ALMOST CERTAINLY NOT REAL

a short play inspired by Cecilia Payne-Gaposchkin

Claudia Barnett
7165 Primrose Lane
Lascassas, TN 37085
615-580-1205
clodilla98@gmail.com
www.claudiabarnett.net

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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

oxygen

CECILIA

silicon

ADELAIDE

aluminium

CECILIA

magnesium

ADELAIDE

and iron.

CECILIA

So the stars must be made of

ADELAIDE
oxygen
silicon
aluminium
magnesium
and iron.
So says everyone.
Namely … Harlow Shapley,
our boss.
Your boss, Adelaide. I’m on fellowship, so I have no boss.
Still, our “Dear Director” ...
“D.D.” of the Harvard Observatory
and my doctoral dissertation in astronomy.
ADELAIDE

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
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.
Truly!?

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

ADELAIDE
And you’ve uncovered a fundamental truth.

CECILIA
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.
CECILIA

I (didn’t)—

ADELAIDE

Is it because you’re a woman?

CECILIA

Is what—?

ADELAIDE

That they were so dismissive?

CECILIA

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

ADELAIDE

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

CECILIA

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

ADELAIDE

You’re not furious that they failed you?

CECILIA

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

ADELAIDE

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

CECILIA

He ordered a printing of 600 copies.

ADELAIDE

Then shouldn’t we be celebrating?

CECILIA

A moment.

ADELAIDE

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?
“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.”

Almost certainly not real?

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

Mitigated, obfuscated.

In print. In perpetuity.

Brushed aside as an anomaly.

You can’t know that, Adelaide.

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

You can’t know that, either.

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

You can’t know that.

Perhaps I’m a prophet. Or perhaps—

You’re a scientist.
They call us “the Heavenly twins.”

Because we study the stars.

And we’re beautiful and young.

You’re beautiful.

And Heaven’s a place in the sky ...

If only! I would turn the telescope upon it.

And whom would you see?

My father. Miss Leavitt.

And me.

You’re right here.

Time is relative.

So is space. But you’re here. Now.

If you say so.

I’m certain.

End of Play