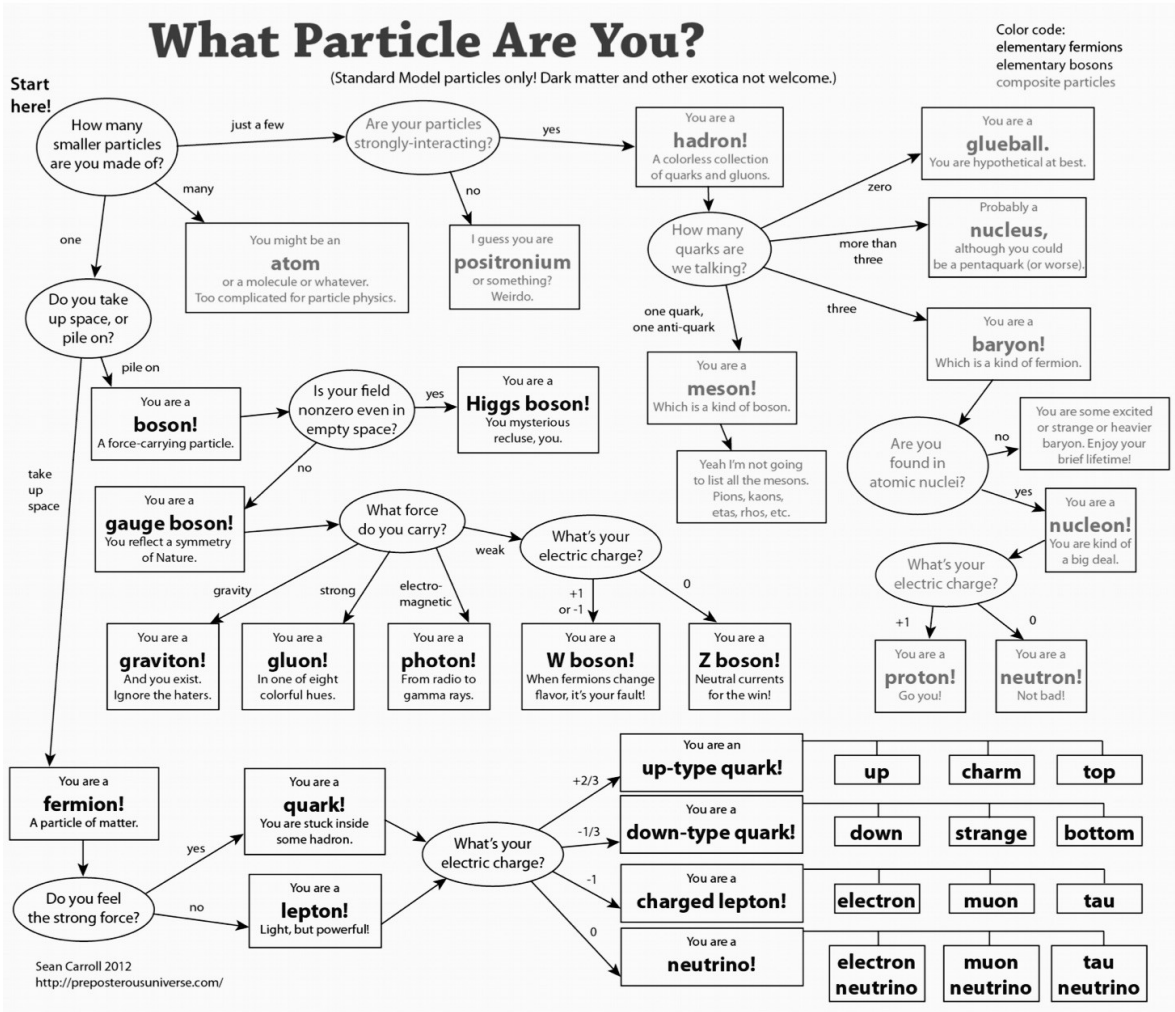
Particle physics: Standard Model!/ incomplete!

Part/whole, fail/succeed, know/not know.

Gaps.

Part II: Particles, Physics and Perception

Although this is not a document aimed at physicists, or scientists, or even those curious about physics, she, the writer, who is interested primarily in story and in narrative, begins here because it is where it began for her, so many years ago, the spark that led to this PhD project. And it's where humans may have begun to get particulate, to split and fragment everything, where "everything" includes story and narrative. She hopes, although the word "physics" is a turn-off for many people, that you don't find it so here. She hopes you are entertained and intrigued. Perhaps you might like to play this game before reading on: What Particle Are You?[20]



[20] S. Carroll, *What Particle Are You?*, [online image], http://www.preposterousuniverse.com/blog/2012/04/25/what-particle-are-you/comment-page-2/, (accessed December 2016).

Atoms

It was Democritus, born around 460 BC, according to the New World Encyclopedia, who came up with the idea of everything being made of

> infinite numbers of permanent, imperishable, immutable, and indivisible elements called “atomon” (atoms; means “indivisible”).[21]

How on earth, she thinks, did Democritus do this? How did he sit, contemplate his surroundings and theorise in such detail and postulate so decisively: This is how it is, how it must be. He had no microscope, no telescope. He could touch, taste, smell, but he was limited. Compared to today's shiny laboratories, with their shiny equipment, their atom-smashers, DNA sequencers.

Ah! Perhaps he was able to be this creative in his thinking *because* of the limitations. Because of what he *couldn't* see, *couldn't* know. She is familiar with this already. She has spent the past few years teaching writing workshops on liberation through constraint. If we have too much information, too much knowledge, this may stifle.

The First Wholeness

Of course, there was something slightly earlier than the Greeks: “The universe erupted in a hot Big Bang, spewing matter and radiation outwards from a hot fireball,” writes Frank Close in *The New Cosmic Onion: Quarks and the Nature of the Universe*[22]. “Some 14 billion years ago, all the material that we see today in the galaxies of stars would have been compacted together in a volume smaller than an atom. It is the explosion outwards that we refer to as the Big Bang.”

After the Big Bang, things began to chill and clump: “[O]ut of that fireball,” writes Close, “the quarks, electrons and neutrinos were the survivors while the universe was still

[21] New World Encyclopedia contributors, ‘Democritus’, *New World Encyclopedia,* http://www.newworldencyclopedia.org/p/index.php?title=Democritus&oldid=972463 (accessed April 9, 2017).

[22] F. Close, *The New Cosmic Onion*, Boca Raton, Florida, Taylor and Francis, 2007, p. 1.

very young and hot. As it cooled, the quarks were gripped to one another, forming protons and neutrons. The mutual gravitational attraction among these gathered them into large clouds that were primaeval stars."[23] We could also call this:

- The End of Wholeness
- When We Got Particled
- The Universe Grows Up
- The Grand Fragmentation
- The Big Clumping
- Look! Stars!
- Falling To Bits
- Why Have One Thing When You Can Have Trillions?
- Is It Cold In Here?
- Matter Pulls Together

and so on…

Particle Physics – When We Got Smashing

> "Collisions of high-energy particles create in a small region of space conditions that are feeble copies of that first Big Bang… The early universe has been likened to the ultimate high energy physics laboratory and, it is argued, an elegance and beauty which existed then became obscured as the universe cooled. Our high energy physics experiments have revealed a glimpse of that early unity."[24]

[23] F. Close, *The New Cosmic Onion*, Boca Raton, Florida, Taylor and Francis, 2007, p. 9.
[24] Ibid. p. 8.

> "The Large Hadron Collider (LHC) is the world's largest and most powerful particle accelerator. It first started up on 10 September 2008, and remains the latest addition to CERN's accelerator complex. The LHC consists of a 27-kilometre ring of superconducting magnets with a number of accelerating structures to boost the energy of the particles along the way."[25]

Fast forward [particle accelerator joke] to the day of writing this, April 20 2016. We have a lot of particles. We have drilled down inside the atom, which, it turns out, is not indivisible. "Atoms are not the smallest things," writes Frank Close. "Each has a rich labyrinth of inner structure where electrons whirl around a massive compact central nucleus".[26] She learned about this a quarter of a century ago, during her undergraduate degree in maths and physics at Manchester University. Here are some of the things she remembers from her studies:

- Ernest Rutherford discovers the nucleus, the inside of the atom, in 1911, by firing beams of alpha particles at gold foil[27]. [Gold foil is something you don't forget. This is something that makes you both understand and wonder at the enterprise of science. *Gold foil*.]
- Quarks are fundamental particles[28], the smallest "building blocks" [a phrase beloved by physicists] of matter, and they have funny lovely names: top quark, bottom quark, charmed quark, strange quark, up quark, down quark. Quarks have flavours and colours.
- We can't see any of these particles. Not with the strongest microscopes we have.

[25] *The Large Hadron Collider*, [website], CERN http://home.cern/topics/large-hadron-collider, (accessed April 2016).

[26] F. Close, *The New Cosmic Onion*, Boca Raton, Florida, Taylor and Francis, 2007, p. 3.

[27] 'Alpha Particles and the Atom', *Rutherford's Nuclear World*, [website], https://www.aip.org/history/exhibits/rutherford/sections/alpha-particles-atom.html, (accessed April 2016).

[28] E. Inglis-Arkell, 'What Are Quarks and Why Do They Have Colors and Flavors', *io9*, 30 April 2012, http://io9.gizmodo.com/5905629/what-are-quarks-and-why-do-they-have-colors-and-flavors, (accessed April 2016).

> But, as Esther Inglis-Arkell succinctly explains, “while no one to this day has ever "seen" a quark on its own, experimental results and observed properties of particles match up so perfectly with the theory of their existence, and don't match up as well to any other theory, that scientists are satisfied that they exist.”[29] Well, yes, she remembers thinking back then, emerging dazed from the lecture theatre. Well, yes, but surely this is a sort of fiction? She couldn't grasp it, got frustrated and angry. Perhaps a failure of teaching, and/or perhaps a necessary feeling which is what has led, ultimately, 25 years later, to this point.

She left physics behind after her undergraduate degree – all her experiments were disasters, she always felt a failure, couldn't swallow the information being presented, wanted the Big Picture, but none was (then) forthcoming. And besides, she just wanted to write.

Physics and physicists carried on without her. Now there is this enormous particle accelerator at CERN, the European Organization for Nuclear Research, underneath parts of Switzerland and France, where, like a large version of dodgems at the fair, the idea is that you must crash into things. Where “you” means protons (a type of particle found inside every atom) driving very fast. It's all about collision. Because when things smash into each other, matter is altered.

Although dodgem cars may be built for purpose, they are not the same afterwards. Perhaps they've lost a few flakes of paint, chipped a little metal or plastic. Or maybe they are robust to the naked eye, but several elementary particles slipped away during the crash.

This is what happens at the Large Hadron Collider (LHC): using enormous magnets, the protons are being made to crash into each other at enormously high speeds, and little bits – particles – fly off in all directions. What results from the collisions tell us what's out there. Or in there, rather, deep inside the atom, inside the particles inside the

[29] E. Inglis-Arkell, 'What Are Quarks and Why Do They Have Colors and Flavors', *io9*, 30 April 2012, http://io9.gizmodo.com/5905629/what-are-quarks-and-why-do-they-have-colors-and-flavors, (accessed April 2016).

atom.

The numbers are beyond comprehension: there are 600 million collisions PER SECOND[30] in the LHC. Computers take snapshots of each one and the resulting images look like this:

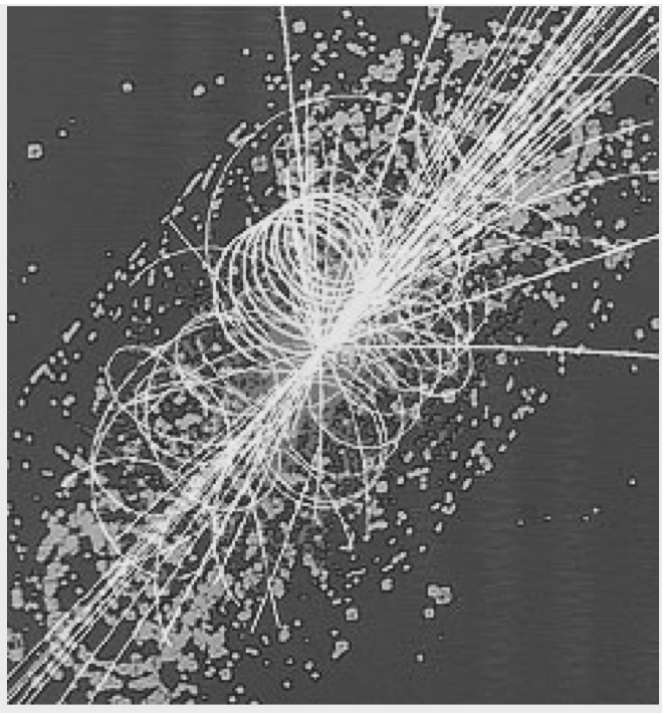


Image courtesy of CERN

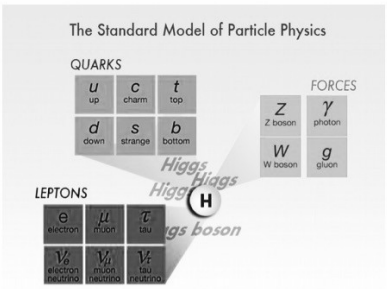
Sifting through all of this data has resulted in the discovery (which doesn't, of course, mean "seeing") of many, many particles.

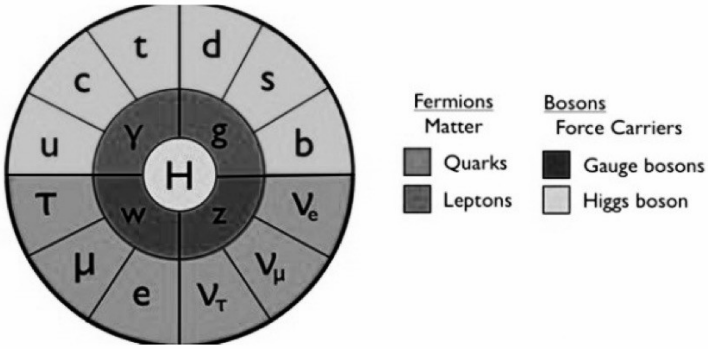
The Standard Model

Humans are pattern-seekers, looking for causes and links, and to that end the "Standard Model of Particle Physics" was developed in the 1970s in an attempt to fit all these particles together into a kind of whole:

[30] 'Collisions', LHC Machine Outreach, *CERN*, [website] http://lhc-machine-outreach.web.cern.ch/lhc-machine-outreach/collisions.htm, (accessed June 2015).

> "The standard model is ... a theory of fundamental particles and how they interact. It incorporated all that was known about subatomic particles at the time and predicted the existence of additional particles as well...There are seventeen named particles in the standard model... The last particles discovered were the W and Z bosons in 1983, the top quark in 1995, the tau neutrino in 2000, and the Higgs boson in 2012."[31]





The Standard Model of Particle Physics[32] The Standard Model of Particle Physics[33]

As can be seen from the images above, there's no standard way to present this standard model. It is divided into "families" – fermions and bosons, or quarks and leptons – and there are the forces, too. **[Interlude** This is not going to be a physics lecture. There is no place, she believes, within a PhD in Creative Writing, for lectures on any subject. The idea is to provide background, context, for her creative work. Perhaps we've already reached that point here? She does not want to bore you. Never. Is this enough? Perhaps just a little more.]

31 'The Standard Model', *The Physics Hypertext Book*, [website], http://physics.info/standard/, (accessed July 2015).

32 'The Standard Model of Particle Physics', [online image], Baylor University, http://www.baylor.edu/physics/index.php?id=94285, (accessed July 2015).

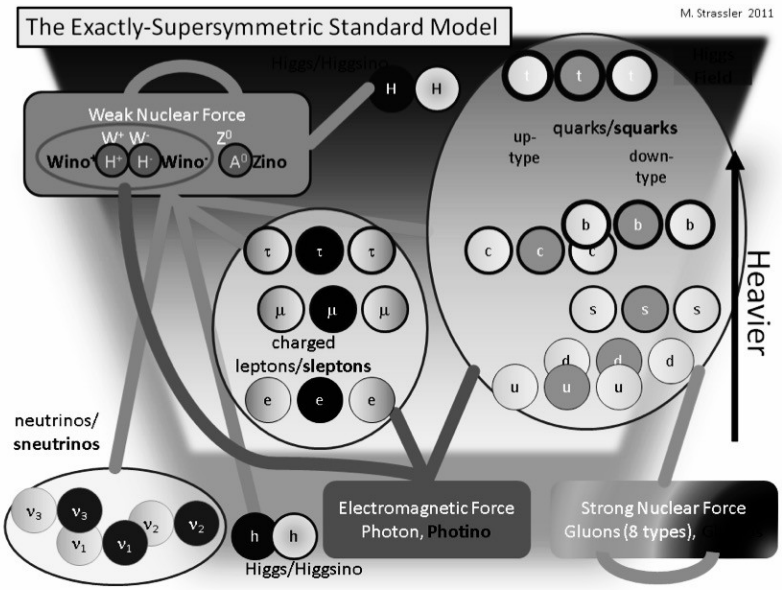
33 A. Kaufman, 'Particle Fever', [online image], Sloan News, 13 March 2014, http://scienceandfilm.org/articles/2442/particle-fever, (accessed July 2015).

Not Finished Yet

As Frank Close says, “The Standard Model is not the last word – it is essentially the summary of how matter and forces behave at energies so far explored. It is generally recognised as being an approximation to a richer theory whose full character will eventually be revealed...”[34] Yes, this does sound like the plot of a thriller. And this is what excites physicists, the thought that there's still more to be discovered. And perhaps, even, that the current theories, the current model, could be wrong!

Symmetry Is Super

One of these possible new additions to the Standard Model is called “supersymmetry”. “Supersymmetry, also known as SUSY, is a theory that extends the standard model with a host of heavier partner particles,” wrote Jacob Aron in New Scientist magazine in December 2015, just after the Large Hadron Collider was switched on again after several years' break. “Finding any evidence for the theory is one of the LHC’s main goals in this second run, but it looks like we don’t have anything yet.”[35]



[34] F. Close, *The New Cosmic Onion*, Boca Raton, Florida, Taylor and Francis, 2007, p. 173.

[35] J. Aron, 'Physicists struggle to squeeze new particles from the LHC', *New Scientist*, 15 December 2015, https://www.newscientist.com/article/2070579-physicists-struggle-to-squeeze-new-particles-from-the-lhc/, (accessed January 2016).

To try to sum this up, she passes you over to Matt Strassler, professor of theoretical physics and designer of the previous image: “If supersymmetry were a symmetry of nature, **every type of elementary particle that we know of in nature would have to have partners we have not discovered yet**. Since there are over two dozen particles known, that would mean we have a lot of work left to do!”[36]

She has been thinking a lot about supersymmetry while writing her book. Symmetry itself is a fascinating concept. One of the ideas it involves is antimatter:

> Antimatter particles are almost identical to their matter counterparts except that they carry the opposite charge and spin. When antimatter meets matter, they immediately annihilate into energy.[37]

So, if the universe were completely symmetrical, it would mean there were equal amounts of matter, and antimatter, and – poof! – everything would be annihilated. Or would already have been annihilated and she wouldn't even be writing this. This implies that our world is not symmetrical.

Those who propose the supersymmetry theory answer this by claiming symmetry is hidden, or, as Matt Strassler says, “physicists often say *spontaneously broken*, but really this is not a good image to have intuitively — the symmetry is still there, it has just been made difficult to recognize.”[38]

[36] M. Strassler, 'Supersymmetry – What Is It?', *Of Particular Significance* [web blog] https://profmattstrassler.com/articles-and-posts/some-speculative-theoretical-ideas-for-the-lhc/supersymmetry/supersymmetry-what-is-it/, (accessed July 2015).

[37] D. Kwon, 'Ten Things You Might Not Know About Antimatter', *Symmetry Magazine*, April 2015, http://www.symmetrymagazine.org/article/april-2015/ten-things-you-might-not-know-about-antimatter, (accessed July 2015).

[38] M. Strassler, 'Supersymmetry – What Is It?', *Of Particular Significance* [web blog] https://profmattstrassler.com/articles-and-posts/some-speculative-theoretical-ideas-for-the-lhc/supersymmetry/supersymmetry-what-is-it/, (accessed July 2015).

Difficult to Recognise: Bohm & Reality

> Reality is what we take to be true. What we take to be true is what we believe. What we believe is based upon our perceptions. What we perceive depends on what we look for. What we look for depends on what we think. What we think depends on what we perceive. What we perceive determines what we believe. What we believe determines what we take to be true. What we take to be true is our reality.[39]

So far so good with particle physics, right? Not so fast [accelerator joke #235]. There are those within physics who aren't satisfied with physics' world-view. The above quote – which sounds rather like a riddle – is from the late American physicist David Bohm. Although to call him a physicist is to limit him to just one box. She knew when she began to tackle the subject of wholeness that Bohm would be part of the discussion; she knew she had his book, *Wholeness and the Implicate Order*[40], on a shelf somewhere. She hadn't yet read it, but kept hearing about him in so many contexts.

It is hard to know where to start with Bohm. Best to hear from the man himself: here he is explaining his own theory, transcribed from a video of an interview filmed at the Niels Bohr Institute in Copenhagen, 1989:

> There is some evidence for [a new world-view of wholeness], especially in physics… In relativity… we have an unbroken universe which is in constant flow, dynamically. Even the very notions of space and time have become relative where they previously were absolutes. That's a very revolutionary view…

Bohm goes on to talk about quantum physics – what happens at the tiniest scales, within the atom – and how, because each quantum process apparently can't be broken without it

[39] M. Popova, 'Trailblazing Physicist David Bohm and Buddhist Monk Matthieu Ricard on How We Shape What We Call Reality', *Brainpickings*, September 2015, https://www.brainpickings.org/2015/09/22/the-quantum-and-the-lotus-riccard-david-bohm-reality/,(accessed April 2016).

