

ELECTRIFYING WOMEN

From fact to fantasy



Edited by Hannah Stone

**In collaboration with The University of Leeds project:
'Electrifying Women: Understanding the
Long History of Women in Engineering'**

Electrifying Women: From Fact to Fantasy
First edition, February 2020

Editorial copyright©2020 Hannah Stone
Text copyright ©2020 the contributors as credited

The right of Hannah Stone to be identified as the editor of this work has been asserted in accordance with the Copyright, Designs and Patents Act, 1988.

All rights reserved. No part of this publication may be reproduced, stored in or introduced into a retrieval system, or transmitted, in any form, or by any means (electronic, mechanical, photocopying, recording, e-book or otherwise) without the prior written permission of the rights holder.

ISBN: 978-1-5272-7506-1

A CIP catalogue record of this book is available from the British Library.

Cover image: Women's Engineering Society visit to a power station, c.1938.
Source: NAEST 092/07/01, Caroline Haslett papers, Institution of Engineering & Technology Archives, London.

Designed and typeset in Calibri by Hannah Stone.
Printed and bound in the UK by Leeds University Print Services.

Foreword

History distinctly lacks the female touch, both in terms of the people recorded and the authors who document it. The men are there in droves, with their innovation and invention, their politics and policies. The women whose stories have passed through the annals of time to us are usually those of a higher 'station' or who broke the mould such as Boudicca, the six wives of Henry VIII, Elizabeth I, and Florence Nightingale. Their stories could not be stifled or silenced and live with us largely through oral history or fiction. Yet, still now only a minute percentage of the women's lives that have been lived have ended up among the "chosen few" to be highlighted on the National Curriculum throughout schools in England.

The Women's Engineering Society (WES) celebrated its 100 year anniversary in 2019. Yes, one hundred years! Women have been involved in engineering for at least that long and have made some remarkable contributions. But very few of those women have made it into the history books or have an online presence. Today, only 12% of the British engineering workforce is female, despite women having played, and continuing to play, a significant role in the sector. WES believes this is largely to do with the inherent prejudice in British society that engineering isn't an appropriate career for girls. WES strives to overturn this belief and reveal the history of the women who have made a difference and provide role models to inspire future generations.

The Electrifying Women project has built on the research that has been carried out during the Society's Centenary year. I took part in one of the creative writing workshops, held at the inspiring Leeds industrial Museum. The workshop was thought-provoking and enlightening. Whilst facts may have been lost through time, using the resources and archives of the Women's Engineering Society and with the guidance of Hannah Stone, the writers in this anthology have brought to light some of the remarkable women engineers of the last century. These poems, stories, letters and plays, although fictitious, have explored what life might have been like for these women to follow their dreams and ambitions in a male world, and whose stories might otherwise not have been told.

Helen Close, Centenary Trail Project Officer, Women's Engineering Society

Preface

This volume presents responses to a series of creative writing workshops I ran during the autumn of 2019, at the suggestion of Professor Graeme Gooday, Professor of Philosophy, Religion and History of Science at the University of Leeds, and supported by funding from the Arts and Humanities Research Council's impact and engagement project 'Electrifying Women: Understanding the Long History of Women in Engineering', grant reference: AH/S012702/1, for which Graeme was the Principal Investigator.

Hosted in the centenary of the Women's Engineering Society, the project has been an extraordinary celebration of women throughout history and in the present day who work or worked as engineers of one sort or another; who supported their menfolk who were, in some cases, more celebrated engineers; who dreamed of reaching the stars, even if their personal circumstances (and even their gender) inhibited a fuller engagement with external action.

It is very heartening, at a time when girls are still under-represented in the study of STEM subjects, to see such an enthusiastic response to the idea that women can design machines, explore scientific discoveries and contribute to the public advancement of knowledge and understanding about aspects of engineering as diverse as the internal combustion engine, data encryption, computer code and astronomy. Engagement activities associated with the project were diverse. Alongside public lectures, a vibrant blog and 'wikithons' we saw a cohort of drama students at the University of Leeds use the project as the basis for writing their very own mini-drama, SHE, performed to enthusiastic audiences in Leeds in November 2019. More information about the project may be found on the website: Electrifyingwomen.org and on Twitter @ElectrifyingWmn.

Many thanks are due to Graeme for all his support, encouragement and imagination in requesting and facilitating this community engagement with the project, and to Dr Emily Rees, Research and Engagement Assistant, who not only carried out all the necessary administration but participated in two of the workshops and helped me craft the process. I am extremely indebted to them both. Special thanks also to Liz McPherson who attended the first workshop and used the ideas as a catalyst for her own creative writing workshops, generating even more engagement with the concept of electrifying women. I'm also grateful to Ian Duhig, who had not been involved in the project but very graciously permitted me to include his Amy Johnson poem (written for a

residency at Sewerby Hall which has a collection of Amy Johnson memorabilia), which I spotted on social media. These women engineers get everywhere!

But final thanks must go to the writers here, who were bold enough to participate, for their willingness to engage with my suggestions for adopting the persona of women engineers, for their inventiveness and imagination and persistence in writing these very diverse pieces. I subtitled my workshops 'from fact to fantasy', hoping to give free rein to the imagination of the participants. As you can see, the authors here published have given themselves free rein to invent characters and scenarios, and in so doing have added some 'missing pieces' (albeit fictional) to the history of women engineers.

It has been a huge privilege to be involved in this project, and to support the intersection between academia and creative writing; it is a field I hope to continue working in. For details of any upcoming workshops, readings or other events that I am involved in, do email me on hannahstone14@hotmail.com, or make contact via my Facebook page.

Hannah Stone

Contents

How to be Amy	Liz McPherson	8
The Last Testament of Amy Johnson	Ian Duhig	11
Driving Dreams	Sarah Holloway	12
A Letter to My Husband	Amanda	13
Jobs for the Girls	Beth Chappell	15
Electrifying ...	Malcolm Henshaw	17
Electricity	Lucien Conteh	18
The Lasting Tooth	Barbara Muller	19
Decorative Electricity	Liz McPherson	26
An Electrifying Woman	Lynda Steele	27
A regular terror	Moira Garland	28
Ada Lovelace, Enchantress of Numbers	Howard Benn	34
Queen of Industry	Marie-Paule Sheard	35
Her Prison	Bill Fitzsimons	36
The Un-engagement of Miss Caroline Haslett	Hadassah Louis	37
Women Engineers	Eileen Neil	39
Women Engineers in the Twenty-first Century	Dru Long	40
That Idiot Finch	Emily Rees	41
Mrs Gordon's Diary, 1885	Graeme Gooday	43
Homage to the founders of the WES	Joanna Leser	45
Author and Editor Biographies		47

How to be Amy

Chapter I. Growing up

Ride your bike and play cricket with the lads
(don't get your front teeth knocked out).
Lead a rebellion at school, go to uni.
Discover planes, fall in love, learn to fly.

