

ALMOST CERTAINLY NOT REAL

a short play inspired by Cecilia Payne-Gaposchkin

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## ALMOST CERTAINLY NOT REAL

Every high school student knows that Newton discovered gravity, that Darwin discovered evolution, even that Einstein discovered relativity. But when it comes to the composition of our universe, the textbooks simply say that the most prevalent element in the universe is hydrogen. And no one ever wonders how we know.

—an unnamed Harvard undergraduate student

### Characters

CECILIA                      Female, British, 25.  
ADELAIDE                    Female, American, 25.

### Setting

Cambridge, MA, 1924. Somewhere between the Earth and sky.

### Note

I picture this play as a movement piece, perhaps a dance, in which the characters grow farther apart. Quotation marks indicate Cecilia Payne-Gaposchkin's own words and are not meant to affect delivery. My sources are *Cecilia Payne Gaposchkin: An Autobiography and Other Recollections*, edited by Katherine Haramundanis, and *What Stars Are Made of: The Life of Cecilia Payne-Gaposchkin* by Donovan Moore.

|                              |          |
|------------------------------|----------|
|                              | ADELAIDE |
| The Earth is made of         |          |
|                              | CECILIA  |
| oxygen                       |          |
|                              | ADELAIDE |
| silicon                      |          |
|                              | CECILIA  |
| aluminium                    |          |
|                              | ADELAIDE |
| magnesium                    |          |
|                              | CECILIA  |
| and iron.                    |          |
|                              | ADELAIDE |
| So the stars must be made of |          |

oxygen  
CECILIA

silicon  
ADELAIDE

aluminium  
CECILIA

magnesium  
ADELAIDE

and iron.  
CECILIA

So says  
ADELAIDE

everyone.  
CECILIA

Namely ...  
ADELAIDE

Harlow Shapley,  
CECILIA

our boss.  
ADELAIDE

Your boss, Adelaide. I'm on fellowship, so I have no boss.  
CECILIA

Still, our "Dear Director" ...  
ADELAIDE

"D.D."  
CECILIA

of the Harvard Observatory  
ADELAIDE

and my doctoral dissertation in astronomy.  
CECILIA

The first by a woman  
or anyone  
at Harvard.  
Also Eddington.  
Sir Arthur Stanley Eddington,  
whose claim of the uniformity of nature is essentially a law.  
And Russell.  
Henry Norris Russell,  
whose word is also law.  
He can veto any publication.  
And so ... ?  
And so ...  
It must be so.  
Except it's not.

ADELAIDE

CECILIA

ADELAIDE

CECILIA

ADELAIDE

CECILIA

ADELAIDE

CECILIA

ADELAIDE

CECILIA

ADELAIDE

CECILIA

ADELAIDE

CECILIA

ADELAIDE

The stars are not made of oxygen, silicon, *aluminium*, magnesium, and iron?

CECILIA

*Nope.*

ADELAIDE

I thought not.

CECILIA

Did you?

ADELAIDE

Actually, I never gave it much thought. It was a reasonable assumption, so everyone supposed it true. Except for you. Cecilia.

CECILIA

I've been studying—

ADELAIDE

So have I.

CECILIA

You've been cataloguing the stars.

ADELAIDE

The galaxies.

CECILIA

While I've been scrutinizing the plates.

ADELAIDE

Harvard Observatory's library of photographic plates. A collection created by Henrietta Swan Leavitt, Annie Jump Cannon, Antonia Maury—

CECILIA

I've been scrutinizing the plates for two years.

ADELAIDE

A very long time.

CECILIA

Two years of estimating, plotting, and calculating.

ADELAIDE  
And you've discovered that

CECILIA  
"The composition of the stars is amazingly uniform."

ADELAIDE  
We knew it was uniform.

CECILIA  
We assumed it was uniform.

ADELAIDE  
But we assumed it was uniformly oxygen, magnesium, et cetera. And you're saying it's not.

CECILIA  
I worked my way through the periodic table, and according to my calculations of the stellar spectra ...

ADELAIDE  
Your uncommonly careful calculations of the stellar spectra ...

CECILIA  
Helium is a thousand times more abundant than predicted.

ADELAIDE  
A thousand times!?

CECILIA  
And hydrogen's a million.