[40] D. Bohm, *Wholeness and the Implicate Order,* London and New York, Routledge & Kegan Paul, 1980.

becoming a completely different process, "each process is a whole"[41]. Then we have wave-particle duality: "the discovery that electrons, which are classically particles, can behave like waves…and light, which is classically a wave, can behave like a particle."[42]

Bohm points out that what's happening here is really about context. Look for a wave, you see a wave. Same with a particle. His third point is about what's known in physics as "non-locality"': particles separated by great distances seem to be able to communicate instantaneously, which may sound like Star Trek but has been experimentally proven. Bohm believes that in fact the universe is an "indivisible whole" but for various reasons we have forgotten this:

> In physics we see the parts because that's the way we have approached them for the last few centuries....we accept this mechanical way of looking at things, but if you went back one thousand, two thousand years, I don't think people actually saw the parts as primary. The way we see is influenced by the way we think.[43]

This is the main thrust of his concept, which was revolutionary when Bohm published his book in the 1980s, and is still controversial: The universe is actually a whole, but we see it as made of separate parts – such as physicists focussing on particles – because that's how we've trained ourselves to see it. This is known as "reductionism": "the scientific attempt to provide explanation in terms of ever smaller entities".[44] [Perhaps ironically, the thesis she wrote on this very topic during her MSc in Philosophy of Science in 1994 has now been reduced to invisibility; she can't find it anywhere.]

She is taken with Bohm's idea that it is a matter of perception. While this may be new for science, it is much older: Stoic philosophers and Buddhists, for example, have

41 *Interview with physicist David Bohm: Part 1 of 5*, [online video], 2008, https://www.youtube.com/watch?v=SvyD2o7w24g, (accessed April 2016).

42 *Interview with physicist David Bohm: Part 1 of 5*, [online video], 2008, https://www.youtube.com/watch?v=SvyD2o7w24g, (accessed April 2016).

43 Ibid.

44 'Reductionism', *Wikipedia*, [website], https://en.wikipedia.org/wiki/Reductionism, (accessed April 2016).

been telling us for centuries that reality is what we make of it. But due to the advent of the scientific method, to experimentation and the way science is being done, we've become the Great Fragmenters in all things.

Well, we had to, says Bohm, because "to some extent it has always been both necessary and proper for man, in his thinking, to divide things up, and to separate them, so as to reduce his problems to manageable proportions"[45] She understands this too – it chimes with the way she can hold a whole idea for a short short story or poem in her head if its size is less than, say, 2000 words. Anything more than that and she has to break the concept up in order to tackle it, as she found she needed to do with these poetics. In fact, she had to write the outline of this document three times at three different lengths in order to find a way to grasp its shape, its wholeness (see Part I).

The section of Bohm's book she finds the most fascinating, and the hardest to grasp (which he freely acknowledges), contains his ideas about changing language itself so that we can alter our thought patterns to perceive the actual wholeness of reality. "What, then, will be our question, as we engage in this inquiry into our language (and thought)?" writes Bohm. "We begin with the fact of general fragmentation. We can ask in a preliminary way whether there are any features of the commonly used language which tend to sustain and propagate this fragmentation, as well as, perhaps, to reflect it."[46] Bohm suggests we rethink the "subject-verb-object structure of language":

> For example, consider the sentence 'It is raining'. Where the 'It' that would, according to the sentence, be 'the rainer that is doing the raining'. Clearly, it is more accurate to say: 'Rain is going on.'[47]

What Bohm would like us to consider is to change the syntax of our language "to give a

[45] D. Bohm, *Wholeness and the Implicate Order,* London and New York, Routledge & Kegan Paul, 1980, pp. 2-3.
[46] Ibid. pp. 28-29.
[47] Ibid.

basic role to the verb rather than to the noun", to perceive the world as processes instead of parts, of movement and flow instead of fragmentation. This resonates with her attempts to think about herself, thanks to several years of reading philosophy and Buddhism, as less an "I" who walks, talks and loves, than a *walking*, a *talking*, a *loving*. It's difficult. Bohm acknowledges that it is extremely difficult. She is happy to be a *working-on-it*, that this is a life's work, not just to see the world as whole, but to see herself as part of it. Part. Whole. We have moved here in this chapter from physics to begin to touch on philosophy. She takes the next step.

Part III: Wholeness and Philosophy

Missing You[48]

The woman in her twenties
is amazed she's an anomaly. She's

doing fine – if fine means living,
breathing, getting married, having

children – without the chunk
that in us normals holds half

of all our neurons. Her brain,
the jaw-dropped doctors think,

became expert in alternatives,
workarounds, diversions. Who's to say

she's not finer than the rest
of us? Our signals

take no chances, walk
the roads most travelled by, while hers,

double-jointed,
are dancing.

Physics is something she has been interested in and reading about since childhood. Now, she looks further afield, and as she begins to wonder about wholeness, she begins to wonder about everything. What are the parts of us that are essential? What are we part of? What does it mean to be part, to be whole? Can we be both – or neither? "*Without the chunk/that in us normals holds half/of all our neurons."* Every subject area, it seems, has a take on wholeness and wholes and parts. She turns to philosophy.

[48] T. Hershman, 'Missing You', *Under The Radar magazine*, 2015, inspired by 'Woman of 24 found to have no cerebellum in her brain – health', *New Scientist*, 10 September 2014, http://www.newscientist.com/article/mg22329861.900-woman-of-24-found-to-have-no-cerebellum-in-her-brain.html#.VE0qh-elo6U, (accessed September 2014).

Mereology

When she gave a talk on her doctoral research at a conference on science and literature, an audience member mentioned mereology. The Encyclopaedia Britannica tells her this is a "branch of logic, founded by the 20th-century logician Stanisław Leśniewski, that tries to clarify class expressions and theorizes on the relation between parts and wholes"[49]. The Stanford Encyclopedia of Philosophy says: "Mereology: the theory of 'parthood relations'"[50]. Parthood relations?

Parthood?

She lets her mind wonder – and wander – about the "hood":

– *Neighbourhood*: a specific area where, by definition, those who live there are neighbours.

– *Hood:* on a coat, a jumper. Hoods cover. But not all the time, they may also be simply there, and unused, waiting. Also: slang for hoodlum. Shorthand for neighbourhood (boys in the).

– *Selfhood*: the state of being an individual person.

– *Knighthood*: the rank or dignity of a knight. [Does a knight feel him or herself an individual in the neighbourhood?]

– *Robin Hood.* Of course. Taking from the rich. Giving to the poor – in the neighborhood?

– *Parthood*: A specific area where, by definition, those who live there are parts? The state of being a part? The rank or dignity of a part? A hoodlum?

Relations?

– Sex, of course.

[49] The Editors of Encyclopaedia Britannica, 'Mereology', *Encyclopaedia Britannica*, [website], http://www.britannica.com/topic/mereology, (accessed October 2014).

[50] A. Varzi, 'Mereology', *The Stanford Encyclopedia of Philosophy,* [website] http://plato.stanford.edu/entries/mereology, (accessed October 2014).

– Family – unchosen, forced upon.

– The way separate things – objects, ideas etc... - are connected, relate to one another

The First Question: What defines a 'part'?

Professor of philosophy Achille C. Varzi says that "in English we can use 'part' to indicate any portion of a given entity."[51] Varzi then befuddles the issue, because the portion – which really just means "part", doesn't it, rather like defining "red" as being like "crimson" – might be attached to the "given entity", detached, sometimes attached or detached.

Her head hurts.

Varzi gives eight examples[52]. She approaches them cautiously, one at a time:

1. The handle is part of the mug

The handle of a mug is an aspect of mug-ness which adds an ease of lifting to the mug. However, it is not essential; she has seen, even owned, mugs without handles. [Is there a name for a handleless mug? Why must we always name everything?] The handle must be attached to the mug. The handle, to be a handle, must be adequate to perform its function, but here she sees she is drifting from parthood relations towards something else. She veers back. What else can she say? The handle is part because it is not the whole mug – a handle alone would not function the way a mug functions, and it would also not function as a handle if there was nothing it handled onto.

Conclusion: One part can do without the other but not vice versa.

2. The remote control is part of the stereo system

Something detached, implicit in the word "remote". It controls without physical connection, but it has a connection, through electromagnetic waves. It is not essential,

[51] A. Varzi, 'Mereology', *The Stanford Encyclopedia of Philosophy,* [website] http://plato.stanford.edu/entries/mereology, (accessed October 2014).

[52] Ibid.

either, like the mug's poor handle. It makes life easier: no need to rise from your armchair, as you used to do. But life would go on without the remote control. It is a cultural icon, a 20th century novelty, now accepted as necessity.

Conclusion: no physical connection is needed to be a part.

3. The left half is your part of the cake

Interesting, a different kettle of fish, mugs, cake, stereo systems. This part is not only physically connected, it represents a portion of the whole, and while a handle can exist without a mug, and a remote control may have wandered away from its stereo system, half a cake is still cake.

Conclusion: A part can be a part of a whole and also embody the essence of the whole.

4. The cutlery is part of the tableware

This seems simpler. Tableware is defined as dishes and cutlery, so cutlery is part of this set of things because of the way the set is defined. Cutlery itself is a set of things, so cutlery is a both part of a set and also a whole made of parts. But then again, a remote control has parts within it – the buttons, the battery, the cover, etc... And within cutlery, a fork has tines, a knife has a handle. A handle seems less reducible, unless she takes it to the molecular level, of course. How far down do we go?

Conclusion: something can be a whole in itself, and be part of a set of other wholes, each of which may have its own parts.

5. The contents of this bag is only part of what I bought

This seems like some kind of judgement call, some attempt to describe a quantity, to compare with something else. Oh dear, she is getting a bit lost now.

Conclusion: a part can be relative, not absolute.

6. That area is part of the living room

7. The outermost areas are part of the perimeter

8. The first act was the best part of the play

Varzi then goes on to add to her headache: "On the other hand, the English word 'part' is sometimes used in a broader sense, too, for instance to designate the relation of material constitution, as in (9), or the relation of mixture composition, as in (10), or the relation of group membership, as in (11):

(9) The clay is part of the statue.
(10) Gin is part of martini.
(11) The goalie is part of the team.[53]

Shut up

Everybody shut up.

One Last Thing, Or Two, Or One in Two Parts

Before she puts this to one side, she stumbles upon "mereological nihilism" and, to balance out, "mereological essentialism". She vows to only glance at these briefly, because, as with the previous chapter, this document is not a work of philosophy any more than it is a work of physics. Mereological nihilism "is the position that objects with proper parts do not exist (not only objects in space, but also objects existing in time do not have any temporal parts), and only basic building blocks without parts exist. Or, more succinctly, 'nothing is a proper part of anything.'"[54]

Right. A dagger in the guts for mereology, which rather likes parts. There are no parts. None at all. Oh wait, no: things do have parts but the things that have parts don't

[53] A. Varzi, 'Mereology', *The Stanford Encyclopedia of Philosophy,* [website] http://plato.stanford.edu/entries/mereology, (accessed October 2014).
[54] 'Mereological nihilism', *Wikipedia*, [website], https://en.wikipedia.org/wiki/Mereological_nihilism, (accessed October 2014).

actually exist. And why don't they exist? Because:

> our senses give us only foggy information about reality and thus they cannot be trusted; and for example, we fail to see the smallest building blocks that make up anything, and these smallest building blocks are individual and separate items that do not ever unify or come together into being non-individual. Thus they never compose anything. So, according to the concept of mereological nihilism, if the building blocks of reality never compose any whole items, then all of reality does not involve any whole items, even though we may think it does.[55]

So, actually, there are only parts. The only wholes are what we believe are the smallest building blocks of matter – i.e. quarks. That's it. Mereological nihilists [she thinks she would like to be known as a mereological nihilist. She would need a wider business card] are deniers of parthood relations – parts are not relating at all, say the nihilists.

She is not sure she understands this one bit. Searching for more clarity leads her to read about *The Problem of the Many*[56], which seems to be mostly about clouds. Or rather, what is and isn't a cloud. Or, rather, what is and isn't anything at all. We shed skin, a nail rusts. She thinks, as she often does, of death. When her cat was put to sleep, this was the first time she witnessed a death. And in her grief, she imagined that he was not his body. Her cat had lost an eye, and still continued to be alive, so he was not his eye. His liver didn't function well, but he had been still alive, so he was not his liver.

We can replace almost every part of us –

The woman in her twenties/ is amazed she's an anomaly.

[55] 'Mereological nihilism', *Wikipedia*, [website], https://en.wikipedia.org/wiki/Mereological_nihilism, (accessed October 2014).

[56] B. Weatherson, 'The Problem of the Many', *The Stanford Encyclopedia of Philosophy,* [website], http://plato.stanford.edu/entries/problem-of-many/, (accessed October 2014).

Mereological Essentialism

So – what are we? Mereological essentialism[57], Wikipedia says, claims that "objects have their parts essentially, implying that if an object were to lose or gain a part, it would cease to exist—that is, it would no longer be the original object but a new, different one." Is the woman who had no cerebellum not a woman? What is a *woman*?

Labels & Conclusions

Now the discussion seems to have turned to the issue of labels and definitions – can we say that this [points to object in sky] is a cloud? "If the problem of the many applies to humans as well as clouds, then by similar reasoning we cannot name or demonstrate any human, or, if you think there are no humans, any human-like object."[58]

This, she realises, fits with her desire to unlabel, undefine. Her poems, her stories – can you point and say, This is a poem? This is a story? She wants to take away that ability. To say, these are word-objects. These are not clouds. Don't call them clouds. Perhaps she is a mereological nihilist. Her headache has gone.

[57] 'Mereological essentialism', *Wikipedia*, [website], https://en.wikipedia.org/wiki/Mereological_essentialism, (accessed October 2014).

[58] B. Weatherson, 'The Problem of the Many', *The Stanford Encyclopedia of Philosophy,* [website], http://plato.stanford.edu/entries/problem-of-many/, (accessed October 2014).

Part IV: Fragments, Fractals, Readers and Authors

> "It is the fragment and the fragmentary state that are the enduring and normative conditions...It is the whole that is fragile, transitory, and poignant. And precious and freighted though the fragment may be, it is in reality tough and a survivor." [59]

Her next step in the contemplation of parts and wholes takes her to fragments. William Tronzo, in the collection of essays he edited, entitled *The Fragment: An Incomplete History*, says: "Fragment presumes fragmentation, an action whose results can never be entirely foreseen, in contrast to other, more deliberate, forms of partitioning or division. And fragmentation is movement."

She has always thought of *fragment* as different from *part*, because with a fragment, there may not be – or may not have been – a *whole* it emerged from or would return to. Although this sounds right to her, it also sounds implausible, and she delights in holding those two opposing thoughts, one in each hand.

"Fragmentation is movement." This idea appeals to her. She is delighted also that, in what looks like an art book, Tronzo immediately turns to physics, to the Big Bang, which he sees as the first – and frankly pretty impressive – act of fragmentation. "It is my understanding of physics," says Tronzo, "that atoms behave in certain predictable, rational ways, but when they are shattered, their pieces go off in all directions to perform spectacular events of creation and destruction. It is precisely this volatility, this unpredictability, these reverberations that I see in the fragment and its effects in history".[60]

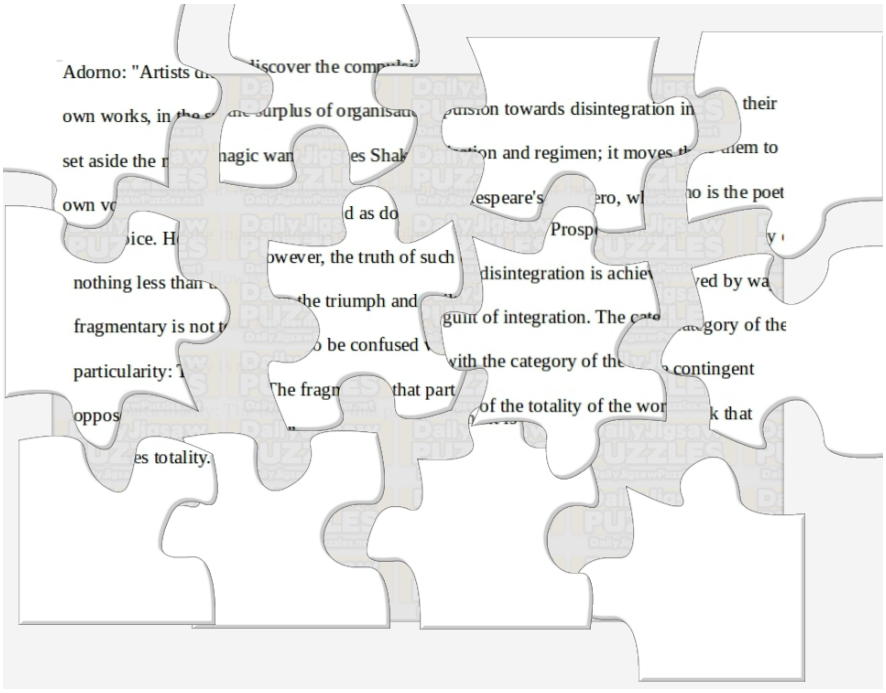
What writer, she thinks, wouldn't want to "perform spectacular events", at least of creation, if not destruction? What writer wouldn't want to have reverberations? Movement?

[59] W. Tronzo (ed.), *The Fragment: An Incomplete History*, Los Angeles, Getty Research Institute, 2009, p. 4.

[60] Ibid.

[She herself fragmented spectacularly a few years ago, and wasn't sure that wholeness would be possible again. Or rather, she understood the illusion of wholeness and also the necessity for that illusion. She does not regret anything that happened. She had already begun work on this project. Everything, as they say, is connected. All the pieces fit somehow, although some are not from this particular jigsaw and must be prodded and pushed a little.]

She makes a jigsaw of a quote by Theodor Adorno from the Tronzo book about disintegration, which she likes but doesn't fully understand:



Artists discover the compulsion towards disintegration in their own works, in the surplus of organisation and regimen; it moves them to set aside the magic wand as does Shakespeare's Prospero, who is the poet's own voice. However, the truth of such disintegration is achieved by way of nothing less than the triumph and guilt of integration. The category of the fragmentary is not to be confused with the category of the contingent particularity: The fragment is that part of the totality of the work that opposes totality.[61]

[61] T. Adorno, *Aesthetic Theory*, cited in I. Balfour, 'The Whole Is Untrue', in W. Tronzo (ed.), *The Fragment: An Incomplete History*, Los Angeles, Getty Research Institute, 2009, p. 83.

Tronzo's book on the fragment approaches the concept by way of many different subjects, including visual art and archaeology. She finds these attempts to define the fragment extremely useful. Says Jacqueline Lichtenstein in her essay, 'The Fragment: Element of a Definition':

> If, when I break a vase, I can collect all the pieces, I say to myself, "Let's try and glue these pieces back together." But the disappearance of one piece (thrown inadvertently into the garbage) transforms the remaining pieces into fragments... it is the missing pieces that confer on the surviving pieces their status as fragments.[62]

She takes this to imply that it's not a quality inherent in the ceramic. It is *context*. If asked, she wonders, what would the vase want? Or a jigsaw, say, with missing pieces? The vase could still be a vase if almost all the pieces were glued back together and the gaps were in places that didn't interfere with the holding of water. Or would it now be decorative instead? A jigsaw, however, might lose its jigsawness with just one missing piece, become a stack of cardboard shapes.

This leads her to the Gestalt school of psychology, which is all about context and perception: "Gestalt theory emphasizes that the whole of anything is greater than its parts. That is, the attributes of the whole are not deducible from analysis of the parts in isolation. The word *Gestalt* is used in modern German to mean the way a thing has been 'placed,' or 'put together'."[63] She is not sure – or not sure she wants to speculate – what this means yet for her own work, the book that these poetics support and contextualise. She would like it to work as a whole, but not a fixed whole, one that varies with each reader. Because of the

[62] J. Lichtenstein 'The Fragment: Element of a Definition', in W. Tronzo (ed.), *The Fragment: An Incomplete History*, Los Angeles, USA, Getty Research Institute, 2009, p. 119.

[63] The Editors of Encyclopaedia Britannica, 'Gestalt psychology', *Encyclopaedia Britannica*, [website], http://www.britannica.com/science/Gestalt-psychology, (accessed May 2015).

gaps. Glenn W. Most says in his essay ‘On Fragments’, also from Tronzo's book*:*

*“*Closed, finished texts and objects can sometimes seem to rebuff us. They are already perfect, what can we add to them besides our own misunderstandings? But a text or object upon which time and fortune have unleashed all their destructive fury can present itself to us in the form of a fragment: wounded, incomplete...The hypothetical whole we can imagine on its basis can come to seem far more deeply satisfying to us, because we ourselves have helped to create it, than the real original could ever be.”[64]

Although “rebuff” is a strong word, she believes that the second part of his thought is close to what she is aiming for, without the fury unleashed by time and fortune – not on this book, although perhaps on its author. Her book will be something the readers help create, because of what is missing as much as what is there. If glued together one way, it might be a vase. Another, perhaps, a teapot. The shape is up to you, the person reading it.

Another essay in the book she finds fascinating is on archaeology, by Chapman and Gaydarska:

> One aspect of personhood that follows from the fragmentation premise is fractal personhood, in which a person emerges out of other people, places, and things, materialising relations of enchainment with these other entities through broken as well as complete objects. The conceptualisation of the fragments of broken things as nonhuman "dividuals" (parts of objects or people in contrast to individual objects or people) help us understand the relationship between individuals and dividuals. [65]

[64] G. W. Most, 'On Fragments', in W. Tronzo (ed.), *The Fragment: An Incomplete History*, Los Angeles, Getty Research Institute, 2009, p. 18.

[65] L. Chapman and B. Gaydarska, 'The Fragmentation Premise in Archaeology: From The Paleolithic to More Recent Times', in W. Tronzo (ed.), *The Fragment: An Incomplete History*, Los Angeles, Getty

She likes this new word: “dividuals”. The idea that each person is what they are through “other people, places and things”. This in turn reminds her of epigenetics, the scientific field which looks at how the expression of our genes is affected by our environment – and also, it appears from brand new research, how we *perceive* our environment[66]. We are what we react to – and how we react, and we can alter our reactions, we are not automatons, which connects to Bohm's ideas about our perception of reality.

For the first time in this book on fragments, she comes across the word “fractal”. Coined by mathematician Benoit Mandelbrot in 1975, the Fractal Foundation defines “fractals” as “infinitely complex patterns that are self-similar across different scales.”[67] Says John Briggs in *Fractals: The Patterns of Chaos*:

> Mandelbrot coined the term 'fractal' to suggest 'fractured' and 'fractional' – a geometry that focusses on broken, wrinkled and uneven shapes. Fractal geometry describes the tracks and marks left by the passage of dynamical activity.[68]

Briggs talks a lot about chaotic, dynamical systems like the weather, constantly changing:

> [D]ynamical systems imply a holism in which everything influences, or potentially influences, everything else – because everything is in some sense constantly interacting with everything else. **So, paradoxically, the study of chaos is also the study of wholeness**.[69]

Research Institute, 2009, p. 119.