Chapter II. Johnnie

Enjoy the smell of oil, getting your hands dirty.
and especially your nickname - Johnnie.
Study for your Ground Engineer's Licence,
pass with flying colours.

Chapter III. Ambition

Come up with the mad idea of flying to Australia
but make it really tough by aiming for the world record.
Write a thousand letters seeking sponsorship.
Don't ever give up.

Chapter IV. Preparation

Buy a Tiger Moth with silver wings.
It's made of wood and fabric,
a flying go kart with an open cockpit.
Perfect for a solo journey of 11,000 miles.

Chapter V. Planning

Ignore sensible advice. Put a ruler on the map,
draw a straight line to find the fastest route.
Arrange for fuel at landing sites
(not airports because, in 1930, these don't exist).

Chapter VI. And we're off

There's no radio, radar, sat nav. Maps are patchy
and you have to fly low to navigate.
Suck fuel when the pipe gets blocked
– it makes you vomit but that's no reason to stop, is it?

Chapter VII. Flying High

Over the Alps your engine cuts out.
Freefall blind through thick cloud,
praying more oxygen will do the trick.
Skim the peaks, wings inches from solid rock.
Yee ha!

Chapter VIII. Trouble

In Iraq you run into a sandstorm.
Make an emergency landing in the desert.
All night, hold off a pack of wild dogs with a revolver.
Fly 8 hours a day, fighting exhaustion.

Chapter IX. More Trouble

The monsoons come early and you get lost.
A dodgy touch-down wrecks the propeller and a wing.
You're an engineer, so you fit another propeller
but you can't get hold of a wing.

Chapter X. Wonderful Amy

Fix the damaged wing using shirt fabric and glue.
Of course you won't beat the record now.
You think you've failed
but the world has gone mad for 'Wonderful Amy'.

Chapter XI. Fame and Fortune

Land in Darwin, wondering why there are so many people.
You're a celeb, the 'plucky little secretary'
who made it despite the odds.
Everybody wants a piece of you.

None of them know what it took.

Liz McPherson

The Last Testament of Amy Johnson

An AFA First Officer,
I know my ground crews wink or sneer
as if to say, "Just look at her!"
who're safe down there while I'm up here.
If those we fight, I've learned to hate,
still those we guard I truly love –
not institutions of this state
or its stuffed shirts: I set above
Them home and sisters back in Hull,
Most men I meet I find a bore,
the lives they plan for women dull,
as dull the life I had in store –
a different route in life I planned
and very different maps unfurled:
I bought a cheap De Havilland
and chased the sun around the world
to my born place's opposite,
a gypsy in my Gypsy Moth.
So while the brows of men might knit
I cut my coat from heaven's cloth
and chose to wear this uniform
and ferry planes I helped to build,
not chasing sun, but through the storm,
to burn or fall, all I have willed.
A moth or Icarus or what
you choose to call me, I don't care –
you might love words, but I do not.
All I love's silent, in this air.

Ian Duhig

Driving Dreams

Dawn's breaking, dreams fading,
Run quick to the station, to take papa his tea.
Intent amid the steam,
Voices rise above the din, wheels and whistles clamouring.
I would join you in a flash, stoke the engine, make the dash –
North as fast as wheels can fly, choo choo...! But sigh, I must turn my steps
away, for
Girls do not drive, or so they say.

Dusk falling, day fading,
Returning to the station,
Engine's whistle, today's last stop,
All passengers, please disembark, and go, pass on the spark,
Miles we've covered to reach this mark; track, toil and years led us here, my
dears to say,
See, girls do drive, now lead the way!

Sarah Holloway

A Letter to my Husband

My dearest Richard

These past few days, I have found myself more and more frustrated by the lack of progress on our joint project and the fact that I cannot represent both of us in public, at meetings or ask questions of colleagues that you work with because I am a woman and your wife. I feel so excited about our work and the potential it has to change people's lives but I find myself racing ahead in my thoughts and realise that you are not racing alongside me. I know you are committed to the project but I worry that you don't have the same sense of urgency about it as I do. I sometimes feel like I could burst with the ideas I have in my head and the desire to translate the ideas into concrete answers to the problems and challenges that the project poses.

I have spent hours asking myself why we are advancing at different speeds and I can only conclude that it's because you are a man and I am a woman and you don't feel the need to change the world as quickly or as urgently as I do.

I feel imprisoned by my sex and I am acutely aware of the many things I cannot access and cannot do and I am sure that you do not feel this level of constant anxiety or concern, as you are more at ease about your place in society as a man ... A man who has the right to think and do and act without fear of judgement or obstruction.

Of course, my dearest I am not suggesting that you are trying to block or put obstacles in the way of the project but I believe that you are simply not as keen to move as fast as I am and that your thoughts are not in turmoil as are mine. I am sure you will be surprised when you read this as you probably feel that we are working together in harmony, but little do you realise that my mind cannot be calmed and my desire to change things has become unbearable to me. This is why I must go to London where the suffragettes are mobilising for a demonstration outside of parliament. I need to express myself, my desires, share my concerns with other women and feel a sense of togetherness and solidarity and find my voice.

The project can surely wait a few days and maybe this letter will give you an insight into my thoughts and give you time to think about the next steps that we can take to advance our project.

As I write I suddenly feel an overwhelming sense of liberation, just from sharing this with you and expressing my feelings but it's not enough ... I must go to London! It's as if there is a fire inside me that has been stoked by coal. The news of the suffragettes has given me hope that I will no longer have to walk in the shadows whilst you are able to walk in the sunlight.

I beg you to read this, knowing that it is coming from a place of love and good intention. Try to imagine yourself walking in my shoes and accept that the progress of our project and the progress in society and the struggle for women's rights are so closely linked as to be impossible to separate.