ADELAIDE  
A million times more common than predicted?

CECILIA  
Yes.

ADELAIDE  
Meaning?

CECILIA  
The sun and the stars are made of hydrogen and helium.

ADELAIDE  
Truly!?

CECILIA  
Truly, yes. I've decoded the spectra of starlight.

ADELAIDE  
And you've uncovered a fundamental truth.

CECLIA  
I believe so.

ADELAIDE  
A clue to the history of our world. It's so exciting.

CECILIA  
Isn't it?

ADELAIDE  
It sounds incredible, improbable. Implausible—

CECILIA  
*Impossible*. To use Russell's precise word.

ADELAIDE  
Oh, no.

A moment.

And Shapley, our D.D.?

CECILIA  
Agreed.

ADELAIDE  
Then ... you did not succeed? Your defense—your dissertation—your degree ...?

CECILIA  
Well ...

ADELAIDE  
I love you like a sister. I can't bear to see you fail.

I (didn't)—

CECILIA

Is it because you're a woman?

ADELAIDE

Is what—?

CECILIA

That they were so dismissive?

ADELAIDE

Of course not, Adelaide. We are scientists. "Scientist" is a genderless term.

CECILIA

In fact it was coined for a woman, Mary Somerville, since they couldn't call her a "man of science."

ADELAIDE

That was nearly a hundred years ago. Now we're on an equal plane.

CECILIA

You're not furious that they failed you?

ADELAIDE

They didn't fail me. In fact ... Russell said my thesis was the best he'd ever read.

CECILIA

The best!? I've heard him say that of Shapley's. What did *he* say?

ADELAIDE

He ordered a printing of 600 copies.

CECILIA

Then shouldn't we be celebrating?

ADELAIDE

A moment.

Wait. How is that possible if they said it's "impossible"? They applauded your thesis yet contradicted your conclusions?



CECILIA

“To realize one’s limitations marks the awakening of intellectual integrity, without which imagination, ingenuity and assiduity are barren.”

ADELAIDE

Is that a riddle? Are you speaking of their limitations ... or your own?

CECILIA

“An admission of ignorance may well be a step to a new discovery.”

ADELAIDE

That’s true ... but it doesn’t mean to say you’re wrong when you’re right. You know you’re right. You’re certain.

CECILIA

In science, nothing’s certain.

ADELAIDE

You seemed certain.

CECILIA

Maybe so, but one can’t always know.

ADELAIDE

What did you do, Cecilia?

CECILIA

I revised my conclusions.

ADELAIDE

You said you were mistaken?

CECILIA

I said I was ...

ADELAIDE

You disputed your own data?

CECILIA

No, I ...

ADELAIDE

What did you state, Cecilia. Your exact words?

CECILIA

“The outstanding discrepancy between the astrophysical and terrestrial abundances are displayed for hydrogen and helium. The enormous abundance derived for these elements in the atmosphere is ...”

A silence, then a whisper:

“almost certainly not real.”

ADELAIDE

*Almost certainly not real?*

CECILIA

There was no other way to publish. And this way the data's in print, the discovery recorded.

ADELAIDE

Mitigated, obfuscated.

CECILIA

In print. In perpetuity.

ADELAIDE

Brushed aside as an anomaly.

CECILIA

You can't know that, Adelaide.

ADELAIDE

You'll regret it for the rest of your life.

CECILIA

You can't know that, either.

ADELAIDE

I can and I do, and I'll tell you what else: Russell will get credit for this find.

CECILIA

You can't know *that*.

ADELAIDE

Perhaps I'm a prophet. Or perhaps—

CECILIA

You're a scientist.

They call us “the Heavenly twins.”

ADELAIDE

Because we study the stars.

CECILIA

And we’re beautiful and young.

ADELAIDE

You’re beautiful.

CECILIA

And Heaven’s a place in the sky ...

ADELAIDE

If only! I would turn the telescope upon it.

CECILIA

And whom would you see?

ADELAIDE

My father. Miss Leavitt.

CECILIA

And me.

ADELAIDE

You’re right here.

CECILIA

Time is relative.

ADELAIDE

So is space. But you’re here. Now.

CECILIA

If you say so.

ADELAIDE

I’m certain.

CECILIA

End of Play