66 D. Dobbs, 'The Social Life of Genes', *Pacific Standard*, September 2013, https://psmag.com/the-social-life-of-genes-66f93f207143#.561ms4m6r, (accessed May 2015).

67 ‘What Are Fractals?’, *Fractal Foundation*, [website], http://fractalfoundation.org/resources/what-are-fractals/, (accessed May 2015).

68 J. Briggs, *Fractals: The Patterns of Chaos - Discovering a New Aesthetic of Art, Science and Nature*, London, Thames and Hudson, 1992, p. 21.

69 J. Briggs, *Fractals: The Patterns of Chaos - Discovering a New Aesthetic of Art, Science and Nature,*

The part that resonates with her in regards to her own work is: “everything influences, or potentially influences, everything else.” Rather than a piece of writing being fixed each time a reader comes to it, it shifts and morphs under the reader's gaze, depending on so many factors – who is the reader at this moment, where is he while reading, what mood is she in?

This always happens between readers and what is read, but often, she has found, the writer tries to control this experience, to keep her grip on the steering wheel, to say, *this* is what I mean. A novel, for example, would like itself to be read, most probably, in a linear fashion – though she knows readers who read the last page first. Will her book make any demands, to be read straight through or to be approached in various ways? She understands that being the author of the words and the structure, she can't relinquish all authority, and it wouldn't serve her to. But she is holding less tightly.

> ...one reason that the elements in chaotic dynamical systems are so sensitive to their initial conditions is that these complex systems are subject to *feedback.* For example, through its eddies and turbulence, the water in a stream creates feedback by constantly folding in on itself. Systems that change radically through their feedback are said to be non-linear.[70]

This leads her to wonder what happens in a reader's mind while they are reading if not feedback of some sort? She moves from fragments and fractals towards theories of reading. American literary theorist and author Stanley Fish writes in his 1970 article, ‘Literature in the Reader: Affective Stylistics’: “If at this moment somewhere were to ask, ‘what are you doing?’, you might reply, ‘I am reading’, and thereby acknowledge the fact that reading is an activity, something that you do.”[71] [This reminds her of David Bohm’s idea of moving language towards verbs and away from nouns. See Part II.]

London, Thames and Hudson, 1992, p. 21.

70 Ibid. p. 19.

71 S. E. Fish, ‘Literature in the Reader: Affective Stylistics’, *New Literary History,* Fall, 1970, Volume 2 Number 1, https://www.jstor.org/stable/46859, p. 123, (accessed May 2016).

> The objectivity of the text is an illusion, and moreover, a dangerous illusion, because it is so physically convincing. The illusion is one of self-sufficiency and completeness...Somehow, when we put a book down, we forget that while we were reading it, *it* was moving (pages turning, lines receding into the past), and forget too that *we* were moving with it.[72]

Fish, in examining just one sentence of a book, talks about the sentence being "no longer an object, a thing-in-itself, but an *event*, something that *happens* to, and with the participation of, the reader."[73] [This also reminds her of Tronzo's concept of fragmentation being movement. Reading = movement = fragmentation?]

The question, Fish says, is not "what does this sentence mean?" but "what does this sentence do?"[74] One of the theorists behind the creation of reader-response theory, Fish didn't believe a text had meaning without a reader and that the experience of reading is related to what happens over time: "In an utterance of any length, there is a point at which the reader has taken in only the first word, and then the second, and then the third, and so on, and the report of what happens to the reader is always a report of what has happened *to that point*.[75]"

She is fascinated by this idea, that how you place the words, in what order, and at what point a reader will come across them, alters not just the reading experience but the meaning, which is, Fish postulates, created in real time between text and reader, rather than being embedded in the text. This makes her curious as to how each reader may read her book, which often uses the same groups of words in a different order, messing with temporality, with any attempt to pin down chronology. She knew when she was doing this that she was trying to have an effect on the reader over and above the surface meanings of the words themselves. Fish is helping her see how this might work.

Of course, there are texts that make the reader work harder than others. In fact, as

[72] Ibid. p. 140
[73] Ibid. p. 124.
[74] Ibid. p. 124.
[75] Ibid. p. 127.

she is writing this, a review is published of her new book, a poetry chapbook, and the reviewer says: "[Hershman's] prose poems are the least story-full in all her work, but they contain a key to her method. Is the latter poem about a father, a son, a General, a leaden mast or a taxi-driver? We must decide, but in the deciding we've succumbed to the inner, mystical narrative; we've come closer to the poetry."[76] Decisions have to be made by the reader, some measure of authority handed over, some measure of control let slip by the author.

French literary critic Roland Barthes proclaimed the death of the author in the title of his 1967 essay. "[T]he image of literature to be found in contemporary culture is tyrannically centered on the author, his person, his history, his tastes, his passions"[77], he wrote. In Barthes' ideal situation "it is language which speaks, not the author: to write is to reach, through a preexisting impersonality — never to be confused with the castrating objectivity of the realistic novelist — that point where language alone acts, "performs," and not "oneself"'"[78].

She finds this idea both appealing and troubling as she reads Barthes' essay. To pretend that a work has no author seems extreme, and also, these days with the Internet and so many author interviews, almost impossible. Is it necessary, though? Or even desirable? Sean Burke grapples with Barthes in *The Death and Return of The Author: Criticism and Subjectivity in Barthes, Foucault and Derrida:* "As 'The Death of the Author' repeatedly implies, critical approaches to the text have been in essence theocentric, the history of literary criticism has for the most part been the history of the glorification of the author."[79]

Burke uses an image from science to counteract this idea that, of course, she likes very much: "Observing light passing through a prism (though 'we know' that the prism is

[76] T. McCarthy, 'Fool for Poetry Chapbooks', *Southword Journal*, April 2016, http://www.munsterlit.ie/Southword/Issues/29A/ffp_chapbooks.html, (accessed April 2016).

[77] R. Barthes, 'The Death of the Author', *Image-Music-Text*, translated by Heath, S., New York, Farrar, Strauss and Giroux, 1978, p. 143.

[78] Ibid.

[79] S. Burke, *The Death and Return of The Author: Criticism and Subjectivity in Barthes, Foucault and Derrida*, Edinburgh, Edinburgh University Press, 1992, p. 25.

not the absolute origin of the resplendent spectacle before us) we do not deny the effect upon the light, still less call for the death of the prism."[80] Exactly! There is a middle ground between authorcide and worshipping the author as a godlike figure with, as Burke says, "univocal mastery of their texts"[81].

She wishes to be this kind of author, the prism: someone the reader is aware of as having written the book they are holding, but not overpowered by. Someone her ideal reader feels free to ignore completely when deciding what "her" book means – making it their book.

She is counting on the phenomenon that H. Porter Abbott discusses in *The Cambridge Introduction to Narrative*: "[W]e overread. That is, we find in narratives qualities, motives, moods, ideas, judgements, even events for which there is no direct evidence in the discourse...Our minds abhor narrative vacuums. We try to fill them in..."[82]

She is relying on the reader of her book to "overread", to fill in the vacuums she is creating, to weave a narrative "whole" from the parts. "Particle fiction" is the name she has invented for this "genre" of books made of parts, and, before she begins to create her own, she takes an in-depth look at several books that she has decided fit the definition of her new term. She takes the books, and, like a scientist, she experiments.

[80] S. Burke, *The Death and Return of The Author: Criticism and Subjectivity in Barthes, Foucault and Derrida*, Edinburgh, Edinburgh University Press, 1992, p. 27.

[81] Ibid. p. 25.

[82] H. Porter Abbott., *The Cambridge Introduction To Narrative*, Cambridge, UK, Cambridge University Press, 2008, p. 89.

Part V: Particle Fictions: **Experiments**

Particle fiction

noun: a book-length work made in some way of parts, where the parts may be fiction, non-fiction, poetry or other, and which is designed to work as a whole

She has come across a number of examples of works she considers to fit the definition of "particle fiction", her new term, over the years, and which inspired this practice-based research. She now begins to collect more, focussing on the 21st century only for the purposes of narrowing the scope, of not going mad. Some are labelled "novels", some "poetry", some "lyrical essays", some nothing at all. One is in the style of auction catalogue entries. They are quite different from each other in the nature of their parts or particles, and the relations between them.

Particle fiction examples

An Acre Of Barren Ground by Jeremy Gavron

Artful by Ali Smith

Bluets by Maggie Nelson

Citizen by Claudia Rankine

Dept. of Speculation by Jenny Offill

The Faraway Nearby by Rebecca Solnit

Important Artefacts and Personal Property From The Collection Of Lenore Doolan and Harold Morris, Including Books, Street Fashion and Jewelry by Leanne Shapton

Lazarus is Dead by Richard Beard

Meridian by David Rose

Mr Fox by Helen Oyeyemi

Petit Mal by DBC Pierre

Sea of Hooks by Lindsay Hill

Telegrams of the Soul by Peter Altenberg

Transatlantic by Column McCann

Why Did I Ever by Mary Robison

She wants to know what constitutes a work of particle fiction. *What* is it? *How* is it? *Why* is it? She chooses several works, and decides to perceive [following David Bohm's ideas about perception and reality; see Part II] that she is not analysing them in the way someone might if they were doing literary criticism, but running experiments to collect data, in the manner of a scientist. After all, her first training was in science and the scientific method.

Science and Literature

She is, of course, not the first to try and bring together science and literature, she is – as scientists themselves often say – standing on the shoulders of giants, those that came before her. For example, a movement called "Vorticism" was founded by British writers Wyndham Lewis and Ezra Pound. Andrew Logemann, in 'Physics as narrative: Lewis, Pound and the London Vortex',[83] writes that the two were "conversant with the discourse of modern energy physics, and sought to instantiate a common discourse between science and the arts."

> [T]hey frequently argued that art was a form of science, or that art and cultural criticism could adopt scientific methodologies. Pound, for example, argues in 'The Serious Artist' (1913) that 'the arts, literary, poesy are a science, just as chemistry is

[83] A. Logemann, 'Physics as Narrative: Lewis, Pound and the London Vortex', *Vibratory Modernism,* A. Enns and S. Trower (eds), Basingstoke, Palgrave Macmillan, 2013, p. 80.

> a science. Their subject is man, mankind, and the individual. The subject of chemistry is matter considered as to its composition."

Pound and Lewis took inspiration from electromagnetic field theory's "vortex atom", says Logemann, which they used to provide "a scientifically inflected language with which to theorise the role of energy and moment in art and culture."

Another well known use of science in literature is by the members of the Ouvroir de Littérature Potentielle (Oulipo) group, founded in France in 1960. Current Oulipo president Paul Fournel writes, in the introduction to *State of Constraint: New Work by Oulipo*:

> The notion that governed the birth of the group – that of turning to mathematics and science in order to develop new literary structures – initially belonged to two long-term accomplices, Raymond Queneau and François le Lionnais: the first a writer and mathematician; the second a scientist by training and by vocation a universal inquirer. For a long time they had been planning to bring writers and mathematicians together to work in the field of literature... [84]

What the Oulipians did is to invent new constraints for themselves when writing/ constructing a text, often with a mathematical basis. One example is a technique called S+7, (or "N+7" in English), invented by Jean Lescure, in which every noun in a text is replaced by the seventh noun that comes after it in the dictionary[85]. And one of the most famous books produced by the Oulipo group is *Life: A User's Manual*[86], by French writer George Perec. The book's English translator, David Bellos, explains in his article, 'Mathematics, poetry, fiction: the adventure of the Oulipo', that *Life: A User's* Manual is

[84] P. Fournel (ed), 'Introduction', *State of Constraint: New Work by Oulipo*, San Francisco, McSweeney's, 2006, p. 5.
[85] 'S+7', Ouplio.fr, [website], http://oulipo.net/fr/contraintes/s7, (accessed 3 May 2017).
[86] G. Perec, *Life: A User's Manual*, transl. D. Bellos, London, Collins Harvill, 1988.

inspired by the mathematical concept of an "orthogonal bi-square of order 10...which distributes pairs of elements around a grid in such a way that no pairing occurs twice, and no element is used more than once along each row or down each column"[87].

However, Perec didn't just take the mathematical concept, he twisted it, writes Bellos, perhaps in order to say: "(a) mathematics is the literal ground on which literature stands; (b) to become a work of literature, the mathematics must be broken, disrupted, treated as a joke."[88]

This appeals to her greatly. Before coming across Oulipo she had already experienced how imposing constraints can liberate a piece of writing, and constraints taken from mathematics are particularly exciting to her. She also appreciates that the Oulipians didn't feel "constrained" by their own constraints; they felt free to break their own rules and play, a vital component of her own approach. When she did discover Oulipo, the knowledge that other creative writers were using science gave her permission to continue with her own literary experiments, in her own way.

However, she hasn't found any evidence that the Oulipian writers used physics. This section is also not referring to generating new work but carrying out experiments on existing works – whose authors may or may not have had science in mind during their construction – using particle physics as inspiration and frame. Once again, there are existing models for this, chief among them those described in Franco Moretti's book, *Graphs, Maps and Trees: Abstract Models for a Literary History.*

As Italian geneticist Alberto Piazza writes in the afterword to the book:"[L]iterary writing can be construed as a system that is not bound by the particular instruments it has itself created and is capable of metabolising metaphors and ambiguities belonging to several systems of knowledge... the system of scientific knowledge...is paradoxically very

[87] D. Bellos, 'Mathematics, poetry, fiction: the adventure of the Oulipo', BSHM Bulletin: Journal of the British Society for the History of Mathematics Vol. 25, Iss. 2, 2010, pp. 16-17.
[88] Ibid. p. 21.

well suited to such a metabolising function". [89]

She reads this after she has already decided to use a system of scientific knowledge as a tool to analyse the particular genre of literature she is interested in. The language that Piazza uses here she finds somewhat ambiguous; she is not sure she understands his sweeping statement about literary writing not being bound by its own instruments, given that his field is not literature but science, and it is a shame, she thinks, that he uses the word "paradoxically", which exacerbates, once again, the apparent divide between the sciences and the arts. However, if Piazza meant that literary criticism is not the only method for analysing literature, she agrees.

Moretti is an Italian literary scholar and founder of something called the "Literary Lab", and he uses "graphs, maps and trees" to take a look at literature from a new angle. Her approach to this ask will employ particle physics. So, what would a physicist do next?

Protocols

What a scientist does before beginning an experiment is write a "protocol", which is "simply a recipe, or written design, for performing the experiment," says the Pennsylvania State University's very concise "Write a Protocol"[90] online guide (see Appendix A (i) for the full guide). The guide says:

> You must write a protocol to insure that you have both a clear idea of how you will do the experiment and that you will have all the materials that are needed...Following the completion of the protocol, the next step in the scientific process is to perform the experiment. As the investigation takes place, observations are made and results are recorded.

[89] F. Moretti, *Graphs, Maps and Trees: Abstract Models for a Literary History*, Verso, London, New York, 2005, pp. 95-96.

[90] J. McLaughlin, 'Write a Protocol', Pennsylvania State University http://www2.lv.psu.edu/jxm57/irp/prot.htm, (accessed August 12, 2014).

The protocol should have the following sections: Purpose, Materials, Methods, Controls, Data Interpretation, and References. Apparently, "it should be possible to write a good protocol in less than a page...Remember do not write "fluff," i.e., extraneous information and/or overly descriptive text that is not relevant to the experiment. The reader of a protocol is interested in being informed concisely and accurately!![91]

She comes upon the concept of the "null hypothesis": " a hypothesis which the researcher tries to disprove, reject or nullify"[92], and decides she will adopt this approach. Here is her protocol:

Protocol for Particle Fiction Experiments (Aug 2014)

Abstract *(write after)*

Study description

- Study question/objective: How does a work of particle fiction bring together its parts to form a coherent whole?

The following null hypotheses will be tested:

1. A work of particle fiction is not made of parts.
2. When a work of particle fiction is separated into its constituent parts, no relationship of any kind will be found between one part and another.
3. Within a work of particle fiction there are no references to its particulate nature.
4. A work of particle fiction is not a coherent whole.
5. A particle in a work of particle fiction cannot be broken down into smaller sub-particles.
6. These smaller sub-particles, if they exist, have no relationship to each other or to the particles.

- Specific aims: To meet these objectives, the following specific aims have been identified:

1. Identify works of particle fiction and choose 3 to study in depth

[91] J. McLaughlin, 'Write a Protocol', Pennsylvania State University http://www2.lv.psu.edu/jxm57/irp/prot.htm, (accessed Aug 12, 2014).

[92] 'Null Hypothesis', Explorable.com, [website], https://explorable.com/null-hypothesis, (accessed April 17 2017).

2. Define what a “particle” means for each subject.
3. Record information about each particle, in terms of length, size, word count, percentage of book size (pages, words), position in book relative to other parts, and other information about the subject.
4. Look for relations between one particle and another using the above parameters.
5. Examine each particle to see if it can be further broken down into sub-particles.
6. Look for relations between subparticles.
7. Compare the results for all subjects to attempt to formulate a Standard Model of Particle Fiction.

- Study population: works of particle fiction, defined as book-length creative works made of parts
- Sample size: 3 books
- Subjects: selection and definitions

1. Eligible are book-length creative works comprised of fiction, perhaps in combination with non-fiction, poetry and graphical elements, that are made up of at least two parts, with no maximum number of parts. This is the definition of “particle fiction”.

- Data collection methods: measurement, definitions

1. Methods will take inspiration from particle physics in terms
2. Instruments will include scissors, and a calculator

- Data management and statistical analysis

Strengths and limitations

Significance/expected impact

She does not finish her protocol. She is too excited about getting on with the experiments and plans to come back to it later and fill in the blanks.

The Experiments

Experiment 1. *An Acre of Barren Ground* by Jeremy Gavron[93]

She begins with this book, published in 2005, because this is the particle fiction she is the most intrigued by. A cover quote from Julie Myerson of *The Guardian* sums up the difficulties of labelling Gavron's book, of putting it into neat pigeonholes: “[This] extraordinary novel-come-social history deftly excavates the East End's Brick Lane, in such depth and with such empathy and gusto that it leaves you breathless”. The other cover quote calls it “unique”, and on the back there is one more mention of “novel”, and a delightful description, “topographical compendium”, which says that the “whole is bound with subtle artifice”.

The thing is, she has read the book once through, and she can't figure out how the whole is bound at all. The artifice is very subtle indeed. It seems to be parts that are in no way linked enough to call “chapters” or complete enough to be seen as individual “stories”. Some appear to be the beginnings of stories, some resemble factual or historical accounts, and others are simply uncategorizable. No characters recur from one particle to the next, and although each particle has as a subtitle an address which is to be found on the map included at the beginning of the book, not all these particles appear to be set at that location.

She decides to take the book apart.

Physically take the book apart. Collide with it, smash it, break it into particles, in the way of a high-energy particle collider. See Appendix A (ii) for evidence for this deed, which to her, a writer and lover of books, is deeply wrong and irreverent.

[93] J. Gavron, *An Acre of Barren Ground,* London, Scribner, 2005.

Results

These are an example of the notes she writes on her private blog as she experiments:

> **An Acre of Barren Ground: The Experiment**
> 25 August 2014
> 10:00 am
> Tools: kitchen knife, scissors, pencil, bookstand, camera
> Methodology: If final page is on the back of first page of new particle, it goes with new particle
> Method: ripping it with my hands, the glue mostly keeps the pages together

She writes on the blog while carrying out the book's destruction:

> As I am coming to the final particles, I am feeling much more fondness for this book, like it's a creature I am dissecting that is revealing itself, disrobing slowly.
> I finish taking the book apart at 11.48, 1 hour 48 minutes. There are 34 particles, including the Acknowledgements. As I put the particles back in order starting with 1, I feel the weight of each and suddenly think of bricks. Are they all bricks from Brick Lane, different sizes and shapes, different ages? I am feeling a little dizzy with all the wealth of data in front of me to measure. Where to start?

When the terrible deed is done, she has a sense that the book is happy with her for wanting to know it so well that she has – in the physical and metaphysical sense if not in the textual – destroyed it. She has reduced it, not all the way to its "fundamental building blocks" because these would be below the level of each single letter, deep down into the weave of the paper, to quarks. But to the level of particle that she is interested in.

Her next step is to collect data on each particle and then analyse the results. She chooses the variables she will record, understanding that there are – as there are, too, in

science, and also in life – always different choices that might have been made, by someone else doing a similar experiment. This is what she chooses to record:

- Page numbers
- Length of part/particle in pages
- Title
- Subtitle
- Initial Observations – including point of view the particle is told in, structure of the particle (prose, poetry, sections), subject matter (i.e. immigration, family)

An example of her data:

> **Particle 3**
> Page: 21-27
> Length (pages) - 6
> Title: A white van
> Subtitle: *half-way up Osborn Street*
> Initial Observations: Osborn Street connects to Whitechapel Road on the map
> *(final page on back of first page of Particle 4)*

Data Interpretation

The book is 340 pages long and consists of 34 particles and she can't at first see any connections between them. She writes on her blog:

> Inspired by Franco Moretti's Graphs, Maps and Trees[94] I realised that I hadn't simply plotted the particles of this book along the map of Brick Lane and its environs that begins the book. I did that, and discovered that they move northwards up the street,

[94] F. Moretti, *Graphs, Maps and Trees*: *Abstract Models for Literary History,* London, Verso, 2005.

crossing from side to side, but always going north. I drew a map of this and traced the route. Then I decided to look and see if I could see any links between the particles on the east side of the area and those on the west, dividing them between "obviously factual" particles and "story/fiction" particles. I couldn't see any pattern. I decided not to keep going with the full "cataloguing" of each particle by theme because I could see nothing was jumping out – and, as with particle physics, more data doesn't not necessarily give more information, it's how you sift it, how you look.

So my conclusion is that the only structure to the book that I can discern is geographical, along the map of the area, which the title does lead us towards."