If I cannot be free to use my brain, take an active part in our work and in society as a whole, I cannot be a happy and productive partner and a fulfilled and loving wife.

Yours Hilda

Amanda

Jobs for the Girls

“I’m an Engineer” Magda told me, when I met her on a country walk. My mind turned to trains, engines, oil, overalls, men! – but I wasn’t sure what to think.

Eventually I learned more. Magda was brought up on the Caribbean island of Tobago, and together with her siblings was encouraged by their parents to get a good education. From her early years, Magda had been fascinated and intrigued by the structure of buildings, and she especially loved an unusual road bridge with a central footpath that led to the sea. This interest led her to do an engineering degree in Trinidad, where there were six women in her year, and around one hundred men.

Having a brother already in the U.K., Magda arrived too and with a determined wish to become a member of the Institute of Civil Engineers she soon secured a job with Leeds City Council where she has worked for nearly 30 years. Initially Magda was the sole female engineer, but she was pleased to tell me there are now several women.

Of course there have been several well-known female engineers in the past. For example, the Austrian/American actress Hedy Lamarr (1914-2000), who had a scientific mind and yearned to be inventive. Together with composer George Antheil in 1940 they developed a communication system intended for use by the navy to guide torpedoes to their targets during the Second World War. Although not used immediately it was patented, and as well as receiving a Pioneer Award, Lamarr was inducted into the National Inventor’s Hall of Fame in 2014. The invention formed the basis of today’s Wi-Fi, GPS and Bluetooth communication systems ... becoming important to the military as well as to the mobile phone industry.

Lamarr was a brilliant woman whose skills were consistently underestimated. Magda expresses an infectious enthusiasm for her work as a Group Engineer with a team focussed on protecting the environment especially in relation to management of drainage and flood risk: the current concern about the effects of climate change much in their minds. Today there is a helpful recognition that women in engineering have much to offer.

“Women engineers can be just as effective and knowledgeable as the guys” she told me, and her working environment is one in which further development is encouraged and supported... since joining L.C.C. Magda gained

a Masters' degree at Sheffield University: up-to-date techniques must be kept abreast of, and continuing professional development is considered essential.

Beth Chappell

Electrifying ...

It's been 20 years
since I was called electrifying.
It was in the Electric Ballroom.
He had greasy hair,
a bit of a git.
I could tell.
"I'm off to University",
he said.
"To study Engineering",
he said.
"You wouldn't understand",
he said.
"No matter"
he said
"Because you are electrifying,
if you would but let me touch you
I would surely feel the shock,
a tingle down my spine."
Not the first time he had used these lines.
I could tell.
I saw him yesterday,
working in the local café,
as I sat sipping my coffee
pouring over
the plans
of my latest
bridge.

Malcolm Henshall

Electricity

You were not here:
though we have lights now,
oil lamps were better.
Now you are here, so you give us
not only light but help us with tasks.
You are a good master and a bad master.
You are a good master because
you make things easier for us,
cooking, washing, now we have the IT age.
Without you it would not happen!
But you are a bad master, too.
If one cable goes wrong with you
you cause death, you cause maiming.
So, why are you here?

Lucian Conteh

The Lasting Tooth

Résumé

The Lasting Tooth (working title) is a play about the perks and costs of living one's life outside tracks and boxes. It tells the story of Amelia Rose Miller, a woman of science and determination who took part in the greatest engineering adventures of her time. As a Tooth Fairy Engineer, Amelia Rose revolutionized the industry: she developed new protocols to harvest children's milk teeth and extract material such as emotional intelligence or resilience to redistribute to the needy.

Having recently become a pensioner, Amelia Rose is gloomy: the 'senior' role is as ill-adjusted to her personality as the 'housewife' role had been. She is not ready to be retired, and already an idea is taking shape. Thanks to her engineering experience and flair, she thinks she can transform into something precious a neglected commodity: the fallen teeth of elderly people. The play will show not only how the challenge is a scientific and engineering one, but how it is also a social one: once again, Amelia Rose must deal with the reaction of her family, entourage and of society at large. Allies and foes come in all sizes and shapes, and from ever surprising stocks.

Cast (provisional)

Amelia Rose	Tilda Swinton
Jacob, husband	Steve Buscemi
Sophie, daughter #1	Amy Adams
Maid, Teresa	Maggie Gyllenhaal
Melanie, best friend	Frances McDormand
Ex-colleagues	Gary Busey, Willem Dafoe
Butler, James	Liam Neeson
Aunt Livia	Honor Blackman

...and Thomas William Hiddleston as the Voice over
SCENE ONE

Where a decision is taken

INT. HOUSE – MULLION COVE

A Victorian house overlooking an angry ocean and a low brooding sky.

A woman in her early seventies, thin and with a stiff upper lip, is sitting in one of the large red armchairs of the reading room. She is surrounded by books and 2D and 3D models of submarines, engines, brains and teeth. On the

mantelpiece lie framed photographs showing her in her overalls with various people and teams, smiling, shaking hands or focused on a blueprint. The woman doesn't pay attention to her surroundings but gazes at the horizon. Her right index finger mindlessly follows the curve of her teacup. Next to her, Thomas William Hiddleston, the Voice over, declaims while pacing up and down. At first, his agitation contrasts with her calm. Gradually though, she too becomes agitated.

Thomas W. Hiddleston:

Amelia Rose is grumpy. *She peeks at a book lying on the adjacent console and then back at the ocean, making a face.* Teresa, the maid, keeps leaving here and there books about knitting, cooking and gardening. Teresa had always disapproved of Amelia Rose's professional choices. At least, she did it openly, whereas other members of the staff and of her family communicated their views through sighs and looks. Her daughter Sophie – an ill-suited name after all – had become the queen of looks. Amelia Rose doesn't care. She never had. Admittedly, she couldn't cook, knit or keep a plant alive. She could, though, draw the blueprint of any sort of machine, engine or robot, she could run a factory – and she had – or repair a submarine. *She hits the armrest with her fist, startling the Voice over.* The view is breath-taking. Jacob – her husband, God bless his support – would want to go for a walk. She had always preferred the smell of chemicals, the greasy atmosphere of shop floors and neon lights to a 'walk.' *She stands up, touches her cheek, and begins to walk back and forth.* One of her teeth is loose, had been for quite some time now. She can feel it move when she pushes it with the tip of her tongue. How ironic. Her mood darkens. Amelia Rose had worked with splendid minds such as those of Amy Johnson, Hilda Lyon or Annie Wilson.