To visualize this, she takes the map that is included in the book:

[image removed from this digitised version]

Fig 1: Map from *An Acre of Barren Ground*

then plots each particle along that map:

[image removed from this digitised version]

Fig 2 Map Plot of each numbered particle along map

then traces the route the book takes through each particle, moving north:

[image removed from this digitised version]

Fig 3. Spatial plot of particles moving south to north (with map)

and subtracts the map from this route:

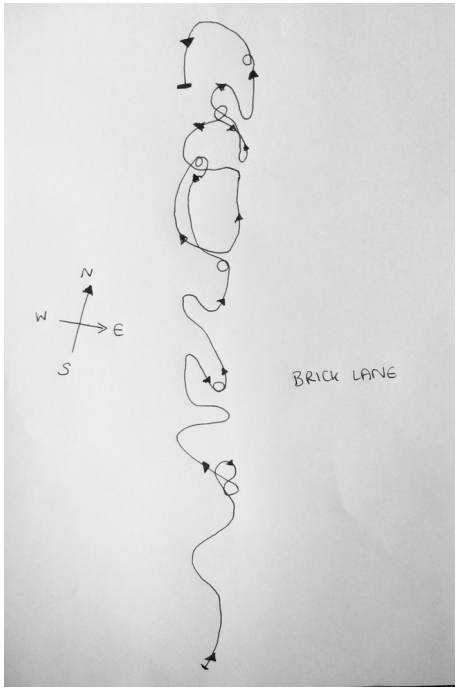


Fig 4. Spatial plot of particles moving south to north (without map)

Her next step is to make a list of particles according to whether they are on the west or east side of Brick Lane, with each particle's major theme and content style (see Appendix A, (iii)).

Conclusion

Moretti asks of "literary maps": "[W]hat exactly do they *do?* What do they do that cannot be done with words...?"[95] Her response is that as regards this book, *An Acre of Barren* Ground, the map that is included in the book is the only clue – is "clue" the correct word? – to what this book *is* or *might be*. There is nothing in the words of the book itself which explains why all these parts have been placed between the covers to create a whole, if that is even the author's intention. Plotting the particles as maps and lists has not given her a

[95] F. Moretti, *Graphs, Maps and Trees*: *Abstract Models for Literary History,* London, Verso, 2005, p. 35.

great insight, has not changed her sense that this book, for her, this particular reader, does not come together as a coherent entity. Yes, there are themes that recur (history is the major theme), but this is not strong enough to create cohesion, coherence.

What is a particle in this book? What would Varzi say[96] (See Part III)? She decides that the closest definition is "the cutlery is part of the tableware". These texts inside the book, each of which stand alone, are part of the book because the author has put them in the book. A sort of circular definition here of a part, but each particle doesn't seem to impact on the others – in a similar way, a set of cutlery may or may not contain, say, a cake fork, at the whim of the cutlery manufacturer. And a fork removed from a set of cutlery wouldn't affect the knife or spoon being used.

As a reader, these particles are like fragments as she understands the term (see Part IV), in the sense that they seem neither to be standalone entities (short stories, essays or other), nor do they form part of a whole, so perhaps there is a whole which they (each particle, or set of particles) were part of – or might have formed part of – that is not presented here? She thinks of the particles as "individuals", as opposed to the idea of the "dividual" in the archaeological sense: "parts of objects or people in contrast to individual objects or people."[97]

Turning to particle physics, her conclusion is that each of the particles in *An Acre Of Barren Ground* can be considered to belong to one of two families – **Storylikes** and **Factlikes** – as particles in the Standard Model of Particle Physics have been assigned to the boson or fermion families due to certain of their properties. Of course, as in other versions of the Standard Model which divide particles into quarks and leptons instead, looking at different properties would assign this book's particles differently: those on the

[96] A. Varzi, 'Mereology', *The Stanford Encyclopedia of Philosophy,* [website] http://plato.stanford.edu/entries/mereology, (accessed October 2014).

[97] L. Chapman and B. Gaydarska, 'The Fragmentation Premise in Archaeology: From The Paleolithic to More Recent Times', in W. Tronzo (ed.), *The Fragment: An Incomplete History*, Los Angeles, Getty Research Institute, 2009, p. 119.

west side of Brick Lane on the map, and those on the east, for example. There are so many possibilities, and she has not exhausted them, but does not think that further delving into the data would yield greater insights.

She decides also to assign to each work of particle fiction a number, the "coherence quotient", a measure of how well the particles connect to one another to form some sort of coherent whole. This book is the least coherent of all those she reads, it does not seem to be aiming for coherence. Only its map ties the particles together, which is what gives it a Coherence Quotient (CQ) greater than zero.

Later, after completing this experiment, she is reading another book by Jeremy Gavron, a memoir, in which he says: "My subsequent two novels had little to do with [my mother] Hannah, but both are fragmented narratives, collections of half stories left for the reader to piece together, find some greater sense in.[98] Gavron has only written two novels, and so this must refer to *An Acre of Barren Ground*. She feels somewhat vindicated in her opinion of the book – although she also believes that an author may not know what his or her own book is about or how it works!

Acre of Barren Ground Particles = cutlery, individuals, families. CQ: 10%

Experiment 2. *Mr Fox* by Helen Oyeyemi[99]

The second experiment is on *Mr Fox* by Helen Oyeyemi, described on the front cover by Sarah Waters as "a wonderfully inventive novel". Once again, a work of particle fiction being labelled a "novel". (She was told by Oyeyemi herself that Oyeyemi sees this book as a short story collection. But labelling, as both writers know, is often a marketing decision,

[98] J. Gavron, *A Woman On The Edge of Time,* Melbourne, London, Scribe, 2015, p. 97.
[99] H. Oyeyemi, *Mr Fox,* London, Picador, 2012.

nothing to do with the author.[100] Novels win more prizes.)

She does not literally take this book apart because it is particulate in a different way, a weaving of stories within one main story, which would be very difficult to physically unstitch. She learns from Mieke Bal's book, *Narratology*, that this structure is termed a "frame narrative" with "embedded narratives": "[S]o-called frame narratives: narrative texts in which at the second or third level a complete story is told. The classic example is the story cycle of the Arabian Nights."[101] She is intrigued by this terminology, which already leads her to see *Mr Fox* in a different way from how she initially read the book, before the start of this PhD.

Results

She writes on her blog:

> Beginning, I am already seeing that this book is more complicated to define than AAOBG [An Acre of Barren Ground], but also, at the same time, much more thematically and structurally connected. I can see she's planting a lot of hints as to the themes of the book and how it should be taken.

(See Appendix A (iv) for the full blog post.)

Mr Fox contains 22 particles. This is an example of the data she records:

Particle 11
- No Title - framing narrative
- p94-100
- First person – Mr Fox
- Characters: Mr Fox, Mary Foxe
- Time – 9-10 years before framing narrative "now", "before Daphne"
- saving life
- war
- books

[100] For further reading on authors and market demands, see J. B. Thompson, *Merchants of Culture*, Cambridge, UK, Polity Press, 2012.

[101] M. Bal, *Narratology: Introduction to the Theory of Narrative*, Toronto, University of Toronto Press, 2009, p. 57.

fire
crazy
dead
names: joe persano, tom franklin, ivor ross
HINT quotes p 95 “And here I am, whole”
gun
suicide
pipe/tobacco/smoking
false memory
wife
happiness
manhood
marriage
drunk
reconciliation
door
violence/hitting

(See Appendix A (v) for a selection of more of the data.)

Data Interpretation

She looks at her data on the 22 particles and – as with her experiment on *An Acre of Barren Ground* – chooses particular properties she will sort the particles by. The most obvious property in *Mr Fox* is **TITLE.** There are 12 **Untitled Particles** and 10 **Titled Particles**. While reading, she defined particles with **titles** to be standalone short stories, often with characters that do not appear in more than one story (several were published as individual stories before the book itself was published), and she now defines **untitled** particles, which have recurring characters, as being part of the single frame narrative.

The next parameter she chooses with which to interpret the data is the incidence of particular **THEMES** across the particles. She has made a list for each particle of the themes, and now she counts the number of particles with one of the seven themes that appear to be the strongest/most frequent (see Appendix A (vi), fig. 1.).

She mines the data further by dividing themed particles into Untitled (**UT)** and Titled (**T**) Particles (see Appendix A, (vi), fig 2). And finally, she classifies according to

whether they occur in the first or second half of the book – Early Particles [particles 1-11] (**E)** and Late Particles [particles 12-22] (**L)** (see Appendix A (vi), fig 3.)

While these tables begin to give her a sense of the structure of the book, depicting it graphically may make it clearer. Her first graph (fig. 5) plots themes by number of particle, divided into titled and untitled particles.

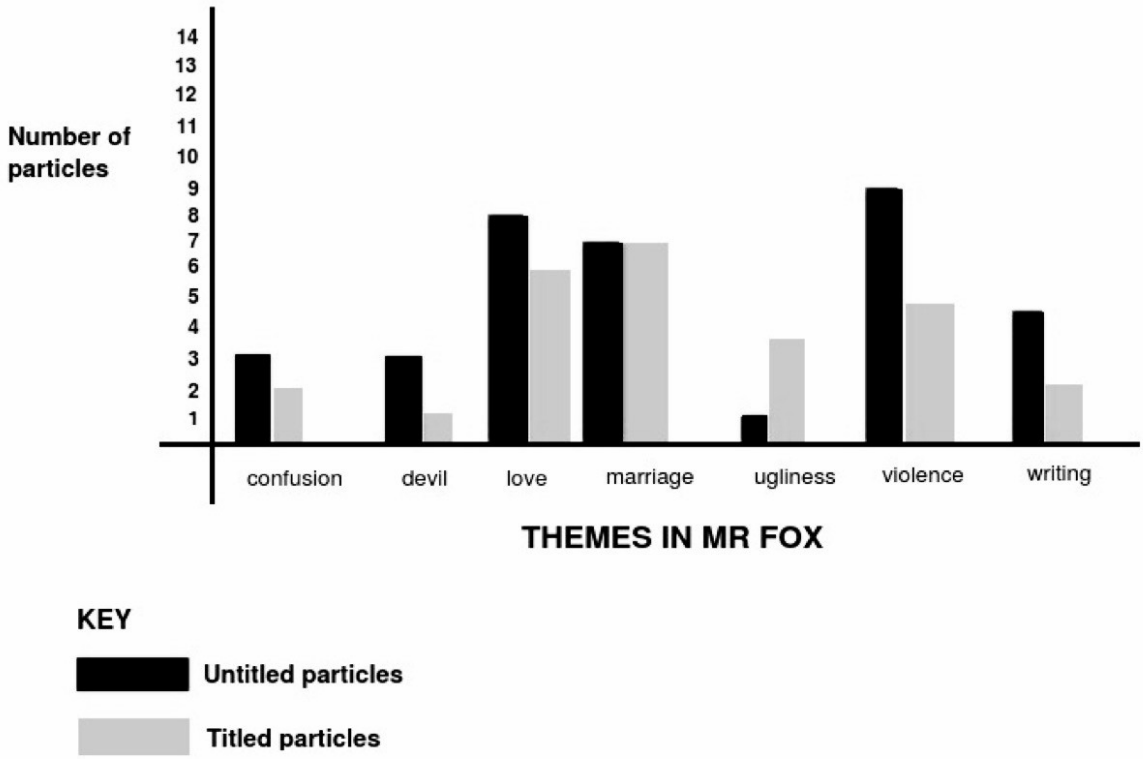
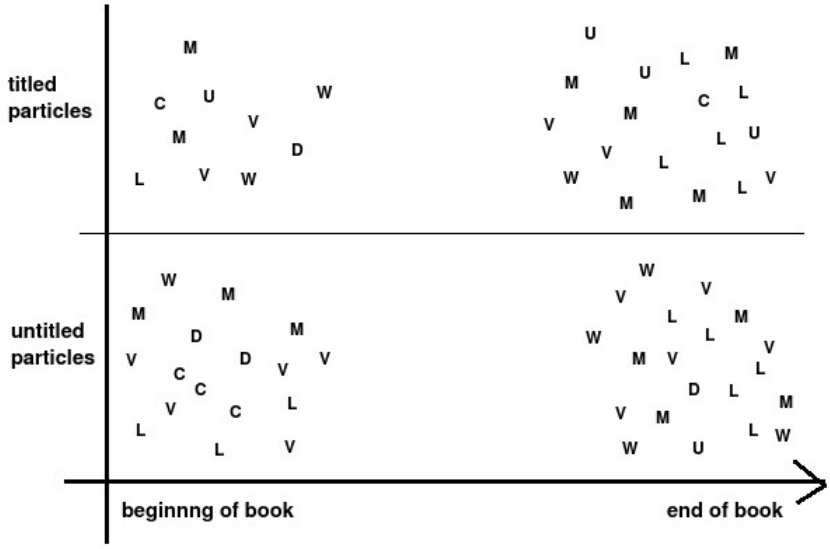


Figure 5: Themes in Mr Fox according to No. of particles, Untitled and Titled

This is definitely clearer, she thinks, than staring at tables of numbers. Here she can see that the themes that are the most frequent in the **titled** particles – which are the storylike particles that could potentially stand alone – are marriage, love, violence and ugliness, whereas the **untitled** particles, which form part of the frame narrative, feature violence, love, marriage, and writing.

The question that arises for her next, given this data, is how the themes shift as the book progresses, and she plots this on a graph-cum-map (see fig. 6). From an initial glance, love is definitely a theme that gets more prevalent throughout the book, as does ugliness, whereas the incidence of violence lessens. None of the themes disappear entirely, all are present throughout the book.



PROGRESSION THROUGH MR FOX BOOK

KEY TO THEMES

C Confusion
D Devil
L Love
M Marriage
U Ugliness
V Violence
W Writing

Fig 6. Map of themes as reader progresses through book, untitled and titled particles

Next, she zooms in on the three most prevalent themes to see if she can learn anything about their incidence as the book progresses (see fig. 7). This isn't very enlightening.

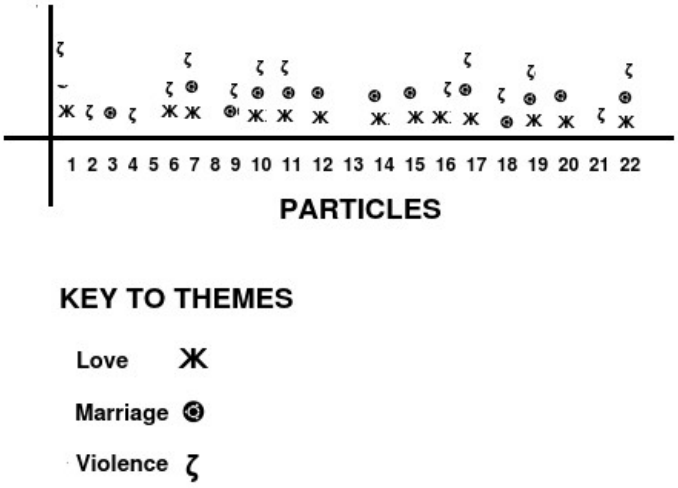


Fig 7. Three most prevalent themes by particle

Finally, she decides to visualise how the titled particles are actually embedded in the frame narrative, which is made from untitled particles (see fig. 8). It looks like a strange diagram of New York subway lines!

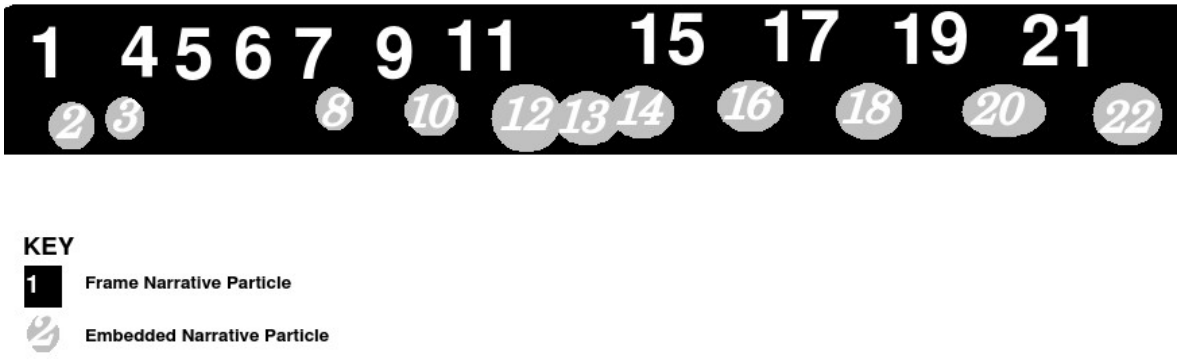


Fig 8. Pictorial Representation of frame narrative with embedded narratives

This helps her see more clearly how embedded (**titled**) particles aren't evenly spaced, there is a small cluster at the beginning, a large cluster in the middle, and then they are dotted throughout the remainder. What she notices now is that the book starts with the untitled frame narrative but ends with a titled embedded narrative particle, seemingly undermining

the concept of “frame narrative”, like a picture frame with three sides to it.

Conclusion

What do the graphical representations illuminate about *Mr Fox* by Helen Oyeyemi? First, she concludes that *Mr Fox* forms a more coherent whole than *An Acre of Barren Ground*, and appears to have a well-thought-out structure, a pattern of weaving the embedded narratives (**titled** particles) into the single frame narrative made up of **untitled** particles. She had the sense of such coherence and patterning from reading the book, but portraying *Mr Fox* in this way, through visuals and diagrams, clarifies this.

What does she make of the finding that the frame narrative doesn’t entirely frame the book? This is a book about storytelling, and she sees this authorial choice as subversive, a hint that stories can’t be contained within a frame – even if the author was not thinking in narratological terms and chose her particle order on instinct (which is how she herself works; she doesn’t think about narrative theory when writing.)

Of course, as in the previous experiment, it is down to the experimenter’s choice of variables and of methods for portraying the data, but here, as opposed to *An Acre of Barren Ground*, there are variables that are more obviously essential to the structure of the book, and picking other variables may not bring to light a hidden aspect of the book.

What would Varzi and the fragmenters say? *Mr Fox*’s untitled particles resemble “the left half is your part of the cake”[102], because all the **untitled** particles are essential parts of a whole, the frame narrative, and also made of “frame narrative” in the same way that the left hand part of the cake is made of cake – whereas the handle doesn’t have essential “mugness” and the mug would function without it, say. The cake wouldn’t be a whole without its left half – or, in other words, if the left half was gone, it would be a different entity entirely. These particles are “dividuals”[103], affected by the particles that

[102] A. Varzi, 'Mereology', *The Stanford Encyclopedia of Philosophy,* [website] http://plato.stanford.edu/entries/mereology, (accessed October 2014).

[103] L. Chapman and B. Gaydarska, 'The Fragmentation Premise in Archaeology: From The Paleolithic to

come before and after.

The **titled** particles, however, are individuals – a number of them, as mentioned, were previously published as short stories – and although they are important parts of the whole that the author is creating here (more important, it seems than all the particles in *An Acre of Barren Ground*), they are like cutlery, too, in that they can each be separated from the set, the whole, and still function as a knife, say, becoming their own whole.

In terms of particle physics, all the particles in *Mr Fox* are "storylike", but here there is a subset of the storylike particle according to two new properties: **titled** and **untitled**. And for her this work of particle fiction works perfectly as a coherent whole. (Is perfection, total completeness, unscientific? She knocks of 5% to account for this possibility.)

Mr Fox Particles = cake, cutlery, dividuals, individuals, storylike subparticles (titled and untitled). CQ: 95%

Experiment 3. *Bluets* by Maggie Nelson[104]

This book, with no cover quotes, describes itself quietly on the back as "essay/literature". The major clue as to how to approach it, is the epigraph:

> *And were it true, we do not think all philosophy is worth one hour of pain.*
>
> PASCAL, *Pensées*

This is what Wikipedia says about *Pensées* by French philosopher and mathematician Blaise Pascal: "The ***Pensées*** (literally "thoughts") is a collection of fragments on theology

More Recent Times', in W. Tronzo (ed.), *The Fragment: An Incomplete History*, Los Angeles, Getty Research Institute, 2009, p. 119.

[104] M. Nelson, *Bluets*, Seattle and New York, Wave Books, 2009.

and philosophy"[105]. The Pensées are numbered statements. So even before we reach page one, those who are familiar with Pascal's work – or take a moment to look it up – have an idea about the structure of *Bluets.* She realises as she is writing this that the epigraph also leads us to think about pain as a theme, one aspect of "blueness". She considers cutting *Bluets* up, separating each of its small numbered parts, but because one is often on the back of another, this would entail buying numerous copies, and she is not sure, having done it once, the utility of doing it again.

Results

The book is 95 pages long and is composed of 240 particles, the largest number of particles in the works she is experimenting on. By particle 155 she decides to end her data collection here, that this is a large enough representative sample to draw some conclusions about this book. (Surely scientists do this too?) On her blog she writes:

> The first particle (1) throws you straight in, it's fiction-like in voice, seems to be addressing the reader, and is both magical and a bit unnerving with its mention of excrement and sea-horses!…In particle 8 on Page 4 she suddenly introduces a new story - "I want to stop missing you". Is this THE story? It's mysterious, it's subtle… This backstory is now weaving itself in more - blue guitar, index finger?? … In particle 14 she talks about community of blue - just by talking about the book she says she's working on, without writing it, people send her things. What is a book before it's written? ...It really feels like many of the particles are little prose poems/flash stories. It's beautifully woven...I've just realised there are two personal storylines woven through this - the story with the ex-lover, and the friendship with the friend who is paralysed…I notice that I only notice non-mentions of "blue" after the fact, I am so absorbed in what's going on, in the writing...

(See Appendix A (vii) for the full blog post.)

[105] 'Pensées', *Wikipedia*, [website], https://en.wikipedia.org/wiki/Pens%C3%A9es, (accessed July 2014).

An example of the data she collected during this experiment:

Particle 7
Carries on directly from (6)
Page 3-4
Length 17 lines
Voice: First person
Style: Colloquial, fiction-like, talking directly to the reader.
Starts with a question
Tone: Interrogative & philosophical
Themes:
love
blue x 6
fooling yourself
sublimity – reference to Pascal/philosophy?
admission
ultramarine (a new blue – 2)
museum
history
pigment
blue object/stuff
observing/viewing
eating/ingestion/food
sex/virgin
body/nipples
accessing blueness

(See Appendix A (viii) for more data from this experiment.)