Amelia Rose Miller:

I have flown alongside Amelia Earhart.

Thomas W. Hiddleston, still addressing the audience:

She had had a splendid career and, as a Tooth Fairy Engineer, had a leading role in the teeth industry.

Amelia Rose Miller:

I have designed the machines to harvest children's teeth from under their pillows. I have written formulas to transform them into emotional energy and into resilience. I've built the factories to do it. I've done it at a time when

women were allowed around machines only to sweep the floor or to bring a cup of tea.

Thomas W. Hiddleston:

Amelia Rose has first devised the means to redistribute the precious result of the process to the needy. She has done it all right under the nose of the patronizing lords, sirs and gentlemen, and while raising five children and attending to a household.

Amelia Rose Miller:

Jacob was supportive, but there were limits.

Thomas W. Hiddleston:

Amelia Rose has been a great and happy engineer.

Amelia Rose Miller:

I was a great and happy engineer.

Thomas W. Hiddleston, finally turning to Amelia Rose:

And you don't want it to be over. Hence the grumpiness.

Amelia Rose Miller:

I retired two weeks ago ...

Thomas W. Hiddleston:

... the toasts and speeches of your retirement party are still echoing ...

Amelia Rose Miller:

... and I despise it.

Thomas W. Hiddleston, raising a finger:

But you have beaten the gender gap. You can beat the laws of old age.

Amelia Rose Miller, brandishing a book about the fundamentals of thermodynamics:

I took up the gauntlet then, and I will take it again now.

Thomas W. Hiddleston:

You will give Sophie, and the others, a good reason to sigh for another decade or two.

Amelia Rose Miller, forcefully putting down the book:
Yes I will. Oh, and I have an idea alright.

Thomas W. Hiddleston, overboard:
Old teeth!

Amelia Rose Miller, evidently surprised:
Yes. Old teeth. As Tooth Fairy Engineer, I have done miracles with milk teeth.

Thomas W. Hiddleston:
On the other side of life though, teeth are disregarded. As are old people. As you, as a woman, have been. But you know better.

Amelia Rose Miller:
I know better and I am sure there is much to be gained from this raw material.

They have been pacing around each other, pointing and brandishing. At this point they stop and face each other. They have a silent dialogue, smiling with a knowing look. They say in unison, low and slow:

Amelia Rose Miller/ Thomas W. Hiddleston:
The barn.

Thomas W. Hiddleston:
The barn would make a very nice workshop.

Amelia Rose Miller:
A very nice workshop indeed.

Thomas W. Hiddleston:
It hasn't been used in years.

Amelia Rose Miller:
The perfect place. I could call Melanie, she would help me get rid of all the junk.

Thomas W. Hiddleston:
And clean it and rearrange it.

Amelia Rose Miller:

I need a sizeable desk, file cabinets and shelving units. Tables and tools, and machines.

Thomas W. Hiddleston:

And a lab bench. You could probably find some at the Teeth Company. They have a stock of castoff furniture. James would help you bring it back. But what will Jacob say?

Amelia Rose Miller:

As long as the house stands and he gets his three meals and brandy, he'll support me.

Thomas W. Hiddleston:

Will the house stand?

Amelia Rose Miller:

Well, Teresa has been its pillar for all those years more than I have. She has relentlessly complained, but she made it work. The household, and hence my career.

Thomas W. Hiddleston:

But what will the neighbours, your ex-colleagues, the women of the parish's club think? And your daughters, your sons-in-law, your grandchildren, the family?

Amelia Rose Miller:

My God, so many people to please, so many requirements to meet. I think I will do as I always have: not care on the one side, and give love and an example on the other. Some of them might even be proud. What do you think?

Thomas W. Hiddleston:

I think they should. I am.

Emotional Silence

Thomas W. Hiddleston:

But I wonder.

Amelia Rose Miller:
What about?

Thomas W. Hiddleston:
The teeth: how will you find them? You'll need teeth to begin your research.
Old teeth.

Amelia Rose Miller:
I might pay a visit to my old aunt Livia.

Thomas W. Hiddleston:
You haven't seen her in years.

Amelia Rose Miller:
All the more reason to visit. She lives in a care home, a posh kind of place, mind you. I could bring along Sophie, she is good at grabbing – and keeping – attention. While she does her little number, I could snoop and sneak to learn a bit more about the teeth habits of the residents.

Thomas W. Hiddleston:
I didn't know being an engineer entailed such a wide scope of activities.

Amelia Rose Miller:
Being a woman entails being resourceful. You can't live the dream. You must invent it, weave it and fight for it.

Thomas W. Hiddleston:
So, you are sure? No knitting, no naps, no resting on your laurels.

Amelia Rose Miller, sits:
So sure. Two weeks since I retired and I crave the smell of grease, the creaks and squeaks of the machines, the excitement of facing problems and finding solutions. I suspect that there is wisdom and nuggets to be extracted from old teeth. You know, it could help people. I have an idea for a machine. I need only to make some changes to the original MTE, the Milk Teeth Extractor. If I modify the throttle shaft and...

Thomas W. Hiddleston:
Don't get all technical on me. Here – *he hands her a notepad and a pencil* – I guess you've missed the sweet smell of blueprints as well?

She takes them, pulls the console towards her and clears it up, passing the books about knitting and being someone she's not to the Voice over. He grabs them and drops them behind her chair. She doesn't notice, fully engrossed in her diagram. He sits, evidently content. Borrowing her cup, he pours himself some tea. Outside, the sky is high and amok.

SCENE TWO

Where Sophie visits the barn (to be continued)

Barbara Muller

Decorative Electricity

You see my dear, it is my pleasure
to wring from iron these drops of golden light,
like honey from the hive in summer,
saved up to serve a feast on winter nights.

The curlicues and cormorants weave
graceful coils and drapes, enhance
a dining room, a writing desk, breathe
life into a hidden gloomy niche.

You see that dragon over there?
His head hangs low, and in his metal
mouth he holds a ball of shimmering air.
A Cupid swathed with loin-cloth sheds

sun-drenched rays onto my dinner guests.
Moreover, should your safety be a fear,
please rest assured, compared to gas
or candles, there is no hazard here.

It is the future. Now, if you're agreeable,
I'll switch it off. See how the spark
is quenched at once – we're frugal people
In this house, and also (you'll remark)
We marry science with exquisite art.

Liz McPherson

An Electrifying Woman

As far as wives go, she really wasn't much cop,
I thought we would separate soon.
But what kept us together, through sickness and health,
was this priceless knowledge, she'd picked up at college,
of putting a one pound coin in the leccy meter,
and we had power for the whole of the month.
Now that made her worth sticking around with.

Lynda Steele

A regular terror

Exhibition at the Halifax Workers' museum.

Displayed here is a selection of letters between two women who were engineers as well as suffragettes and trade unionists. These letters were recently discovered, gathered together, and then donated, by the women's descendants. These discussions continue to be of significance to women in their quest for independence in their working lives.

January 1st 1919

Halifax

Dear Eliza,

Your Christmas greetings, and indeed your hopes for peace, were so welcome. How wonderful that the future for the country, and for women, is looking so brighter than before the war. Now that we both have more opportunity, without the duties of wartime, we must continue to correspond. The factory keeps both James and I occupied and I am sure you have your duties too at home. Were we living nearer each other a meeting might have been possible.

Now that the new law has passed perhaps it will stir recollections of our days of campaigning for women to have the vote, and all that might go with it.

What do you think?

Your very good friend,

Agnes

January 5th 1919

Birmingham

Dear Agnes,

Tom and I are nicely settled here, Tom now in employment with the Associated Society of Engineers. So, you see, keeping our association with the engineering work, just as you both are.

The house is not grand but with help from young Maisie I can be a good wife, and a good mother to little Lilian. She has now started at school – full time, Agnes! Perhaps one day our daughters will have a university degree. But perhaps that is getting too far ahead... How we longed to go to school all day and not be running hither and thither in the weaving shed, bairns that we were.

Ah those speeches in Hebden Bridge back in 1907, what fun we had. I remember what you said afterwards – “I went to jail a rebel, but I came out a regular terror!”

Eliza.

January 26th 1919

Halifax

Dear Eliza,

It was a lively time, though now that I think about it prison was not quite as ‘nice’ as I had anticipated.

It is very good to hear that Tom is representing the engineering workers. Here in Halifax I am so proud to be employing many skilled women in the making of lathes. My hands continue to be covered in oil some days. My other joy is the motor car which requires constant attention and re-oiling. I have encouraged both Sarah and Robert to understand how the Douglas car works, and which has taken us on some merry jaunts into West Riding rural areas.

Agnes

February 28th 1919
Birmingham

Dear Agnes,

I apologise for the delay in writing to you. Maisie had to leave us as her husband has found work (at last) in Worcester and we have not yet found another to take her place so I have struggled to look after our little family, scrubbing, washing, cleaning the grate, cleaning the steps etc. I am quite worn out with it all.

Eliza

Halifax
March 9th 1919

Dear Eliza

A woman's work is never done whether at home, factory or office. I have a dream of getting homes built where electricity will take away many of the burdens that we women have at home.

However I fear that more immediate plans will take up my time. MPs are planning to stop women working in engineering now that the war is over. At our factory here we have trained so many women in the skills to manufacture lathes. Now they want all that to go to waste! It seems the vote is not the end of matters at all.

Agnes

Birmingham
April 18th 1919

Dear Agnes,

We need the men back in these jobs now to earn a wage to keep a family, after all the fighting they have done for us. I for one don't want to be working at two jobs, one here at home, one at the machines.

That would certainly be a prospect: the washing done by machines, the floors to clean themselves. My Good Friday prayer today is for that to come about before long.

Eliza

Halifax
May 25th 1919

Dear Eliza,

It is good to hear that Tom can provide his family with a decent wage. But do remember, dear, that there are many women without husbands like your dear Tom. So many men, like your dear brothers, have not returned and the girls must fend for themselves.

We have re-discovered each other. I do hope this difference in our outlook will not come between our friendship forged so many years ago. Do you recall the tramp to Wakefield and all those hours without food? Thank God we do not have to suffer from lack of something to eat these days.

Agnes

Halifax
June 3rd 1919

Dear Eliza

And it has come to pass, my fears of women being thrown out of jobs. I expect you have seen the newspapers and the 2nd reading of the Restoration of Pre-war Practices Act. James and I have worked alongside each other to keep our women in work they have trained for all through the war years.

Your Lilian must be a growing girl now, the pride of her mother. My daughter, Sarah, is now ten. I thank God they do not need to start their careers yet, as I had to do. Robert comes down from university next week. He wants to get work on these aeroplanes, he says, and I think that's a grand idea.

We go back so far – remember the tram strike? Such a battle we had. And those days and weeks at Hebden Bridge for the weavers strike for the women to earn a decent wage.

Do write.

Your friend,

Agnes

Birmingham
October 12th 1919

Dear Agnes,

I have delayed writing while this bill has been going through. The other reason is that I now have a typewriter and help Tom with his work. Of course I am not paid for this as I do it in between my housework. It has kept me busy.

Surely you will not be able to go on with this idea of keeping the women. The law is quite clear I think. I have seen some of the ASE business records detailing their view. I am sure you appreciate that the men who have returned must demand of the government a wage that meets the needs of their family. As Tom says, the men want these women to look after them, cook their meals, look after the children – they cannot do this when occupied in the factory.

Eliza

Halifax
25 April 1920

Dear Eliza,

We have been so concerned about the loss of the skilled women here. I have always considered that a woman should be able to choose her work if she wishes to do so, together with her right to cast a vote.

You will know about the ASE bringing us to a tribunal next month and I am sad that this puts us at odds with each other.

Agnes

[At least one letter is missing here]

Halifax
23rd May 1920

Dear Eliza,

I have heard the phrase ‘one step forward, two steps back’ and I fear that is the situation we women find ourselves in. I certainly do not intend to deprive men of a better rate, as you have suggested. I have never forgotten where I came from, my father and mother were honest working people, dyers and weavers. But have the men in the engineering union not considered how

they must allow the women to join and work with them? Must we always support the men without them in turn supporting work and equal pay for women?