Data Interpretation

The obvious property to begin with when analysing *Bluets* is **BLUENESS**: i.e. does a particle have a mention of the word "blue", where this can mean the colour or a reference to sadness or depression. As she starts examining the data, a shape emerges that she had not seen so clearly when reading. She realises while making a list – which also includes two other properties: **CONNECTION (**is the particle connected to one or more other particles) and **STORY** (does the particle refers to **storyline 1** or **storyline 2** or no storyline) – that if she leaves gaps to represent particles with no reference to blue, the list of words and numbers takes on a visual dimension, it begins to look like a map.

She decides to turn this list into an image. Once she does, and turns it on its side, it immediately brings to mind a barcode – as Wikipedia neatly defines it, is "an optical machine-readable representation of data; the data usually describes something about the object that carries the barcode"[106]. This is relevant to the image she has generated, which describes something about the object that is *Bluets*.

She then realises it more closely resembles an experiment printout she saw often when she was writer-in-residence in a biochemistry lab: the product of the biochemical process of gel electrophoresis, which "is a laboratory method used to separate mixtures of DNA, RNA, or proteins according to molecular size,"[107] according to *Nature* journal.

Fig 9. Example of a barcode[108]

[image removed from this digitised version]

Fig. 10. Product of Gel Electrophoresis[109]

Fig 11. Image of List Particles Which Contain The Word "Blue" As the Book Progresses (Left to Right) (See Appendix A (ix) for the original image.)

106 'Barcode', Wikipedia [website], https://en.wikipedia.org/wiki/Barcode, (accessed 30 April 2017).
107 'Gel Electrophoresis,', *Nature,* https://www.nature.com/scitable/definition/gel-electrophoresis-286, (accessed 23 April 2017).
108 'Barcode languages' {image], Barcode Graphics [website] http://www.barcode.graphics/general-barcode-questions, (accessed 23 April 2017).
109 'Principles of Gel Electrophoresis', Faculty of Science - Biology, Munroe University, Canada [website] https://www.mun.ca/biology/scarr/Gel_Electrophoresis.html, (accessed 23 April 2017).

The next variable that leaps out at her is the voice or point of view each particle is written from, and she plots this on a pie chart (see fig. 12).

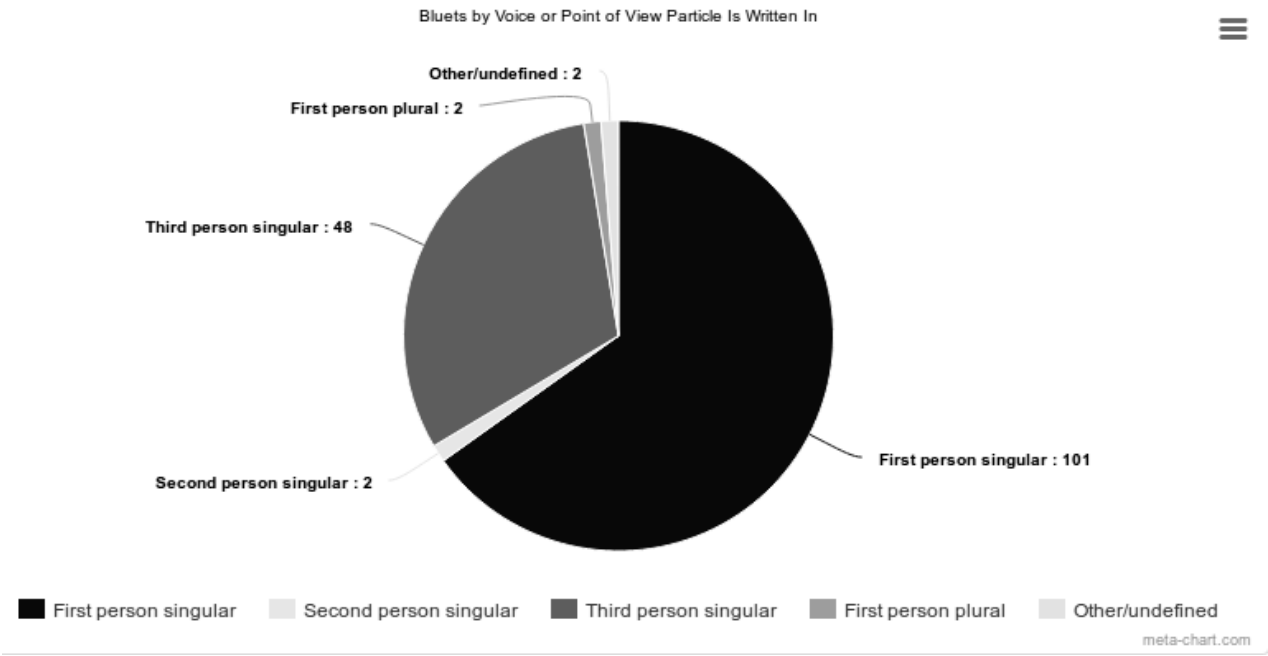


Fig 12. Bluets Particles by Voice/Point of View Particle is Written In

The final variable she examines – since she has looked at content (blueness) and style (voice/point of view) – is length of particle, which she approaches in two ways. First, she does a basic breakdown of the 155 particles by length, divided into three groups: under 10 lines, 10-19 lines, 20-24 lines.

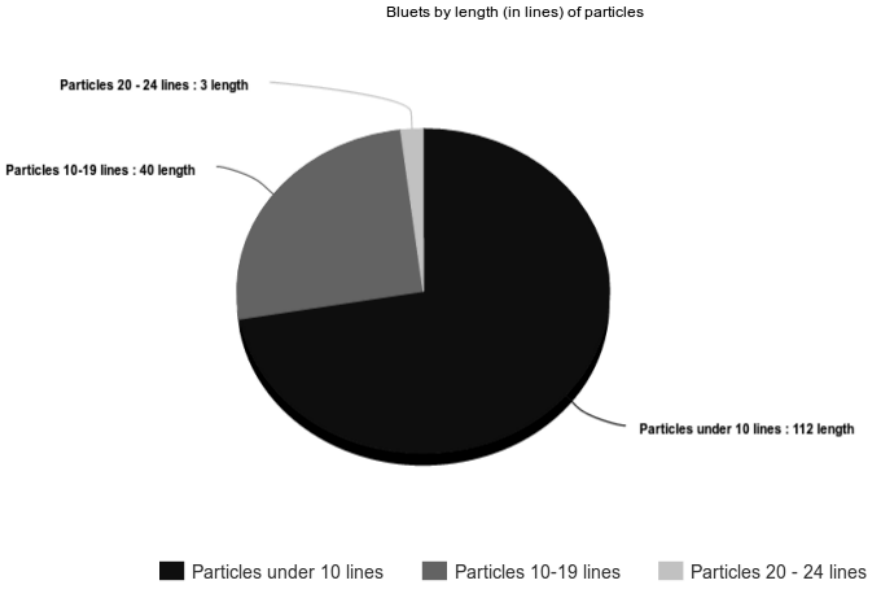


Fig 13. Bluets By Particle Length

It is clear here that the majority of particles are very short. But what happens as the book progresses? She takes a second look at the length data, plotting a bar chart to examine the percentage of particles in each of these three length groups over time through the book. As can be seen from Fig 14, particles do get longer, on average, as the book progresses.

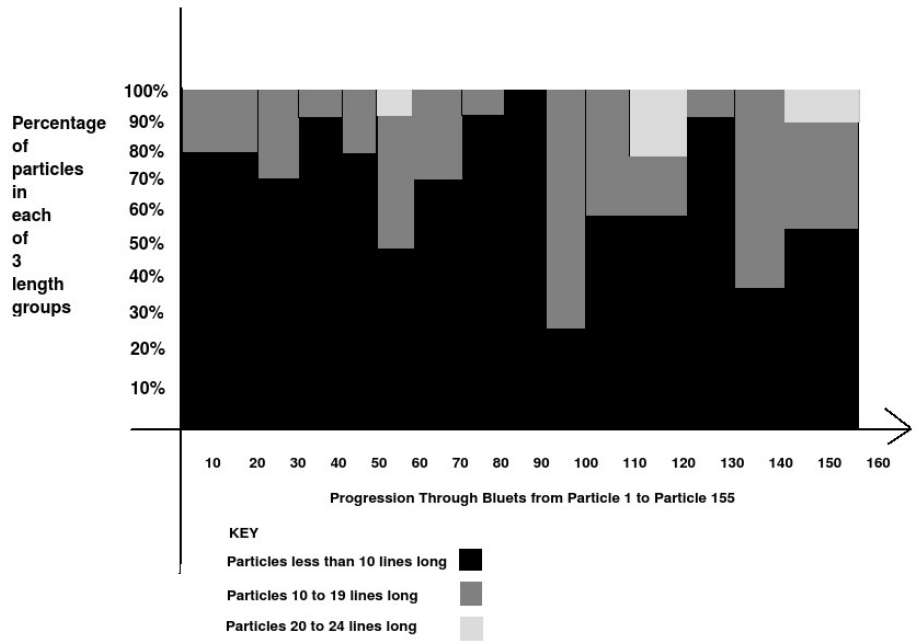


Fig 14. Percentage of Particles in 3 Length Groups As Book Progresses

Conclusion

There are two **storylines** threaded through *Bluets*, one regarding the narrator and her ex-lover, and the other about the narrator and her paralysed friend. These don't seem like frame narratives, though – can there even be two frame narratives? Once again the particles in *Bluets* fall into either **storylike** or **factlike**, but with no further subdivision into **titled** and **untitled –** there are no titles at all. From her data it seems that the majority of the particles are connected to at least one other particle in terms of their content.

This leads her to conclude that *Bluets*' particles are mostly dividuals, inextricable from the whole; very few could stand alone. This is again a case of "the left half is part of the cake" **–** to remove any particles would alter the whole entirely. She concludes that the coherence here is very high.

Bluets: dividuals, cake, storylike, factlike. CQ: 95%

Two More Brief Experiments

Where more full experiments of this scale are outside the scope of this research, she decides to conduct two further, brief experiments to provide supplementary material.

Experiment 4. *Meridian: A Day In the Life With Incidental Voices* by David Rose[110]

Meridian is composed of: 30 titled parts and 4 untitled, all storylike. She writes on her blog:

> I read through *Meridian* by David Rose in one go, one night a few days ago. I would say it's at the North Pole end of literature[111]! It's fairly inaccessible, there is only a slightly coherent narrative thread, a kind of framing narrative, but that never comes to some sort of resolution, it's circular, I think, but I would need to read it again. Then

[110] D. Rose, *Meridian, A Day In The Life With Incidental Voices,* Norwich, Unthank Books, 2015.
[111] M-L. Ryan, 'Narrative and the Split Condition of Digital Textuality', *Dichtung Digital*, 2005, http://www.dichtung-digital.de/2005/1/Ryan/, (accessed August 2015).

> there are embedded narratives, each given a letter of the alphabet, although the order goes a bit funny in the middle. After a few of these short pieces, which each had different characters but weren't exactly stand-alone stories, i seemed to pick up word patterns - words used in one were used in the next, and tied in somehow to the particular letter of the alphabet...The last part of the book has the characters from the alphabetic sections popping back mid-sentence, which I rather loved as a device, this is really experimental! But as a narrative, it didn't work for me. I was trying to understand, trying to see a pattern, but on first read, it left me wanting. I might read it again, see what happens. It definitely inspired me to carry on being very experimental - especially weaving poetry and fiction…

In an interview she found with the author, David Rose, he says: "I ... wanted to write about randomness. It seems to me, with the development of Chaos Theory, that genuine randomness exists in nature on two levels only: the sub-atomic; and the human/social, where the outcome of chance encounters are further rendered contingent by character, mood, ethical outlook…Homonyms embody that random collision of unrelated meanings ... I made a list of them, and set to work. Picking up where the ms. left off – at midday – I replayed a scene from a different perspective, introducing the first homonym near the end, allowing the alternative meaning to generate a new and unrelated narrative, which, in its end on the next homonym, generated the next, and so on; a narrative nuclear fission, setting off a chain reaction of stories, none of which I had any conception of before the process began."[112]

Later on, with someone else's assistance, Rose set about "breaking up the text into three overall sections, and labelling the random narratives alphabetically; all to make it more reader-friendly."[113] While she finds it fascinating, she didn't enjoy reading the book, but she appreciates the experimentation.

[112] D. Rose, 'Meridian by David Rose: A Short History', Unthank Books, [web blog] http://unthankbooks.com/blog/?p=532, (accessed August 2015).
[113] Ibid.

Conclusion

Meridian is also, in a more complex way than *Mr Fox*, a frame narrative with embedded narratives, but some of the embedding happens at the sentence level, not the particle level – a particle might appear in the middle of another particle, mid-sentence. All the particles are **storylike**, there are no **factlike** particles. Most of the particles do have titles which, she understands after reading the above interview, are related to the homonyms he talks about in his randomized process. She is delighted that the author, David Rose, uses the language of physics in talking about his book - "Chaos Theory", "chain reaction" - which makes this the first of the works of particle fiction for which she has some evidence of a physics connection!

How to define the particles here? In Varzi's terms, "The contents of this bag is only part of what I bought" strikes her as pertinent – Rose himself says that the writings are fairly random, they all just happened to end up in the same book (i.e. bag) and that makes them parts of this whole. They are "dividuals", though, because they are so interwoven that they affect each other; to extract one would have wide ramifications. Unsurprisingly, given the author's admission of randomness and chaos, she doesn't assign a very high coherence quotient.

Meridian: storylikes, bag contents, dividuals. CQ: 10%

Experiment 5: *Citizen: An American Lyric* by Claudia Rankine[114]

Citizen by Claudia Rankine is a book tackling the subjects of racism, of personhood and so much more, that has won major poetry prizes but is not so easily categorised. Cover quotes say: "Rankine brilliantly pushes poetry's forms..." and "Wonderfully capacious and innovative..." and call the book "a vivid hybrid of verse, narrative prose and documentary

[114] C. Rankine, *Citizen: An American Lyric,* Minnesota, Graywolf, 2014.

images".

This is the data she records:

Citizen: An American Lyric
Claudia Rankine
158 pages
19 blank pages
7 sections - I-VII - untitled
17 pages with just images
8 pages with images and text
Types of particle:
– Section 1 - 29 paragraphs of prose, all 2nd person, all connected, flowing, ends with image
– Section 2 - 28 longer paragraphs of prose, more essay-like, about videos, Serena, ends with image
– Section 3 - 25 shorter prose paragraphs, more personal, 2nd person, a lot more white space (ironic?)
– Section 4 8 prose paragraphs, each short and each on its own page. No images.
– Section 5 - less paragraphs, more lines, sentences...fragmented, space breaks, 1 image
– Section 6 - 8 scripts for videos
– Script 1, all found material
– Section 7 - half this section seems more traditionally-lineated poetry, then back to short prose paragraphs, 2nd person, autobiog? Ends not in the 2nd person but the 1st.

Conclusion

In this experiment, *Citizen* has **storylike** and **factlike** particles, but, as distinct from the other particle fiction books, it has non-word particles (images), and it is divided into sections or families, within which particles behave differently. Or rather, the seven sections are top level particles, and then there are subparticles within each. She knows that some of the top level particles have been published on their own. So, at one level: individuals; at a deeper level: dividuals. And a relevant parthood analogy is cutlery – both on the level of individual knives and forks, and then deeper, to the tines on the fork, the knife handle. There is a great thematic coherence here, although various subjects are tackled.

Citizen: storylike, factlike, dividuals, individuals, cutlery. CQ: 85%

In Conclusion

Regarding her experiments, she looks back at the null hypothesis from her protocol:

1. A work of particle fiction is not made of parts
2. When a work of particle fiction is separated into its constituent parts, no relationship of any kind will be found between one part and another
3. Within a work of particle fiction there are no references to its particulate nature
4. A work of particle fiction is not a coherent whole
5. A particle in a work of particle fiction cannot be broken down into smaller sub particles
6. These smaller sub-particles, if they exist, have no relationship to each other or to the particles

This is tricky. Yes to number (1), this she can say with certainty she has disproved, as required by a null hypothesis. But from (2) onwards, things get murkier (as she imagines they do in particle physics). Number (2) is not disproved for *An Acre of Barren Ground*, but is for the other subjects of her experiments. Numbers (3)-(5) also vary depending on the book. So, no clear answers have emerged.

One observation she made in the final stages of the experiment, when creating the graphs, maps and other diagrams, is that she has invented this category, "particle fiction" for taxonomic purposes – specifically to categorise books that defy easy categorisation. This is entirely subjective: it's her definition and she is the one to declare what a work of particle fiction is, or might be, and attempt some sort of generalisations. But actually, to use the language of physics, each of these books can be approached as its own universe, with its own types of particles and the relations (or "forces", as physics would have it) between them. Thinking about this, she might have come up with some rudimentary

Standard Model of Particle Fiction, then, for each individual book.

However, her research in this case was designed to help her write her own work of particle fiction and so it was necessary to look across several examples as if they all belonged to this same universe, and see if there was any generalisation to be made. With this in mind, two final diagrams:

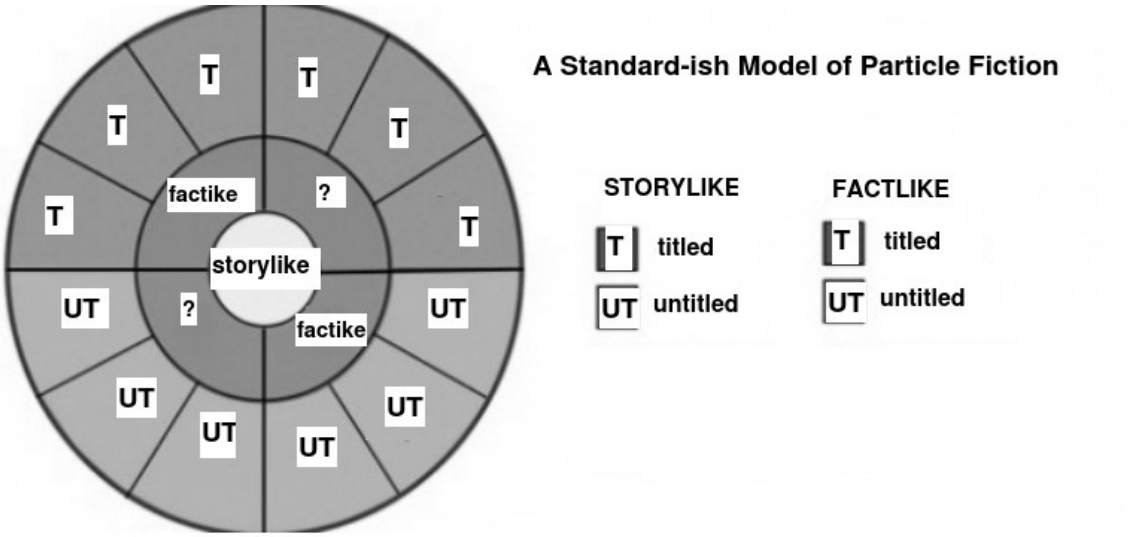


Figure 15: An (Incomplete) Standard-ish Model of Particle Fiction (1), 2017

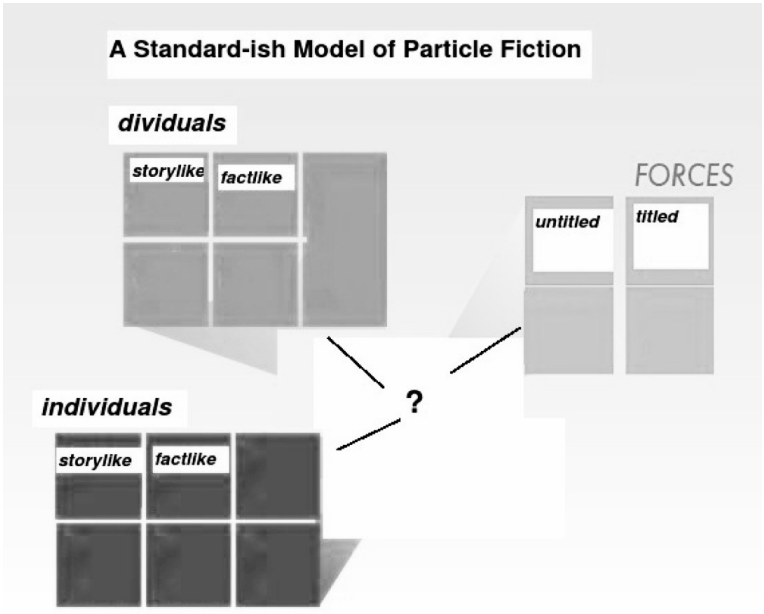


Figure 16: An (Incomplete) Standard-ish Model of Particle Fiction (2), 2017

Two models! With gaps in them, spaces to be filled, by others. It is an attempt. A first attempt, and she is delighted by it. She is satisfied by how she approached the task: like a particle physics experiment, she set out her methodology and she collided in various ways with each book, scrutinising them to attempt to understand the underlying structures, and then presenting the data. Making the graphs, maps and other figures was illuminating, as well as enjoyable. As Franco Moretti says in *Distant Reading*, where, applying the scientific method known as "network theory" to literature, he draws diagrams of nodes and edges between characters in Shakeaspeare's *Hamlet*:

> I had been thinking about Horatio for some time – but I had never "seen" his position within Hamlet's field of forces until I looked at the network of the play. "Seen" is the keyword here. What I took from network theory were less concepts than visualization: the possibility of extracting characters and interactions from a dramatic structure, and turning them into a set of signs that I could see at a glance, in a two-dimensional space."[115]

Collecting data in the way that she did already began to reveal shapes and connections in a language she is not expert in but is comfortable with, the language of numbers, of quantities. She was then required to be creative in imagining how to visualise this data, playing with different formats to see which might reveal the most. She learned a great deal from this process, primarily, as Moretti says, about "seeing", in a way that writers don't often do, being focussed on words and word-meanings. She stepped back and looked at a book as a collection of data points. This is "distant reading", as Moretti defines it, as opposed to "close reading":

> [W]e know how to read texts, now let's learn how not to read them. Distant reading: where distance, let me repeat it, is a condition of knowledge: it allows you to focus

[115] F. Moretti, 'Network theory, Plot Analysis', *Distant Reading,* London, Verso, 2013, and Stanford Literary Lab [website] https://litlab.stanford.edu/LiteraryLabPamphlet2.pdf, (accessed 30 April 2017), p. 11.

> on units that are much smaller or much larger than the text: devices, themes, tropes —or genres and systems. And if, between the very small and the very large, the text itself disappears, well, it is one of those cases when one can justifiably say, Less is more. If we want to understand the system in its entirety, we must accept losing something. [116]

So, what is gained and what is lost? What is lost is the unique nature of each of these books – creating the taxonomic label "particle fiction", as with any definition or genre, blurs individuality, looks for commonalities rather than uniqueness. And all the choices made in her experiments were subjective; another experimenter may well have invented different methods and examined other variables.

This leads her to another physics-inspired literary genre: "quantum fiction", a term coined by American author Vanna Bonta in the title of her novel, *Flight: A Quantum Fiction Novel*, published in 1995[117]. Says Sonia Front in *Shapes of Time in British Twenty-First Century Quantum Fiction*[118]:

> "Fiction writers, poets, filmmakers and other artists, are…allowed to play imaginatively with scientific concepts. And so, there are quantum sculpture, quantum poetry, quantum theatre, quantum fiction and science fiction books and films, integrating the new physics into their plots. While many of the writers have a consistent scientific rationale behind their plots, some deliberately violate scientific principles or incorporate speculative theories for their own purposes.

She has previously read some of the books that are listed by Wikipedia[119] as examples of

[116] F. Moretti, 'Conjectures on World Literature', *Distant Reading,* London, Verso, 2013, and *New Left Review* [website], https://www.ffyh.unc.edu.ar/posgrado/cursos/moretti.pdf (accessed 30 April 2017), p57.

[117] V. Bonta, *Flight: A Quantum Fiction Novel*, San Francisco, California, Meridian House, 1995.

[118] S. Front, *Shapes of Time in British Twenty-First Century Quantum Fiction,* Newcastle-upon-Tyne, Cambridge Scholars Publishing, 2015, p. vii.

[119] 'Quantum Fiction', *Wikipedia* [website], https://en.wikipedia.org/wiki/Quantum_fiction, (accessed April

this genre (*The Time-Traveller's Wife* by Audrey Niffenegger[120]; *Our Tragic Universe* by Scarlett Thomas, [121], *The Eyre Affair* by Jasper Fforde[122]), and she can see how these books could be viewed as both commenting on and utilising ideas from quantum physics. In some cases the books themselves reference quantum physics[123], indicating to the reader perhaps how they "should" be read. Examples include *Carnival*, by Wilson Harris[124], which she finds almost unreadable but fascinatingly so, and *Mobius Dick*[125], a novel written by a physicist, Andrew Crumey, whose main character is a physicist and which Nicholas Lezard in his review in the *Guardian* says is "about non-collapsible wave functions"[126].

She sees some overlap between her notion of particle fiction and the concept of quantum fiction – not least because from quantum physics we get wave-particle duality, the idea that "deep down, everything in the universe has wave nature. Of course, everything in the universe also has particle nature, "as Chad Orzel says in his article 'Six things everyone should know about quantum physics'. "This seems completely crazy, but is an experimental fact, worked out by a surprisingly familiar process." [127]

What as she has done with particle fiction – taking published books and attempting to impose a post-publication genre on them regardless of the author's intentions – others are doing with quantum fiction. She has no objections to this, believing that once a book is published, it is up to the reader how they read it and the conclusions they draw. [Reading a book with a certain genre in mind can alter the reading experience, for good and ill – as

2017).

120 A. Niffenegger, *The Time Traveler's Wife*, Orlando, Florida, Harcourt, 2003.

121 S. Thomas, *Our Tragic Universe*, Edinburgh, Canongate, 2010.

122 J. Fforde, *The Eyre Affair*, London, Hodder and Stoughton, 2001.

123 To read more about the fundamental assumptions of quantum physics, see C. Orzel, 'Six things everyone should know about quantum physics,' *Forbes*, July 8 2015, https://www.forbes.com/sites/chadorzel/2015/07/08/six-things-everyone-should-know-about-quantum-physics/#4dce07077d46, (accessed 6 May 2017).

124 W. Harris, *Carnival*, London, Faber and Faber, 1985

125 A. Crumey, *Mobius Dick*, London, Picador, 2004.

126 N. Lezard, 'Meltdown moments', *The Guardian*, June 11 2005, https://www.theguardian.com/books/2005/jun/11/featuresreviews.guardianreview20#, (accessed January 2017).

127 C. Orzel, 'Six things everyone should know about quantum physics,' *Forbes*, July 8 2015, https://www.forbes.com/sites/chadorzel/2015/07/08/six-things-everyone-should-know-about-quantum-physics/#4dce07077d46, (accessed 6 May 2017).

she has intended it to do here, in her own experiments, but which she prefers not to do when reading for pleasure.]

Returning to Moretti's thoughts on the loss and gain of data visualisation, what is gained here, for the purposes of this PhD? Something vital: The experiments have given her inspiration and permission to see how others' particle fictions were constructed and to create her own particle fiction, in her own way. Not rules, guidelines or proscribed pathways, but ideas, opened doors, many paths. The next step: to write.

Part VI: Particle Fictions: What She Does Next

1. She has never done this before, never written a book-length work, never contemplated one. She has books, yes, but they are collections – of stories, poems – that were written singly, with no thought of coming together, with no thought of pages next to other pages next to other pages. With no thought of: Book.

2. She begins with physics. Often in her writing – mostly short stories up to this point, and more recently also poems – she has used science as inspiration. But she has stayed away from physics because physics is what she is "supposed" to know. She has a BSc in Maths and Physics. But she doesn't know. She barely remembers. And she has been scared. She is still scared. And excited. Her journey has led her here.

3. She attends two undergraduate particle physics lectures given by her external supervisor, Helen Heath, a particle physicist at the University of Bristol, and visits the Physics Department to ask questions. These are some of the notes she takes (see Appendix B (i), (ii) and (iii) for the full lists): Similarity; structure; families; antimatter; interact; supersymmetric; collision of particles = exchange of FORCE; Reconstruct collisions – What just happened; What particles am I not seeing?; The Missing Universe; Don't see ACTION, only COLLISION DEBRIS; NAMES; STANDARD MODEL MIGHT BE WRONG – THRILLING!; Can't SEE anything – DETECTORS, DETECTION; Have sets of FUNDAMENTAL STORIES/PIECES, then COLLIDE THEM – exchange elements.

4. Then she starts to play. She knows something now, after 18 years of writing fiction, about her writing process, which involves minimal thinking, the putting aside of any

research. As a former science journalist, she came to understand a need to short-circuit the strong-voiced, logical part of her mind in order to allow herself to make things up. She has to actively befuddle herself to achieve non-linear connections and sparks. This she most successfully does by always doing something else while she is writing, often playing online scrabble or writing tweets. The other method that works for her is to bombard herself, reading widely, often actively colliding very different ideas to see what emerges.

5. She writes bits, parts, prose, poetry. She uses "found materials" – texts from books and articles on particle physics – and plays with these. Part of this "play" involves imposing constraints, which she finds extremely useful and liberating. She doesn't know about the French Oulipo movement until after she begins. (For more on Oulipo see Part V).

6. She is by now writing a great deal of poetry and decides to try her hand at a sestina – a poetic form with rigid rules involving repetition – inspired by her visit to the physics lab. She also initiates a collaboration with fellow doctoral student, poet and physics enthusiast Miranda Barnes: they set each other challenges to invent new poetic forms inspired by physics theories. These are the rules for the poetic form she invents for gravity, which is defined by two masses exerting force on each other: "2-stanza prose poem, with the title and both stanzas beginning with the same letter, and with one line centred in the middle which contains the last few words "pulled" from stanza one and the first few words "pulled" from stanza two. Number of words is up to the poet, as is the length of the stanzas." (See Appendix B (iv) for the resulting poem, *Bird by Bird.*)

7. She is at the same time experimenting on works of particle fiction, as detailed in Part V. To see what might be possible. To see how she might want to tackle this Book.

8. A story is emerging. One character has a name: Susy. This is directly inspired by physicists' nickname for the theory of Supersymmetry: SuSy. She keeps writing, to find out what happens. This is how it has always worked – she writes stories with no advance planning, no plotting, in order, first, to entertain herself. At the same time, she is feeding herself with all the other topics covered in these poetics, examining wholes and parts, wholeness.

9. She, her supervisor, and three of her fellow PhD colleagues present papers at a conference on experimental narratives in London. The other presentations are fascinating and thought-provoking, especially the talk by literary scholar and critic Marie-Laure Ryan. Ryan describes what she calls three "zones" a narrative work can fall into or aim for: the North Pole, the Tropics and the Temperate Zone[128]. The North Pole is where we find the truly experimental work, where few people go. The Tropics is the most popular place, the location of "mass entertainment", and the Temperate Zone falls somewhere in the middle. After listening to presentations on work which would definitely be found in the North Pole – and hearing privately from one of the presenting researchers that she really didn't enjoy the book she is researching – she decides that she doesn't want to be there, doesn't want her book to be so unreadable. She wants to be read, to entertain.

10. But then something happens when she is on a solitary writing retreat. On Day 1, she receives an email from a literary agent offering to represent her new short story collection. She is thrilled! This new collection is comprised of quite experimental and odd stories and this display of enthusiasm from someone from the mainstream publishing industry is something she has never received before. It gives her a shot of permission to truly experiment with her work of particle fiction. She realises that she had not been letting

[128] M-L. Ryan, 'Narrative and the Split Condition of Digital Textuality', *Dichtung Digital*, http://www.dichtung-digital.de/2005/1/Ryan/, (accessed August 2015).

herself loose, not been really playing the way she loves to do. So she begins again.

11. The first thing she does is use the text she has written so far, short sections about Susy and her interviewers, as her own "found" text and plays with it, to get deeper underneath the surface level of story and of meaning. As Hazel Smith says in *The Writing Experiment,* "A surrealist writer is normally less interested in representing the external world than in conveying psychological and social reality by **presenting** the world in an abnormal way. A surrealist text usually creates a physically impossible situation, it transgresses normal physical laws: it conjures up a situation that doesn't exist in reality."[129]

12. Here is a list of some of the things she does, inspired by physics, fragments, wholeness and parthood relations:

i. *Time / causality*: she runs the text backwards, so the final sentence of the section becomes the first sentence, and the penultimate sentence becomes the second sentence, etc… How does running time backwards change the meaning and the story? What does it tell us about the characters?

ii. *From prose to poetry*: she takes the original text, written as prose, and inserts line breaks to turn it into a poem. What does the collision with the prose "particle" and breaking of it into smaller particles – lines – do to the story, the character, the narrative?

iii. *Shift the breaks*: she then moves words around in this poem, away from their original order. How does a different configuration of word-particles change the meaning, the story?

iv. *Exploding the text*: like an "exploded view" image, which is an "illustration or diagram of a construction that shows its parts separately but in positions that

[129] H. Smith, *The Writing Experiment: Strategies for Innovative Creative Writing*, Crows Nest, Australia, Allen and Unwin, 2005, p. 34.

indicate their proper relationships to the whole."[130] She explodes her initial text too, keeping it as prose but inserting gaps, white space, to see what words then clump together.

13. With a background in maths and physics, she sees this is not as a literary exercise, not as creative writing, but as physics. She is being a word-physicist. She wonders briefly what her external supervisor, the particle physicist, would think of this. She is delighted to realise what she is now allowing herself to do that she would have been nervous about earlier in her writing life. All these word-experiments are a move nearer towards Ryan's North Pole of narrative. She enjoys playing with the text and relishes the idea that she is demonstrating her thoughts about parts and wholes, of particle physics, through structure rather than explaining directly to a reader.

14. What happens next surprises her. She reads *Citizen: An American Lyric*, by Claudia Rankine, an astonishing work that sits somewhere between poetry and personal essay, and she is inspired, for the first time, to write a personal essay, in response to two films she has just seen. She comes up with an idea for a new form: placing one of her own poems (that she had already written, not created specially for this) somewhere on the page and writing a prose text that wraps around the poem, concealing it. She deliberately chooses a poem without too much thought, and writes her personal essay, incorporating the words from the particular line of the poem when she reaches it, so that it makes sense inside the prose. She doesn't plan the essay, it is stream-of-consciousness.

15. Writing the personal essay, in the first person, she learns something about how she sees the world. This happens often – she is a writer not as a job but because she writes her

[130] 'Exploded view', The Free Dictionary, [website], http://www.thefreedictionary.com/exploded+view, (accessed July 2015).

world into being. She rarely knows how she thinks or feels about something until she writes. The next stage: inserting gaps into the prose text to begin to reveal the concealed poem. She does this in six steps, highlighting the lines of the poem more and more strongly while fading out the surrounding text. The way the poem begins to appear reminds her of those flip-books: "a collection of combined pictures intended to be flipped over to give the illusion of movement and create an animated sequence from a simple small book without machine"[131] And later, she also views these personal-essay/poem hybrids as a kind of film itself – what is a film if not a set of discrete images in a sequence that our brain turns into a flow?

16. Hazel Smith expresses well what she was doing: "Defamiliarisation, compression and the polysemic [multiple meanings] play of language are all ways that we can distinguish poetry from prose. However, it cannot be said too often that poetry and prose sometimes share the same characteristics, and that we may often find ourselves writing poetic prose or prose poems...turning genre on its head is a major experimental strategy, and one of the ways in which our writing can question how we represent the world around and within us."[132]

17. She creates several more of these hybrid works after watching a number of other films that inspire a strong reaction, each time choosing another of her pre-existing poems, putting it in a different place on the page, writing up to and around it, then revealing the concealed poem.

18. She takes herself away again on another retreat to finish the first draft of the book. She

[131] P. Fouché, 'History', Flipbook.info, [website], http://www.flipbook.info/history.php, (accessed July 2015).

[132] H. Smith, *The Writing Experiment: Strategies for Innovative Creative Writing*, Crows Nest, Australia, Allen and Unwin, 2005, pp. 37, 47.

imagines that the Susy-and-her-interviewers story will keep unfolding, and she has a sense of how this might happen, but no plan. She wakes up early on the first day of the retreat, begins to write, and is astonished when, by 10am, she has finished the book. She writes on her blog: “What kept going through my head as I wrote was: "Have I said what I need to say?" and now I feel I have...It's all in there. It's going to be short, around 50 pages, and I need to edit it, and add in some images - my tracings/drawings of particle collisions and cloud chambers, and perhaps other things.” She leaves the retreat early. She is done.

19. What is required now is to put the book aside for several months to work on these poetics, leaving unwritten only this section, about the writing of the book, which she doesn’t want to approach until the book is completely finished. It is important to know when to stop herself looking at something, to remove the writer from the writing until the writer has become not quite the person who wrote it and can approach it with fresh eyes.

20. She returns to the book four months later. Before reading it, she comes up with some questions and thoughts to put herself in the most positive frame of mind (see Appendix B (v) for full list):

– It's MY book and doesn't have to please anyone but me
– It's a work of particle fiction, and a coherent whole is both up to me and not up to me, something to hand over to the reader
– I want it, like everything I write, to move me first. I am the First Reader.
– It is already a book.
– It is already particle fiction
– I am already the writer, the author, and the one who will let it go.

21. After she reads it, she writes on the blog: “I really love it. THANK GOD.”

22. Then: editing. The main issues are: where to begin the book; editing the flow of the personal essays; where to end the book; whether to keep everything in; deciding how much to explain. She realises that she had set herself rules for the creation of different pieces of work in the book – not allowing herself, for example, to change the wording of the Susy prose sections to make the emerging poems better, or that she would leave the personal essays as they came out, not smooth them out. She understands how these rules were necessary for her to create the work in the first place, but they were created by her, and now she can abandon them. So she does.

23. She decides that the quotes from David Bohm, William Empson and CERN that appeared on the first page of the book direct the reader too strongly as to how to read it. Instead, the book will begin with the birds-flying-into-the-window poem. One of her supervisors compared her poem to the double-slit physics experiment performed by Thomas Young in 1801[133], which The High Experience website's article[134] says will "mindfuck you": it demonstrated for the first time that electrons behave sometimes as particles and sometimes as waves, a concept called "wave-particle duality". Are her birds some kind of wave-particles?

24. She also decides not to put one of the personal essays, with the "I" point of view, after the opening poem, instead moving straight into the Susy story, the narrative element, in order to create tension. She intersperses each Susy section – which is made up of prose, the same prose running backwards, this backwards prose with inserted line breaks, and then this backwards prose with line breaks edited into a poem – with one of the "personal essays". This serves both to make the reader wait to see what happens next with Susy,

[133] 'Young's Experiment', *The Physics Classroom*, [website], http://www.physicsclassroom.com/class/light/Lesson-3/Young-s-Experiment, (accessed April 2017).

[134] J. Lejuwaan, 'This Will Mindfuck You: The Double-Slit Experiment', *HighExistence*, http://highexistence.com/this-will-mindfuck-you-the-double-slit-experiment,/ (accessed July 2015).

heightening their desire to read on, and also to suggest that the character who is speaking in the personal essays may be one of the characters the reader has just been introduced to.

25. She titles each personal essay, edits the language, and reworks how the poems emerges from the prose so that each essay is visually different. How her work looks on the page is a vital aspect of the book, especially where poems emerge from the prose: a reader will quite quickly realise that the text in each subsequent step is the same, and so it becomes not just about reading but about looking. This is her version of what is often called "concrete poetry", "visual poetry" or "shape poetry", where the appearance of the words is an essential part of the effect. With this, she is conveying ideas about wholes and parts: how something which seemed an essential part becomes, when the context is altered, its own independent whole. And ideas about collision, fragmentation, breakage.

26. She understands when re-reading her notes about particle physics attempting to "rewind" what has taken place and see events that cannot be seen, that this is the role film plays in her PhD. A film is a collage of parts which construct a story, sometimes in a linear fashion, sometimes moving around in time and space. She views her book is being like a page-based film, and, in *Teaching Modernist Poetry*, she finds a kindred spirit: American poet Muriel Rukeyser, writes Peter Middleton in the book's conclusion, had: "direct experience of film-editing and made comparisons between the use of cutting to create speed and complexity in film and the rapid shifting of focus in modern poems which similarly 'moves in terms of quick, rhythmic juxtapositions'".[135]

27. An article in the *New Yorker* magazine also speaks to this idea of film and page. In 'Capturing James Baldwin's Legacy Onscreen', film critic Hilton Als writes about the

[135] P. Middleton and N. Marsh (eds), *Teaching Modernist Poetry*, Basingstoke, Palgrave Macmillan, 2010, p. 185.

2017 documentary film *I Am Not Your Negro,* directed by Raoul Peck, on American writer James Baldwin, inspired partly by Baldwin's own book-length essay *The Devil Finds Work*[136]. Als calls the book "an amalgam of essay, criticism, memoir and plain old talk which presages so many of the delicious unclassifiable works by Renata Adler, John Keene, Sarah Manguso, Leslie Jamieson and Maggie Nelson"[137]. He goes on to say: "In the book – which is divided into three parts, moving from his experience of Hollywood films to his work as a screenwriter in Hollywood to a more global take on blacks in movies— Baldwin cuts repeatedly from tenderness and hope ...to fierce rhetoric and a despair that centers on a question of faith… But it is the jumpiness and the contradictions of Baldwin's text that play so well in Peck's movie: film, too, often jumps around and contradicts itself – or reality." This is also the aim for her own book, that its particulate nature will imply to a reader something about the nature of reality, and how we construct our lives from parts we create links between.

28. Another visual aspect are the particle collision images she gets permission from CERN to include. She decides to provide CERN's descriptions of the experiments presented in the images in the Notes at the end, to give a hint as to how the book might be read. She includes the jigsaw she has created from the Theodor Adorno quote (see Part IV)[138] because, although she does not fully understand it, she has given herself permission for her book to be situated closer to Ryan's North Pole zone of less immediate comprehensibility. She trusts her reader, too, to read actively.

29. When she chooses as the final section the personal essay about vanishing, disappearance, love and what is created in the space between people, she sees visually that

[136] J. Baldwin, *The Devil Finds Work*, New York, Dial Press, 1976.

[137] 'Capturing James Baldwin's Legacy Onscreen', Als, H., *The New Yorker,* http://www.newyorker.com/magazine/2017/02/13/capturing-james-baldwins-legacy-onscreen, February 13th and 20th, 2017.

[138] Adorno, T., *Aesthetic Theory*, cited in I. Balfour, 'The Whole Is Untrue', in W. Tronzo (ed.), *The Fragment: An Incomplete History*, Los Angeles, Getty Research Institute, 2009, p. 83.

the poem has to disappear from the prose completely, leaving white space. Clouds. This is exactly the note on which she wants the book to end, giving the reader permission to fill the gaps in for themselves. She recently heard poet and writer Sarah Manguso give a lecture[139] on the concept of omission, which Manguso divided into five categories:

- Formal omission: Visible blanks, erasures etc...
- Narrative omission: leaving out parts of the narrative to create 'a potential narrative'
- Referential omission: using 'an intentionally obscure symbol', a bit like a riddle with no answer
- Descriptive omission: details left out
- Subjective omission: leaving out the characters' feelings or the narrator's feelings about the characters

It appears that she is part of a tradition of omission, and this fits with the idea of reader response and dialogue between text and reader that poet and critic Peter Jaeger talks about when discussing Jeff Derksen's poem, *But Could I Make a Living From It*: "[I]f there is a connection between trees and cod and grass, it must be found in the relationship existing between the consciousness of the reader and the text, for the text refuses to make authoritative claims about its subject matter"[140]. She, too, is refusing to make authoritative claims. She requires, as Jaeger describes, the "active work of a reader to produce meanings, and those meanings may vary from reader to reader according to their position in the 'world.' Thus the reader is dialogically implicated in the text."[141]

30. She had not expected to find an ending, had expected her book to finish ambiguously. But working on the final essay, she realises that the gravity-inspired prose poem in the

[139] S. Manguso, 'Five Types of Omission', lecture given at Tin House Summer Writers Workshop, Portland, Oregon, July 2016.

[140] P. Jaeger, 'But Could I Make A Living From It: Jeff Derksen's Modular Form', *Canadian Literature: A Quarterly of Criticism and Review,* Issue 203 (Winter 2009): 30-39, https://canlit.ca/full-issue/?issue=203, (accessed May 2016).

[141] Ibid.

middle of the book, *But If I Knew A Little More,* (see Appendix B (iv)) belongs at the end, to resonate with the opening poem, acknowledging that nothing is tied up neatly, and gently teasing the reader about their need for greater resolution. As psychoanalyst and writer Adam Phillips says in *Missing Out:* "Not being able to find out what the writer wants from the reader – exhausting the possibilities of the reader getting it – forces the reader, if he is sufficiently intrigued, to do something else...When we ask of a writer, what is she trying to get away with, we are asking both what authority does she feel answerable to, and what new set of obligations is she trying to meet or create?"[142] The poem – and thus the book – ends with the word "enough". And for her, it is.