My plans are in hand now for building homes to improve women's lives, and the common people's standards of living, with the use of engineering products and inventions, and electrical appliances.

I trust that Tom is improving in health.

Agnes

Halifax
20th June 1920

Dear Eliza,

How are you? Not having heard from you again I fear that you have been offended by my letter, or that Tom might have taken a turn for the worse.

Agnes

No further letters were found.

This is inspired by the life and work of the engineer Laura Annie Willson, (1877-1942) and to a lesser extent by that of Mary Taylor (1863-1934) a fellow suffragette. By 1919 Laura Annie and her husband owned and ran a factory in Halifax that manufactured lathes, while Mary was married to an official of the Associated Society of Engineers trade union. These letters, and the Halifax Workers' Museum, are entirely fictional.

Special thanks are due to Anne Kirker, a volunteer and researcher, who is part of the group who set up the ongoing Laura Anne Willson exhibition at the Halifax Industrial Museum, and whose talk on November 5th 2019 at the Todmorden Book Festival was so engaging and illuminating. Other thanks go to Nancy Hall, 'Rebel Girls' by Jill Liddington, and to The University of Leeds for their 'Electrifying Women' project which alerted me to Laura Annie in the first place.

Moira Garland

Ada Lovelace, Enchantress of Numbers

She is born the product of language.
Daughter of Byron,
her mother's fear, that she should
grow in similar mood and temperament,
She has her lie for hours on end
so she learns self-control.
In bed,
Ada counts her fingers
to check they're all there,
hearing the universal beat,
mind, unlike a machine
all cogs and wheels,
electric with connections,
exploring, expanding
numbers into words.
Could she count the stars
without limit?

She gives Babbage the beauty
behind his device.
The Difference Engine!
He proudly stamps his name;
she signs A.A.L.

Ada, you will be lost to opium and time.
There's just too much Byron in you.
But you'll give us a language

all your own.

Howard Benn

Queen of Industry

Dear Papa

I am sorry to tell you that I was not chosen by the mill to be put forward as Cotton Queen. I am not surprised to be honest. I am not pretty enough. Marjorie is so sweet and accommodating. I do not resent her being chosen. You should see her lovely hands. You would not think they handle spools and thread all day. Mine are rough and stained by the oil of the cogs on the looms which I work on. If she wins the national competition, and I would not be surprised if she does, she will get pretty clothes and travel the country.

I am saving from my wage regularly to pay for night classes. I am the only girl in the class and get teased by the boys but I can take it. The teacher looks down his nose at me but it does not frighten me. I will show him what I am made of when the exams results come out. I already work as an engineer, or rather as a woman mechanic as we are supposed to be called. I love my work. I love solving problems with the looms, figuring out why they are not working well, why they jam or produce poor cloth. I love to find the right tool for the job and feel such satisfaction when all is working smoothly. Mr. Arkwright, the supervisor at the mill, is kind to me although he does not understand why I like to stick my hands in the greasy machines. He has found a long leather apron for me which I wear over my skirts. I am very grateful to him. This protects my clothes and stops them getting stuck inside the looms. I tore at least two skirts when I started.

It will all be worth it when I am an engineer one day. I know I am just a girl – I can hear you say – but I am already working on a design for a new loom which would make the weaving much more regular and efficient. I may show it to Mr. Arkwright one day.

I hope you and Mama and the children are all well back home.

Your affectionate daughter

Emily

Marie-Paule Sheard

Her Prison

An engineer's lot should be a happy one, but not so Sally Smith, who felt hemmed in by blueprints, measurements, the cold equations of slide rule considerations and the limitations of structure.

Stress analysis and compensating factors (if any) confined her life with the boundaries of her profession. She sought to escape the logic of mathematics which had become her prison.

She is now searching for a less rigid, more flexible approach. Perhaps a form of metaphysical, or spiritual, engineering, a configuration of cosmic verities, a pipeline to infinity.

She longed to break the chains of mechanical conformity and reach for the stars. She would not be satisfied until she could draw a map of the mind of God.

Bill Fitzsimons

The Un-Engagement of Ms Caroline Haslett

Ms Haslett, a young woman of 18, stands in a large abandoned dusty barn over tables assembled in disarray. Three other women, clad in large dresses, fuss over some drawings. Ms. Haslett is unrolling some copper wires when the large barn doors suddenly open. Sunlight pours in. A tall, dark, handsome suitor stands in the doorway. He is wearing a tailored suit. The women quickly cover their drawing plans with clothes and sewing material. Ms. Haslett sits down promptly, putting both her hands on her lap. She does not hide the copper wires which are on the table next to her. The suitor stares at them with mock fancy.

SUITOR: It's complicated, isn't it?
Ms. Haslett stares at the coppers.

MS. H: Oh, but is it?

SUITOR: It is not as simple as tossing a couple carrots and onions in a pot to make a broth.

Ms. Haslett only notices the basket at Suitor's feet. A basket of vegetables he has brought for her as a gift – a gift to make him dinner so as to judge if she is a suitable cook. Cooking; a suitable skill for a wife to have. Ms. Haslett prods her wires as if in thought.

MS. H: Go on.

SUITOR: Go on, what?

MS. H: (staring at him intently) Go on, toss a couple carrots and onions in a pot. Go on, make a broth.

The other women snigger. The sniggering makes the Suitor angry. He approaches, angrily kicking the vegetable basket. The vegetables roll askew.

SUITOR: Oh, nasty woman, must you be so snide? (he snatches some clothes from the table) Will you ask me to wear an apron and a duster too?

Ms. Haslett takes hold of the cloth in his hand.

MS.H: As far as I can remember, I did not emerge from my mother's bowels wearing aprons or holding dusters. I fancy to imagine she wasn't wearing one at my birthing nor was yours.

SUITOR: Must we bring our mothers into this? (a stray chicken enters the scene) Your imagination is a wild goose.

The other women rush to stop a school of chickens from entering the barn. The chickens cause a fracas. Ms. H and Suitor ignore all this.

MS. H: Indeed, the goose so wild it said nay when the farmer tried to slit its throat, pluck its feather or give it a warm coddle over the spitfire.

Suitor is stunned. He stands back. The disarray from the chicken and the women chasing them has exposed Ms. Haslett's and her friends' secret lab.