[142] A. Phillips., *Missing Out: In Praise of the Unlived Life,* London, Hamish Hamilton, 2012, pp. 30, 44, 105.

Part VII: Putting It In Context: Modernism, Postmodernism, Structure and Science

"The Modernist Period in English Literature occupied the years from shortly after the beginning of the twentieth century through roughly 1965."[143]

"Modernism and postmodernism are not separated by an Iron Curtain or Chinese Wall; for history is a palimpsest, and culture is permeable to time past, time present, and time future. We are all, I suspect, a little Victorian, Modern, and Postmodern, at once."[144]

"Post-modernism can be seen to exhibit the same sense of crisis and loss of belief in an external authoritative system of order as that which prompted modernism."[145]

She is writing this chapter last, after she has finished everything else – on a day in 2017 where the American President seems to be mulling over nuclear war with North Korea and here, in the UK, the Prime Minister appears more robot than human. Modernism and postmodernism – "loss of belief in an external authoritative system of order"? Oh yes. Her book, Part 1 of this PhD, is called *And What If We Were All Allowed To Disappear.* Because sometimes she wants to disappear from the craziness of the world. Here, though, she is stepping back, and out, to see where her book sits in the worlds of literature and, perhaps, science.

"Modernist fictions... raise questions such as 'How can I interpret this world of which I am a part? And what am I in it?... What is there to be known. Who knows it? How do they

[143] 'Modernism', *The Literature Network*, [website], http://www.online-literature.com/periods/modernism.php, (accessed April 2016).

[144] I. Hassan, *The Postmodern Turn: Essays in Postmodern Theory and Culture,* Ohio, Ohio State University Press, 1988, and on Georgetown University [website], http://faculty.georgetown.edu/irvinem/theory/HassanPoMo.pdf (accessed April 2016).

[145] P. Waugh, *Metafiction: The Theory and Practice of Self-Conscious Fiction*, London and New York, Methuen, 1984, p. 21.

know it, and with what degree of certainty?...What are the limits of the knowable?' But postmodernist writing… raises problems such as: 'What is a world?; What kinds of world are there, how are they constituted, and how do they differ?; What happens when different kinds of world are placed in confrontation, or when boundaries between worlds are violated?; What is the mode of existence of a text, and what is the mode of existence of the world (or worlds) it projects?; How is a projected world structured?'" [146]

Is her book a modernist work? Is it postmodernist? What questions is she asking in her work, she wonders, coming across the passage above, from Hazel Smith's *The Writing Experiment*. The frame narrative of her book, in which her character, Susy, is being questioned by three anonymous interviewers, is – for her, she can't speak for any future reader – all about interrogating the world, asking questions in the way that science does, that particle physics does. (That art also does, of course. Science is just one framework for curiosity.) What do her fictional interrogators know about Susy, she wonders. What do they – or she – know about the world? What can poetry or prose say about the world? The personal essays with the embedded poem are asking these questions in a different way, using a popular cultural medium, film, as a springboard for discussion about the human condition.

The structure of the book itself, though, with its violation of the boundaries between "different kinds of worlds" – prose becomes poetry, poetry is hidden in prose and then revealed, one section is from the point of view of an inanimate object, the room itself – poses the postmodern, existential kinds of questions. She would like the reader to ask all these kinds of questions. So: elements of both modernism and postmodernism.

[146] H. Smith, *The Writing Experiment: Strategies for Innovative Creative Writing*, Crows Nest, Australia, Allen and Unwin, 2005, p. 147.

"Impossibility of errorless work.

Activity, not communication.

Importance of being perplexed. Unpredictability.

Breaking rules.

Art's self-alteration.

Goal is not to have a goal."[147]

American composer, writer and theorist John Cage's above statements on art (quoted in a compendium of postmodern American poetry) reassure her. She hasn't aimed for errorless perfection in her book or these poetics; she embraces a jaggedness in the writing, a hint that this is not a hermetically-sealed and finished work. Her book is less about communicating ideas of particle physics and wholes-versus-parts than actively *being* the wholes and the parts. She herself is perplexed, she sees the book as conveying her uncertainty about the world and life's unpredictability.

She has broken rules that had been in her head: Poetry is one thing, prose is another; there are boundaries; it has to make sense. (She is breaking rules here by centring all the text in a "postmodern" kind of way. But also she is, by this, following that golden rule: Show not tell. In a similar way, perhaps, to Charles Bernstein's *The Artifice of Absorption*[148], (as mentioned in the Introduction to these poetics), an article about absorption in poetry, written like a poem.) Her writing alters itself within the book. Was she goal-less while writing? Perhaps the goal was to finish, but now that the book is done, she wishes to let it go, with no plan for its reception.

To understand better what these terms from literary theory might mean, she reads not just

147 J. Cage, 'Themes and Variations', P. Hoover (ed), *Postmodern American Poetry*, London and New York, W W Norton & Company, 1994, pp 621 - 626.

148 C. Bernstein, 'The Artifice of Absorption', *Paper Air,* Singing Horse Press, Pennsylvania, 1987, and on The University of Buffalo [website], http://epc.buffalo.edu/authors/bernstein/books/artifice/, (accessed 4 April 2017).

articles and essays about modernism and postmodernism, but a number of modernist and postmodernist texts, such as *Cane*[149], by Jean Toomer, published in 1923 and referred to as a modernist classic. In his introduction, Darwin T. Turner says that "Jean Toomer did not conceive of *Cane* as a novel"[150]. Turner says: "*Cane* has a thematic unity…Poems link, separate, echo and introduce the stories with themes of nature's beauty, man's disruption of nature's harmony, work, tributes to Black folksong, love, false gods and true gods..."[151]

"*Cane*: 116 pages, a mix of short story-type pieces and poems, and prose poems, and sometimes there are poems in the short stories. They stand alone, but are part of a whole, a continuum. Very powerful, the whole seems to me to be a poem, the language is astonishing, the ideas are beautiful, dark, disturbing, about love and human nature, identity, society, death and nature. And time, I think - the different shapes of the word on the page slow you down or speed up your reading."

The above is from her blog. *Cane* is the first work of particle fiction she has come across which combines poems and prose in this way, and she loves how it alters her reading pace and highlights what can be conveyed differently in different forms. It is surreal, yes, and appears to address the postmodern-type questions mentioned above. Might it have been thought of as *post*modern if it were written at a different time?

"I am producing too many stories at once because what I want is for you to feel, around the story, a saturation of other stories that I could tell and maybe will tell or who knows maybe already have told on another occasion, a space full of stories that is perhaps simply my lifetime, where you can move in all directions, as in space, always finding stories that cannot be told until other stories are told first..."[152]

149 J. Toomer, *Cane*, New York, Liveright, 1975 (first published 1923).
150 D. T. Turner, 'Introduction', Toomer, J., *Cane*, New York, Liveright, 1975 (first published 1923), p. xxi.
151 Ibid. p. xxii.
152 I. Calvino, *If on a winter's night a traveller,* New York, Harcourt Brace Jovanovich, 1981. p. 109.

So says one of Italo Calvino's characters in *If on a winter's night a traveller*, and this resonates with how she sees her own book, *And What If We Were All Allowed to Disappear*. Her book is a bringing together of many stories and characters, and – although she has constructed the particles of her work of particle fiction in a particular order – a reader of her book will also be able to "move in all directions", and in doing so, her book may shift and reveal other stories, ones that she herself has not planned, or even noticed.

"Frames are essential in all fiction. They become more perceptible as one moves from realist to modernist modes and are explicitly laid bare in metafiction...metafiction destabilises 'commonsense' contextual constructions of the everyday world... by preventing the reader from settling into any given context and by making him or her aware of possible alternatives to this 'commonsense' reality..."[153]

Calvino's book was written in 1979 and is perfect example of metafiction, says Patricia Waugh in *Metafiction: The Theory and Practice of Self-Conscious Fiction,* from which the above quote is taken. As opposed to realist fiction, with a metafictional work the reader is never allowed to forget that he or she is reading a book, something artificially constructed, by an "author". Calvino does this again and again, stepping into a story and then out of it, until she is dizzy reading it, but loving the disorientation, the dizziness. She is fairly sure her book isn't quite as disorienting or confusing as *If on a winter's night* or some of the postmodern poetry she has been reading, such as Andrea Brady's *Wildfire*[154]. Brady calls this a "verse essay on obscurity and illumination" and she finds it difficult to read, which is clearly Brady's point. Or T. S. Eliot's *The Waste Land*[155], published in 1922, which Waugh describes as a "complex web of cross-references and repetitions of words and images

[153] P. Waugh, *Metafiction: The Theory and Practice of Self-Conscious Fiction*, London and New York, Methuen, 1984, p. 90.
[154] A. Brady, *Wildfire* [website], http://www.krupskayabooks.com/wildfire, (accessed 2 April 2017).
[155] T. S. Eliot, *The Waste Land*, Poetry Foundation [website], https://www.poetryfoundation.org/poems-and-poets/poems/detail/47311, first published in 1922, (accessed April 2 2017).

which function independently of, or in addition to, the narrative codes of causality and sequence."[156]

Hazel Smith calls *The Waste Land*, a literary collage:

"A literary collage usually brings together chunks of writing drawn from a number of different sources and juxtaposes them. In a collage we are usually conscious of certain discontinuities between the elements, but also of new continuities produced by the interface between them…This discontinuous structure means the connections between the texts retain greater fluidity, so that the meanings interact with each other in multiple ways."[157]

She had had collage in mind when constructing her own book, and sees in it these kinds of discontinuities that Smith is referring to here – both when she turns the prose of the narrative sections into poetry, and when she brings out the hidden poem from within the personal essay, which involves a literal breaking of the text to release the poem. Her structure is deliberately discontinuous in order to highlight the ideas of parts and wholes – and, as Smith mentions, to bring forth for the reader new continuities and multiple meanings. As Canadian poet Christopher Dewdney says in his poem *Radiant Inventory,* "Everything/ interpenetrating, extensile,/ at once continuous and discrete."[158] She is aiming for that mix of continuity and discreteness, flow and breakage, part and whole.

"Decisions about the structure are ideological as well as formal, not only because the shape of the text affects the content, but also because… conservative structures are more closed, adventurous ones tend towards openness...broaden the scope of the writing and

[156] P. Waugh, *Metafiction: The Theory and Practice of Self-Conscious Fiction*, London and New York, Methuen, 1984, p. 23.

[157] H. Smith, *The Writing Experiment: Strategies for Innovative Creative Writing*, Crows Nest, Australia, Allen and Unwin, 2005, p. 67.

[158] C. Dewdney, 'Radiant Inventory', Canadian Poetry Online, Toronto, University of Toronto [website], https://canpoetry.library.utoronto.ca/canpoetry/dewdney/poem1.htm (accessed 4 April 2017).

maximise the plurality and complexity of the meaning."[159]

Paris: A Poem[160] by Hope Mirrlees, published in 1919 and also regarded as modernist, is – like *Wildfire* and *The Waste Land* – a collage of found material, historical quotes and narrative, and, as Hazel Smith writes in the previous quote, she sees the poem's structure as being vital, almost a character in itself. She enjoys reading *Paris: A Poem* more than *The Waste Land* and *Wildfire*, writing on her blog that it is: "like a very odd, postmodern tourist guide to Paris and to time and history. You feel the author wandering around the city, this is her stream of consciousness? Space & time." Which brings us on to science.

"In a sense, metafiction rests on a version of the Heisenbergian uncertainty principle: an awareness that for the smallest building blocks of matter, every process of observation causes a major disturbance…and that it is impossible to describe an objective world because the observer always changes the observed."[161]

She is delighted when Patricia Waugh herself alludes to physics, because this is what she thought while reading many of these modernist and postmodernist works, from the poetry and novels mentioned to the short stories of Jorge Luis Borges[162] and Samuel Beckett[163]. The beginning of the twentieth century was bringing about great revolutions in science, chief among them Albert Einstein's ground-breaking theory of relativity, which smashed previous notions of space and time[164], followed by Werner Heisenberg's uncertainty principle, as mentioned above, and all the quantum oddness that ensued.

159 H. Smith, *The Writing Experiment: Strategies for Innovative Creative Writing*, Crows Nest, Australia, Allen and Unwin, 2005, pp. 49-50.

160 H. Mirrlees, *Paris: A Poem*, HopeMirrlees.com [website], http://hopemirrlees.com/texts/Paris_Hope_Mirrlees_1920.pdf, first published 1919, (accessed 2 April 2017).

161 P. Waugh, *Metafiction: The Theory and Practice of Self-Conscious Fiction*, London and New York, Methuen, 1984, p. 3.

162 J. L. Borges, *The Book Of Sand*, London, Penguin Books, 1977.

163 S. Beckett, *The Complete Short Prose 1929-1989*, New York, Grove Press, 1995.

164 For more on Einstein's Theory of General Relativity, see 'What is Einstein's theory of relativity?', *WIRED*, 28 March 2017, http://www.wired.co.uk/article/einstein-theory-relativity.

Many of the modernist and postmodernist texts reminded her of scientific ideas about the nature of time itself, frames of reference, the observer/reader affecting what is being observed, particle collisions, cause and effect, energies and fields, and doubts regarding the fundamental "realness" of reality as we perceive it. These modernist authors were aware of science, says Michael Whitworth in his chapter, 'Science and Poetry'[165] in *Teaching Modernist Poetry:* "A significant early document on the literary side is Pound's 'A Few Don'ts for Imagists' (1913). There Pound insists that the poet is like the scientist." In more postmodern times, poet Charles Olson talks about his concept of "open field poetics".

"A poem is energy transferred from where the poet got it (he will have several causations), by way of the poem itself, all the way over to, the reader. ... an energy which is peculiar to the verse alone..."[166]

She reads Olson's essay, 'Projective Verse', which does not directly reference science, but she can't see how it can be referring to anything but, given its talk of fields and energies. Mandy Bloomfield's article 'Landscaping the Page: British open-field poetics and environmental aesthetics', on Olson, among others, reinforces her first impressions.

"This notion of the 'field' draws on the poet's interest in contemporary scientific developments, especially in physics, and he represents the poem not just as a spatialised arrangement of objects, but as a dynamic configuration of forces and energies." [167]

She is very interested to discover, in Peter Middleton's conclusion to *Teaching Modernist Poetry,* that many of Olson's ideas "were taken, unacknowledged, from Muriel Rukeyser's

[165] M. H. Whitworth, 'Science and poetry', *Teaching Modernist Poetry, P.* Middleton and N. Marsh, Basingstoke, Palgrave Macmillan, 2010. Available from: E-Book Library, (accessed 12 March 2017).

[166] C. Olson, 'Projective Verse', *Postmodern American Poetry: A Norton Anthology*, Hoover, P. (ed), New York, W W Norton & Company, 1994, p. 164.

[167] M. Bloomfield, 'Landscaping the page: British open-field poetics and environmental aesthetics', *Green letters: Studies in Ecocriticism*, vol 17, no 2, 2013, p. 128.

book *The Life of Poetry*...Rukeyser wrote: 'Exchange is creation. In poetry, the exchange is one of energy. Human energy is transferred, and from the poem it reaches the reader. Human energy, which is consciousness, the capacity to produce change in existing conditions' (1945: 185)."[168] Ah, she thinks, it came first from a woman poet, and was "taken" by a man. Hmm. (See the Introduction for more on gender issues in writing.)

'Heisenberg situates quantum theory within the wider cultural phenomenon of modernism...the relationship between modernism and the 'classical' approaches to experience that preceded it is analogous to the relationship between particle and wave descriptions of subatomic particles."[169]

Scientists weren't unaware of literature either, says Ronald Schleifer above, from 'Analogy and Example: Heisenberg, Negation, and the Language of Quantum Physics'. She had never thought before of scientists relating to art in this way. It is this interplay between art and science that she has always been fascinated by, never understanding the separation between the two. [As she is finishing the writing of these poetics, she attends a talk about art and science at a literary festival at which the person representing art and the particle physicist nearly come to blows. While this makes for an entertaining event, she is saddened by the antagonism.]

Her own book might have had more obvious scientific content; this was one of the choices she made. There are hints for the curious reader, but she decided not to include anything directly taken from the particle physics she used as inspiration, but rather to demonstrate this through the form. To date, her approach to the use of science as inspiration for her

[168] P. Middleton and N. Marsh (eds), *Teaching Modernist Poetry*, Basingstoke, Palgrave Macmillan, 2010, p. 185.

[169] R. Schleifer, 'Analogy and Example: Heisenberg, Negation, and the Language of Quantum Physics', *Criticism: A Quarterly for Literature and the Arts*, vol. 33, no. 3, Detroit, Wayne State University Press, 1991, pp. 303-304.

own fiction and poetry has not been to include in the creative work itself any research she carried out (science articles she has read, say), in the way that Andrea Brady does in *Wildfire*, for example, the verse essay which, in its web-based incarnation, has embedded links to its sources[170]. She strongly believes her creative writing is not a vehicle for the scientific education of the reader, interested only in creating a compelling reading experience, one that affects the reader, involving them in the work, whether poetry, prose or hybrid.

"My poetry… is warped out of science. A lot of poets have an anti-science bias, a vision of themselves as romantics in a tower, but I don't. I'm a naturalist, I believe that science and nature are one, that science is a perceptual tool which allows us to define nature more specifically. Science has to incorporate and mythologize as it happens. All poetry deals with information, finally." [171]

She agrees with Canadian poet Christopher Dewdney, above, that the separation between poetry and science – between arts and sciences in general – is an artificial one, one that she has never understood. She has met many writers who have such an anti-science bias, which saddens her; as a teacher of writing, she constantly attempts to break down this bias and introduce the idea of science as simply one more source of inspiration. Dewdney also seems to be echoing her thoughts, expressed earlier in this poetics, that she has been "doing science" in this creative writing research, a sort of word-physics. But she is not working in a vacuum, and she understands better after researching this chapter that she has taken the baton passed by those who came before – the modernists, the postmodernists, the experimentalists, the poets, the prose writers, the scientifically-curious.

[170] A. Brady, *Wildfire* [website], http://www.krupskayabooks.com/wildfire, (accessed 2 April 2017).
[171] C. Dewdney, 'Christopher Dewdney: A Biography', *Canadian Poetry* Online [website], https://canpoetry.library.utoronto.ca/canpoetry/dewdney/index.htm (accessed 4 April 2017).

Part VIII: In Conclusion

She has done it. She has written her own work of particle fiction, an arguably postmodernist, hybrid, experimental book, combining poetry and prose, fiction and non-fiction. She has answered her research questions, using particle physics to inform the creation, style and content of her book, and, through the style and content of her book, illustrating ideas about particle physics and about wider notions of wholeness and whole versus parts.

What she is attempting to convey through her book about particle physics and of parts is that the definition of a "particle", "part" or "whole" is relative and dependent on context, something that can be altered, shifted, through collision and by reversing the passage of time, for example. The book attempts to portray the idea that families of particles in particle physics are also subjective, context-dependent, dependent on proximity, in space and in time.

And subsequently, in these poetics, she has documented her process, her methods, her inspirations, and the challenges of writing both the book itself and these reflections contextualising it. She has brought together all the material she read – from physics, philosophy and archaeology to theories of literature, literary criticism, reading and analysis – creating a whole, using a fictocritical style, blurring the boundaries between creative and critical work, to assimilate this material and express her ideas.

What will I do now? As writer and critic Kathy Acker writes in her collection of fictocritical essays, *Bodies of Work*: "Do I write to express what is made or to make? I seem to have chosen the latter, the modernist way. But it is not so simple... I am thinking that the more I write, the more convinced I am that writing, be it about time, is time. Is change, rhythm. Those movements of time. Need writing be only one kind of time, linear

time, that form called history? Need writing end?"[172]

I agree with Acker that I write to make, and that writing, whether creative or critical, is an act of creation. And I agree that no, it does not need to end. This conclusion is one type of ending, but it is not even the physical final page of the book,: there are appendices, a bibliography. I could write another poetics on the writing of these poetics, rehistoricize myself, as the "she" who wrote this document, and how she changed in the writing of it. This research project is finite, is bounded in time, and this is necessary, not only from a financial point of view (for this student), but because I need the illusion of having "finished" something in order to give me the boldness to begin another project.

I see this doctorate – which has changed my writing and reading in so many ways – as a beginning, an opening into a new way. Across these four years, I have become a writer of hybrid works, have given myself permission to break rules and cross boundaries, and all of this I will carry with me, whatever form my writing takes next. To come full circle, I quote again from the Introduction what Robert Sheppard says on poetics: "its orientation is towards the next job".[173]

[172] K. Acker, *Bodies of Work: Essays*, London, Serpent's Tail, 1997, pp. ix, x.
[173] R. Sheppard, 'Experiment in Practice and Speculation in Poetics', *Teaching Modernist Poetry*, P. Middleton and N. Marsh (eds), Basingstoke, Palgrave Macmillan, 2010, p. 161.

Appendix A

i. J. McLaughlin, 'Write a Protocol', Pennsylvania State University [website]:

Once you have designed your experiment you need to formally present it in a **protocol.** A **protocol** is simply a recipe, or written design, for performing the experiment.

You must write a protocol to insure that you have both a clear idea of how you will do the experiment and that you will have all the materials that are needed. A scientist usually writes his/her protocol in a laboratory notebook. Following the completion of the protocol, the next step in the scientific process is to perform the experiment. As the investigation takes place, observations are made and results are recorded.

Components of an Experimental Protocol

1. Purpose: This is a formal statement which encompasses your hypothesis. It **is** a statement of what question you are trying to answer and what hypothesis you wish to test.

2. **Materials:** List all major items needed to carry out your experiment. This list need not be lengthy if the materials are already published, but it should include the essentials.

3. **Methods:** How will you set up your experiment? How many experimental groups will you have? How will you measure the effect you wish to study? How long will the experiment last? These and any other methods should be explicitly stated or referenced so that a reader has all the information they need to know to be able to repeat your experiment and verify your results.

4. **Controls:** Identify the relevant control(s) treatment. Think about the variable(s) you and your group are manipulating. Your control needs to be held under natural, or unmanipulated conditions, not affected by the tested variable.

5. **Data Interpretation**: What will be done with the data once it is collected? Data must be

organized and summarized so that the scientist himself, and other researchers can determine if the hypothesis has been supported or negated. Results are usually shown in tables and graphs (figures). Statistic analyses are often made to compare experimented and controlled populations.

6. **References:** Any published works (journals, books, websites) that you cite in your protocol should be listed in the reference section so that anyone reading your protocol can look that work up if they desire.

Putting this all together, the scientist will be able to write a scientific paper once his/ her data is collected. For these laboratories it should be possible to write a good protocol in less than a page. A sample protocol format has been written for your reference. Remember do not write "fluff," i.e., extraneous information and/or overly descriptive text that is not relevant to the experiment. The reader of a protocol is interested in being informed concisely and accurately!!

ii. Experiment on An Acre of Barren Ground by Jeremy Gavron.

[image removed from this digitised version]

iii. List of particles from An Acre of Barren Ground by west or east side of Brick Lane, with major themes and content type (*story, fact* or *other*):

West side	East side
3 *story* Asian, family	**2** *story* Jews, history, family
8 *story* history, family	**4** ***fact*** **Bible, giants**
10 *story* history	**5** ***fact*** **history, murder**
11 *story* Asian, food	**6** *story* history, animal
12 *story* history, family	**7** *story* history
14 ***fact*** **history**	**9** ***fact*** **history**
15 *other (graphic) story*	**13** ***fact*** **history**
19 ***fact*** **plants, history**	**16** *story* Jews, history,
20 ***fact*** **art**	**17** *other (poem/story)*
26 *story* history	**18** *story* history
29 ***fact*** **pictures/photos**	**21** ***fact*** **history, books**
32 *story* family	**22** *story* history
33 ***fact*** **history**	**23** ***fact*** **history**
	24 ***fact*** **history**
	25 *story* history
	27 ***fact*** **history**
	28 *story* family
	30 *other (fact?)* animals
	31 *story* history, animal

iv. Excerpts from her personal blog written during the Mr Fox Experiment:

Mr Fox experiment

Fri 16 Jan

10.24 am

Beginning, I am already seeing that this book is more complicated to define than AAOBG [An Acre of Barren Ground], but also, at the same time, much more thematically and

structurally connected. I can see she's planting a lot of hints as to the themes of the book and how it should be taken. Am 10% through the book - p 27, particle 4. SO MANY HINTS
Stopped: 12pm p 34

Sun Jan 25
Started again 13.30 p34
A few sections with no titles, all the same time and place, same voice, but definitely separated, could have carried on straight - she wants this to be PARTICULATE. Each section starts with one letter.

Fascinating to find all the little hints she may have consciously or subconsciously left about what the book is about - fairy tales, reality, transformations, power of story
Things that keep coming up:
Violence
Colours
Love
Marriage
Hearts
Happiness
Order
Confusion
Death
Secrets
Money
Writing
Stories

Stopped p 94 15.14

Started again
Sunday 1 March 10.38am and finished book same day, 13.52

So, there are 22 parts - and my initial thoughts are that the same words come up again and again - ugliness is a big thing. And that the HINT quotes become stronger and stronger as the book goes on.

Will break down the data and plot it on some graphs!

v. Experiment on Mr Fox by Helen Oyeyemi

Selection of data collected:

Initial appearance:

- it doesn't call itself anything, but the blurb on the front cover calls it a “novel”

No table of contents
Total number of pages 278

Particles
Difficult to always know where one ends and the next one begins, different ways to read it.

Particle 1
No title – **this is the beginning of the framing narrative for the whole book, which puts everything else in context**
1st person Mr Fox
Past tense
Mr Fox & Mary Foxe
Pages 1 - 5
Length – 5 pages
Time - ?
Place - ?
Magical realist – imaginary characters
Other characters – Daphne mentioned
Turning up - arrivals
English accent
American - implied
Love, marriage
Flirtation
Writing
Muse
Sex
Villain
Murder
Violence - danger
Women/wife murder
Game
Not complete particle – not short story

Particle 2
Pages 6-8
Length – 3 pages
title: dr lustucru
3rd person omniscient
Past tense
Time – just after WW1

Place - ?
Short story
Beheading
Wife murder
Doctor
Villain
violence/danger
Magical realist
War
Body
Head

Interrupted – back to scene from Particle 1
Time- same as P1
PoV - same
Tense - same
Place ?
Setting scene that it is Mr Fox and Mary Foxe who are the characters in each short story
Combined particle – two in one?

Particle 20
Title – sort of 31 rules for lover (circa 1186)
P238-240
story in form of list? Is it fiction or real list? “From *the art of courtly love* by andreas cappelanus”
No narrator
Characters – Daphne Fox, Mr Fox, Mary Foxe mentioned in footnote
Present tense
Place – ?
Time – 1186
playful
marriage
love
widow
stranger
difficulty
some points italicised
Notes at end from all three characters

vi. Data from Mr Fox Experiment

Figure 1: Table of no. of particles per theme in Mr Fox:

Theme	**Particle Numbers**	Total no. of particles
Confusion	6, 7, 8, 9, 22	5
Devil	5, 6, 10, 15	4
Love	1, 6, 7, 10, 11, 12, 14, 15, 16, 17, 19, 20**,** 21**,** 22	14
Marriage	1, 3, 7, 9, 10, 11, 12, 14, 15 ,17, 18, 19, 20, 22	14
Ugliness	8, 12, 14, 18, 19	5
Violence	1, 2, 4, 6, 7, 9, 10, 11, 16, 17 18, 19, 21, 22	14
Writing	1, 3, 10, 13, 14, 17, 19, 21	8

Figure 2: Table of no. of particles per theme titled (T) or untitled (UT) in Mr Fox:

Theme	**Particles – *untitled (UT)***	**Total UT**	**Particles – *titled (T)***	**Total T**	**Total No. of particles**
Confusion	6, 7, 9	3	8, 22	2	5
Devil	5, 6, 15	3	10	1	4
Love	1, 6, 7, 11, 15, 17, 19, 21	8	10, 12, 14, 16, 20, 22	6	14
Marriage	1, 7, 9, 11, 15, 17, 19,	7	3, 10, 12, 14, 18, 20, 22	7	14
Ugliness	19	1	8, 12, 13, 18	4	5
Violence	1, 4, 6, 7, 9, 11, 17, 19, 21	9	2, 10, 16, 18, 22	5	14
Writing	1, 13, 17, 19, 21	5	3, 10, 14	3	8

Figure 3: Table of no. of particles per theme and titled (T) or untitled (UT) in Mr Fox and classified as early in the book (E) or late in the book (L):

Theme	**Particles – *untitled (UT) early (E) or late (L)***		**Particles – *titled (T) early (E) or late (L)***		**Total No. of particles**
Confusion	3 **E**	0 **L**	1 **E**	1 **L**	5
Devil	2 **E**	1 **L**	1 **E**	0 **L**	4
Love	3 **E**	5 **L**	1 **E**	5 **L**	14
Marriage	3 **E**	4 **L**	2 **E**	5 **L**	14
Ugliness	0 **E**	1 **L**	1 **E**	3 **L**	5
Violence	5 **E**	4 **L**	2 **E**	3 **L**	14
Writing	1 **E**	4 **L**	2 **E**	1 **L**	8

vii. Excerpts from her blog during Bluets experiment

Bluets Experiment

I am starting to experiment on Bluets by Maggie Nelson. Started Thurs Mar 5th 10:04 am

The book doesn't describe itself as anything, no clues for the reader.

The epigraph from Pascal -

And were it true, we do not think all philosophy is worth one hour of pain. (Pascal, Pensees) -

does seem to imply this might be a work of philosophy?

The first particle (1) throws you straight in, it's fiction-like in voice, seems to be addressing the reader, and is both magical and a bit unnerving with its mention of excrement and sea-horses!

Am on page 3 and no clue/hint yet as to why this is in numbered parts...aha! Just went and looked up Pascal's Pensees and they are in the same format, number short sections!

On page 4, a glorious quote "first staining your fingers with it, then staining the world"

In particle 8 on Page 4 she suddenly introduces a new story - "I want to stop missing you". Is this THE story? It's mysterious, it's subtle...

This backstory is now weaving itself in more - blue guitar, index finger??

In particle 14 she talks about community of blue - just by talking about the book she says she's working on, without writing it, people send her things. What is a book before it's written?

Am on page 8 and it's getting pretty intense, with sex coming in and this backstory, the prince of blue, dreams, the angel... fucking not making any difference to language.

Got to particle 26 and we are 10% of the way through in particles and more than 10% in pages. She is tying things together, trying to explain why she is writing this book and why she wanted to. Weaving.

Thoughts - there is a framing narrative - colour and blues and blueness - with an embedded narrative, the story of her love affair and break-up...

Lot of sex, and looking - hidden versus seen. And about light.
It's really ALL a story - woven in, she drip feeds us information about her, about her lover/ex-lover. It's done so well, so subtly.

She has a wonderful way of combining the sublime with the violent - the male satin bowerbird in particle 67 who is building a beautiful, blue-themed nest to lure the female, while trashing other bower birds' bowers!

Particle 70 seems to be getting at something important - why is she writing this book? To "build a bower" - i.e. to attract something, someone?? To perform, show off, to compete?

Interesting, we're on a riff about loneliness - "loneliness is solitude with a problem"

It really feels like many of the particles are little prose poems/flash stories. I love this book more and more as I read it very very closely. It's beautifully woven.

I've just realised there are two personal stories woven through this - the story with the ex-lover, and the friendship with the friend who is paralysed.

For the first time, in particle 118, the two story strands come together

Just saw something in an earlier particle, particle 121, that I hadn't noted down, which shows that time passing makes a difference to how we see, what we see.

In particle 129 she is talking about death, about not knowing if she'll be here to see the next blooming of a certain tree, and I find this very moving. She weaves everything so beautifully, it is never less than utterly compelling and it is because, in great part, it's in small parts!

I notice that I only notice non-mentions of "blue" after the fact, I am so absorbed in what's going on, in the writing.

This book is so intense, it's hard for me to analyse it for more than an hour in one go. It brings up many feelings, thoughts.

viii. Selection of Bluets Experiment data

Particle 4
Carries on directly from (3)
Page 2
Length 5 lines
Voice: First person
Style: Colloquial, fiction-like, talking directly to the reader. Rhythmic, repetition.
Italics and normal font
Brackets
Tone: poetic “bolts of hot pain”
Themes: admitting a secret
loneliness
pain
divine/God
suspicion

Particle 5
Slight diversion/tangent from (4)
Page 2-3
Length 14 lines
Voice: Third person
Style: Reportage
Time: 1867
Tone: More factual, quoting French poet Mallarme's letter to friend
Themes: solitude/loneliness
letters

friendship
poetry
philosophy – Thoughts, Ideas
pain/agony
God
French
death
no-blueness

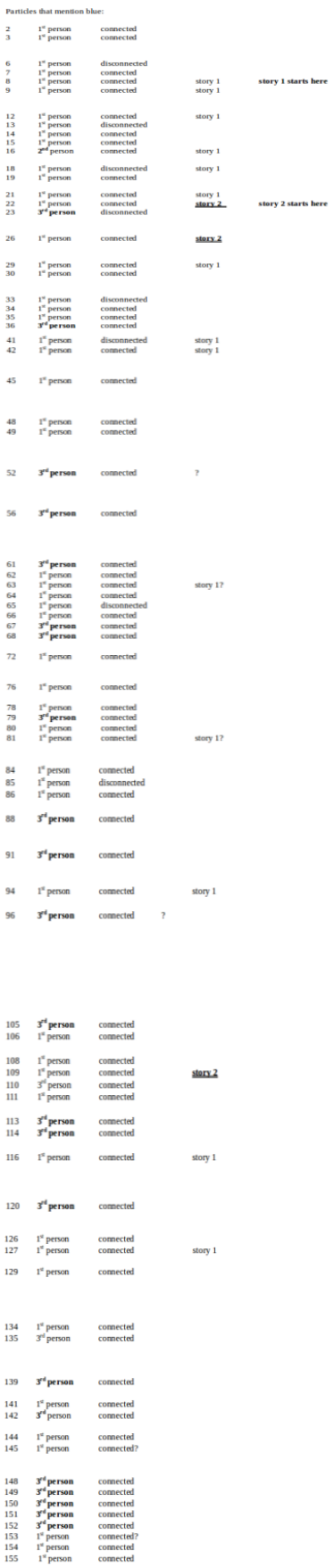
Particle 6
Doesn't seem to carry on from (5)
Page 3
Length 6 lines
Voice: First person
Style: Colloquial, fiction-like, talking directly to the reader. Rhythmic, repetition.

Tone: confusing
Themes:
love
blue/turquoise (a new blue – 1) blue x 1
ocean
blue object
beauty
mountain
choiceless
primal

Particle 7
Carries on directly from (6)
Page 3-4
Length 17 lines
Voice: First person
Style: Colloquial, fiction-like, talking directly to the reader.
Starts with a question
Tone: Interrogative & philosophical
Themes:
love
blue x 6
fooling yourself
sublimity – reference to Pascal/philosophy?
admission
ultramarine (a new blue – 2)
museum
history
pigment
blue object/stuff
observing/viewing
liberation
purchasing
eating/ingestion/food
nature/wildness
poison
light

paint
plates
feeding
disturbance
touch
QUOTE “staining the world”
sex/virgin
body/nipples
accessing blueness

ix. Image of list of particles which contain the word blue, also categorised as being connected or disconnected from other particles in terms of content, and whether they refer to story 1 or story 2.



Particles that mention blue:

2	1st person	connected		
3	1st person	connected		
6	1st person	disconnected		
7	1st person	connected		
8	1st person	connected	story 1	**story 1 starts here**
9	1st person	connected	story 1	
12	1st person	connected	story 1	
13	1st person	disconnected		
14	1st person	connected		
15	1st person	connected		
16	**2nd person**	connected	story 1	
18	1st person	disconnected	story 1	
19	1st person	connected		
21	1st person	connected	story 1	
22	1st person	connected	**story 2**	**story 2 starts here**
23	**3rd person**	disconnected		
26	1st person	connected	**story 2**	
29	1st person	connected	story 1	
30	1st person	connected		
33	1st person	disconnected		
34	1st person	connected		
35	1st person	connected		
36	**3rd person**	connected		
41	1st person	disconnected	story 1	
42	1st person	connected	story 1	
45	1st person	connected		
48	1st person	connected		
49	1st person	connected		
52	**3rd person**	connected	?	
56	**3rd person**	connected		
61	**3rd person**	connected		
62	1st person	connected		
63	1st person	connected	story 1?	
64	1st person	connected		
65	1st person	disconnected		
66	1st person	connected		
67	**3rd person**	connected		
68	**3rd person**	connected		
72	1st person	connected		
76	1st person	connected		
78	1st person	connected		
79	**3rd person**	connected		
80	1st person	connected		
81	1st person	connected	story 1?	
84	1st person	connected		
85	1st person	disconnected		
86	1st person	connected		
88	**3rd person**	connected		
91	**3rd person**	connected		
94	1st person	connected	story 1	
96	**3rd person**	connected	?	
105	**3rd person**	connected		
106	1st person	connected		
108	1st person	connected		
109	1st person	connected	**story 2**	
110	3rd person	connected		
111	1st person	connected		
113	**3rd person**	connected		
114	**3rd person**	connected		
116	1st person	connected	story 1	
120	**3rd person**	connected		
126	1st person	connected		
127	1st person	connected	story 1	
129	1st person	connected		
134	1st person	connected		
135	3rd person	connected		
139	**3rd person**	connected		
141	1st person	connected		
142	3rd person	connected		
144	1st person	connected		
145	1st person	connected?		
148	**3rd person**	connected		
149	**3rd person**	connected		
150	**3rd person**	connected		
151	**3rd person**	connected		
152	**3rd person**	connected		
153	1st person	connected?		
154	1st person	connected		
155	1st person	connected		

Appendix B

i. Notes taken during the Dec 2013 undergraduate particle physics lecture:

- "Culture" of particle physics – unique
- Standard Model - "family" of particles
- Similarity
- String Theory
- Symmetry
- Structure
- FAMILIES
- "Non-Standard-Model Effect"
- Not analogy. Actual experiment.
- MECHANICS
- Two-Body Problem
- "How the world is made"
- Plum Pudding Model
- ANTIMATTER
- Event signatures
- If you've got something neutral, tricky to see it because it doesn't INTERACT. Eg Neutrons
- Electron is stopped by heavy material. Muon isn't.
- Emulsions
- Problem/puzzle
- Scaling
- Deep Inelastic Scattering

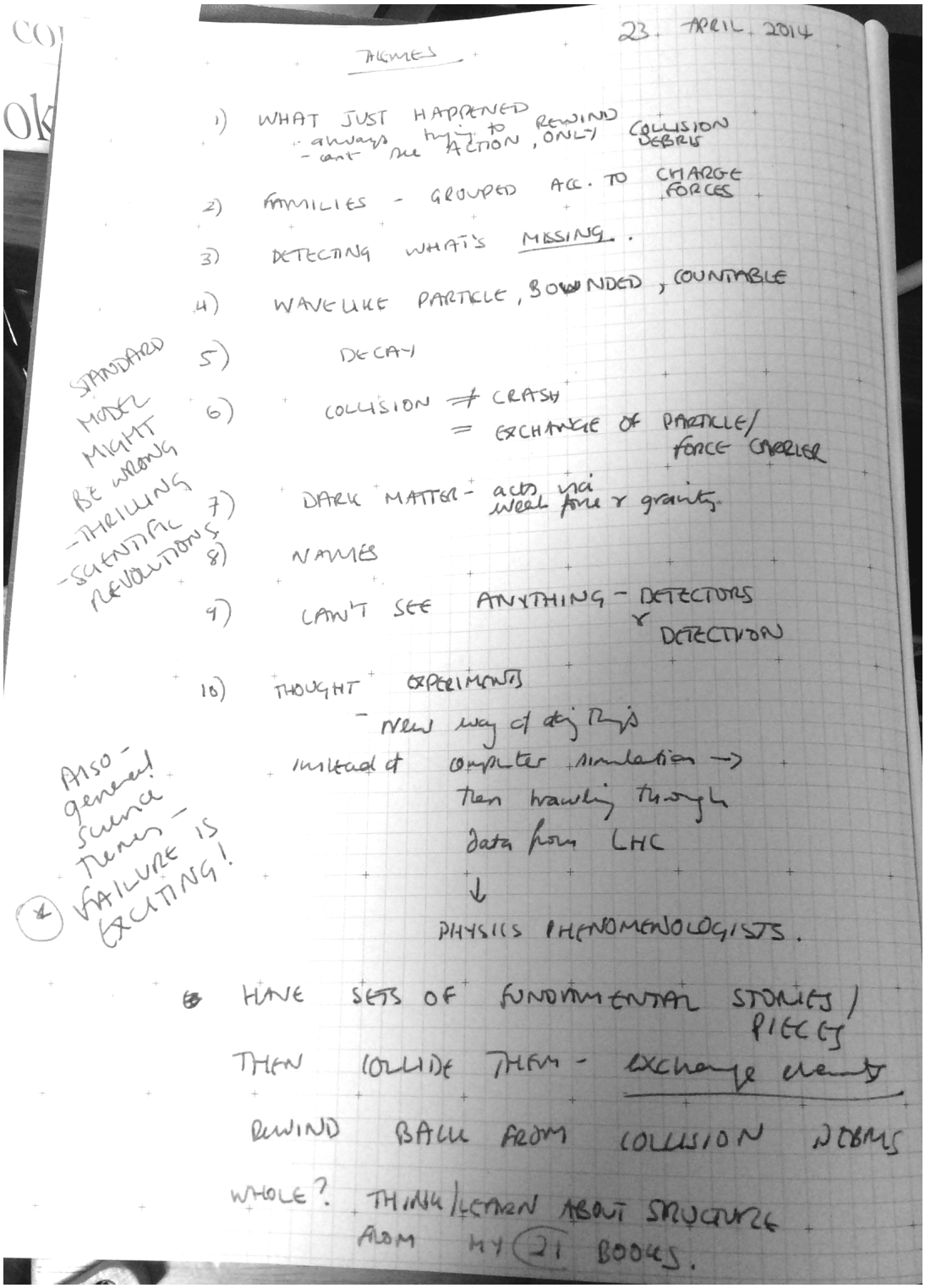
- Idea: In book, draw/write stories INTO diagrams
- Start to believe in quarks
- Ask Helen: What is a particle? Does she feel these particles? How are they REAL to her? What is a "real" particle?
- "New" history
- Low, soft physics = gentle collisions
- Supersymmetric Model – SuSy

ii. Notes taken during visit to the Physics Department at the University of Bristol, April 2014

- Simulation
- Hidden Valley
- Particles affect each other by sharing FORCE CARRIERS
- Loops
- Collision of particles = exchange of FORCE
- How do we know protons are made of quarks? Probe PROTONS with smaller particles – ELECTRONS – which collide with quarks
- Never see a quark by itself, quarks always in container particles
- Reconstruct collisions – What just happened?
- SuSy
- Compositeness
- What particles am I not seeing?
- The Missing Universe
- Standard Model = Matter & Force

- Dark Matter only interacts via weak force & gravity
- ANTIMATTER – just matter with charge reversed

iii. Notes made of possible themes to cover in her creative work:



iv. Poem written to the gravity-inspired poetic form

But If I Knew A Little More

Bird. Bird after bird. Into and under. More birds. And then string. String pulling birds. I whistle and you. I whistle and you dive and flap and surrender.

Flap and surrender before breakfast.

Before breakfast, you leave me, again. I promise, you say, and I can hear the birds on your shoulders, in your pockets, skimming through your hair. You said that last time, I whisper, but you have already gone. The bird sitting opposite me shrugs. Sometimes, the bird seems to say, it's enough to. It's just enough.

v. Questions she sets for herself regarding her book in May 2016

– What order should it go in?
– No page numbers? I rather like that.
– Are there gaps that might need filling?
– Do I need to "polish" any part of it or am I happy to leave it raw, slightly rough, messy, chaotic, "showing my working"?
– Should I add in images? (Collision diagrams, jigsaws)
– Do the personal essays need numbering? Titles?
– Should I add in quotes from the contextualising research?
– Is there enough? What does "enough" mean to me?
– Appendix with film titles etc...?

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