MS. H: Now, if you will excuse me. My imagination has only spun a little something to ease the domestic drudgery imposed upon my sex.

SUITOR: (staring at the soiled vegetables) And the broth?

MS. H: And the broth? What about it?

SUITOR: It need be made.

Suitor clutches his stomach.

MS. H: See. When the stomach groans for something hot, it does not consider whether it is a female or a male stomach. Indeed, there is no such thing. Nor will this invention at my fingertips.

SUITOR: (alarmed) You are a wild goose.

MS.H: That I am. And no, you cannot corner me, undress me, or turn me over at the spitfire.

Suitor turns to leave, upset.

SUITOR: You are a problem!

MS.H: Problems have no sex, I'm glad.

Stray chickens suddenly rain down on Suitor. He runs away, upset. The ladies have a good laugh and get on with their work.

Hadassah Louis

Women engineers

Filaments glow,
incandescent soft slow lights.
Sabres of photons slice the darkness,
wires pulsate, wild electrons
charging.

Today,
photosensitive silver
displays your faces
in their many shades of grey
slowly fading.

How did we get here?
Sisters of the night
we shared before the light
was snared by minds so bright
they shone; by women's hands
and lives, not only men's.
Not only wives ...

What courage brought you from the mills
from stove, from babe at breast, from hills and rills
to build, to birth, to forge this brave new world
of single minded steel your souls unfurled
Each but one among many others –
augmented alloys strengthening each other.
Sparks that arc across the years
touch today's women engineers.

Women glow, incandescent soft, slow lights,
filaments of photons from the past
retrieved at last.
Rebalanced, vast ...
still radiant.

Eileen Neil

Women Engineers in the Twenty-First Century

Stepping late into the Human Story
we found the atmosphere had darkened
while we had waited in the wings.
Now we stand centre stage,
determined to engineer a different outcome
than the one predicted for our children's future.

Women Engineers and Prophets,
Female Poets and their Sisters in the Mines,
all Women in the service of the Other,
will wield the power of truth and act together.
Shoulder to shoulder with the children
we will consign the old inventions and the marvels
of an engineering past, to the museums.

In that future time people will gaze
in horror at old combustion engines
spawning deadline airplanes, and cars,
at nuclear weapons strewn like long-discarded
toys around the world; and trees and vegetables
will grow where once dead concrete stifled Planet Earth,
while female engineers create inventions which will
enable us to breathe, and thrive and love each other.

Dru Long

That Idiot Finch

Where the fuck is my brush?
Is it possible, he asked, to rewrite history
With a feminist agenda?
The patent's not under my name
But they'll comment on my masculine brain
Once I'm dead

Is that her voice? Do we give recourse to
Bad History by adding linguistic flair for a
Matter of effect?

She's there again, finding ways to engineer
Me back to her son, the
Inglorious inventor, the
Patented engineer

It is sometimes difficult, sometimes easy
To imagine the panache of her privilege
I want her to be loud
I want her to be the septic cackle of a bulb
First installed

He's there again, in the stables, where he should be
But somehow I am uneasy
He watches me like I am a liquid flowing for his easy drinking
He knows what I do with my estranged husband's circuitry
Worse than adultery to this fucktard
He strokes my horse,
Takes her soft mouth close to his tweed breast
Where the fuck is my brush?

I lose her there
Become uneasy with my inventing
Because I have no eye for details, only become
Subsumed in what they call the Bigger Picture
I want her to be loud
I don't want her to be drowned in my own anguish

I am Leda, not about to be taken by the swan
(It is always good to include a classical touch)
I am Leda, separated, frowned upon
At some point the pitchforks will come for me
But for now I'm simply tinkering, in velvet,
Waiting for the sparks to dance.

Emily Rees

Mrs Gordon's diary 1885

March 1885

Well thank heavens Jim has got a limited company to support his work on the new dynamo. I don't have to placate the cook any more – she always used to cry blue murder each time he 'borrowed' her utensils. Mind you, it doesn't stop him talking incessantly about the Paddington station Lighting project at dinner: I've become quite expert in all the plans now that I've heard so much about it. I've even given him a few suggestions which he's actually taken up – not that he notices, let alone remembers, he got them from me

April 1885

Did my regular weekly visit to the engineering works to see Jim and his workmen. He has been teasing me mercilessly for likening his Brobdingnagian dynamos to mechanical but sentient daughters. He forgets how he himself talks about these same machines fondly and proudly with the feminine pronoun! What with engineering wives like me supporting everything night and day, and the machines being cast as females too, perhaps engineering isn't so completely a man's world after all!

July 1885

Hurrah! The new Paddington lighting station is now working in an orderly fashion. And all our – and I say 'our' advisedly – dynamos are working perfectly. Strong, stable and resilient – no wonder!

October 1885

James now is looking for new customers for the company. Households and homes, as well as businesses. Something will have to be done about the horrific glare of the electric light! Most men – Jim included seem to love the garish brightness of the new incandescent lamps. I hate it, as do all my lady friends. What to do?

February 1886

Have been trying to think of how to win my lady friends over to the electric light. I hear that Lady Thomson has been using coloured silk to shade the lights

in her home. I tried this myself and it works beautifully to soften that evil glare. I have decided to write a book on this for the benefit of all. I think I will call it 'Decorative Electricity'... might take me a few years to write though!

Graeme Gooday

Homage to the founders of the WES

“A woman in engineering” –
was just a dream to me
I wasn’t very good at maths
or physics, chemistry.
I liked social science
at university,
no type of engineering
but sociology.

Then I trained in teaching
English with VSO
and went off to Nigeria
to a village in Borno.
I worked hard and I loved it;
the students at the college
were girls who tried their best to gain
every ounce of knowledge.

The village women worked so hard,
they farmed and traded food,
raised the children, kept the home,
went out to fetch the firewood.
They also carried water
in pots upon their heads
I really wished that I could be
a water engineer instead.

I thought about retraining
but not too seriously,
maths and science were sadly still
anathema to me.
When I had a dream about
a future I could see
a woman engineer remained
my favourite fantasy.

So I salute these pioneers
who were so unlike me,
who made designs, and built, and fixed,
and studied diligently
despite the customs of the time
and polite society,
who fought against prejudice and
outright hostility.

You did it all for women
and for the world indeed.
Let all your names be honoured
in perpetuity.

Joanna Leser

Author and Editor Biographies

Liz McPherson

Liz McPherson is a creative writing tutor and workshop facilitator. She also organises courses for the Workers' Educational Association. Sometimes she finds time to work on her own writing.

Ian Duhig

Ian Duhig has written seven books of poetry, most recently *The Blind Roadmaker* (Picador 2016), a PBS Recommendation, shortlisted for the Forward Best Collection and T S Eliot Prizes. A Cholmondeley Award recipient, Duhig has won the Forward Best Poem Prize once and the National Poetry Competition twice.

Sarah Holloway

Sarah works in the heritage sector and has always loved words and stories, but not really written creatively since school. Through the WES centenary and Electrifying Women project she's had the chance to explore new stories in a creative way, following up the workshop with a trip to the Railway Museum for extra inspiration.

Amanda

Amanda enjoys writing to and for friends and family, but finds it difficult to write for herself. The workshop was a light-bulb moment, as she discovered how easy it was to write in character. She felt really energised and even "electrified" by the process and wants to write more now.

Beth Chappell

Beth Chappell spent most of her working life in the NHS, initially training as a psychiatric nurse at the Maudsley Hospital, specialising in Therapeutic Community practice. She also worked with drug and alcohol users, as a Mental Health Practitioner, and as a psychotherapist. She is now enjoying retirement!

Malcolm Henshaw

Malcolm Henshaw has studied, worked and retired in Leeds since 1977. His career was as a special school teacher. He is a full-time carer, with his wife Kate, for their daughter. This has informed much of his writing which he has been taking seriously for the past 6 years or so.

Lucian Conteh

Lucien was born in Sierra Leone, where she worked for the Human Rights Commission; she arrived in the UK in 2018 to join her husband. She moved from London to Leeds in 2019. This is her first published poem.

Barbara Muller

Born the year *Star Wars* and *Saturday Night Fever* were released. Partly raised in the Swiss mountains. Studied anthropology, communication, and science and technology studies. Worked in museums, academic research and in a hospital. Loves Russia, the Rockies and Japan, compasses, submarines and cephalopods. Lives in London. Writes.

Lynda Steele

Between bouts of illness, Lynda Steele attends Creative Writing courses with MIND and the WEA. She has learnt so much about herself, other people and the craft of writing. She writes poems and short stories and they all seem to contain autobiographical aspects, whether she wants them to or not.

Moira Garland

Moira Garland's fiction and poetry has been published in print and online, including *Stories for Homes*, *Strix*, *Release a Rage of Red*, *Writers' Café Magazine*, and *Celebrating Change*. Social justice and the rights of women are a regular focus in her work. Find her at www.wordswords-moraig.blogspot.com, Twitter @moiragauthor.

Howard Benn

Howard Benn has been writing poetry for many years now. He came to write this piece after hearing of the Electrifying Women project through his creative writing tutor. Lovelace was, in effect, the first computer programmer. That her story was lost for so long seemed a travesty, so Howard had to write about her.

Marie-Paule Sheard

Marie-Paule Sheard arrived in Leeds from her native France 45 years ago. On retiring from an academic career she decided to join a creative writing group and rediscovered her love for writing prose and poetry. Although it is her second language she enjoys the flexibility and versatility that the English language offers.

Bill Fitzsimons

Bill Fitzsimons, a Dublin-born Leeds-based poet, wrote his first poems in his late 50s. He is a founder member of the Leeds-based Irish writers group Lucht Focail (Word People) and has read at various venues and on local radio. He has published in *Aireings* and *Poetry Monthly* and three group anthologies. His pamphlet *Written on the Skin* is published by Half Moon Press.

Hadassah Louis

Hadassah Louis is working on her debut epic fantasy novel. She was part of the 2018 Femrite Regional Residency for African female writers and Mawazo Writing Institute 'Write the Novel' class. She is also 2019 Atlantic Fellow for Social and Economic Equity. Tweet her @hadassahlouis.

Eileen Neil

Eileen Neil is a Leeds University graduate, and has lived in Leeds and the Northern Lake District. She has enjoyed writing poetry and prose since her childhood. She has published in *Woman Mountain Words* anthologies, *Yorkshire Medicine* and the *British Medical Journal*, read at Ilkley Literature Kendal Mountain Book Festivals. She has recently started writing again following a disabling illness.

Dru Long

Dru Long is a student in the WEA Creative Writing class at Heart (Headingley) with tutor Liz McPherson, and is currently studying for an MA in Creative Writing at Leeds Trinity University. She was runner up in the Leeds Peace Poetry Prize competition in 2016, and had a poem shortlisted in 2018.

Emily Rees

Emily Rees is the Research and Engagement Assistant on the Electrifying Women project. She researches the relationship between technology, gender and domesticity. Working creatively with the history of women in engineering has been one of her favourite parts of working on this project.

Graeme Gooday

Graeme Gooday has long been fascinated by Alice Gordon's co-authored book *Decorative Electricity*, originally published in 1891, and most especially by its extraordinary final chapter on her own personal experiences. As leader of the 'Electrifying Women' project, he was delighted to have an opportunity to explore Alice's creative and emotional life in new ways, particularly because

the testimony of her own personal papers and correspondence seem not to have survived.

Joanna Leser

Joanna Leser joined a writing group intending to write her life story for her family, but, much to her delight, found herself drawn to fiction and poetry as well. This is the first piece of work she has submitted for publication.

About the editor

Hannah Stone has published four volumes of poetry since 2014 (*Perfect Timing*, *Lodestone*, *Missing Miles* and *Swn y Morloi*), as well as publishing extensively in print and online journals and anthologies and collaborations, most recently with Rosemary Mitchell *Holding up Half the Sky*, a creative celebration of women throughout history. She is an alumna of the first cohort of MA in Creative Writing students at Leeds Trinity University and also holds degrees in English Literature and Theology. She co-convenes the Leeds Lieder poets' and composers' forum, hosts the monthly Nowt but Verse event at Leeds Library, and comperes Wordspace spoken word event in Horsforth. She collaborates with composers Matthew Oglesby and Fiona Pacey with whom she sings in St Peter's Singers. When not writing, publishing, editing or facilitating poetry, she teaches for the Open University.