

Playstage

Junior

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# PEOPLE WHO SHAPED OUR WORLD

DIAGRAM BELONGING TO NOTE D

Number of Operations Nature of Operations	Variables for Data						Working Variables							
	${}^1V_0$	${}^1V_1$	${}^1V_2$	${}^1V_3$	${}^1V_4$	${}^1V_5$	${}^0V_6$	${}^0V_7$	${}^0V_8$	${}^0V_9$	${}^0V_{10}$	${}^0V_{11}$	${}^0V_{12}$	${}^0V_{13}$
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	$m$	$n$	$d$	$m'$	$n'$	$d'$								
1	$m$			$n'$		$m'n'$								
2		$n$		$m'$		$n'd'$								
3			$d$			$d'n'$								
4	0					0				$d'n$				
5			0								$d'n$			
6				0								$d'n$		
7					0								$d'n$	
8						0								$d'n$
9							0							
10								0						
11									0					
12										0				
13											0			
14												0		
15													0	
16														0
17														
18														
19														
20														

$\frac{d'm - dm'}{m'n - m'n} = \gamma$




## THE BIRTH OF COMPUTERS



Written by  
Roger  
Hodge

**PEOPLE WHO SHAPED OUR WORLD****THE BIRTH OF COMPUTERS****THE CAST****The Class**

<b>MR FITZ</b>	Teacher (Fizzy, to his class)
<b>MISS SMITH</b>	Teacher – moderate and child friendly
<b>PETER</b>	The practical one
<b>GEORGE</b>	The geek – mentally active
<b>SALLY</b>	The pacifier – a friend to all
<b>JESS</b>	The feminist
<b>MARY</b>	The motherly type

**The Characters**

**CHARLES BABBAGE**  
**JOHN HERSHEL**  
**WILLIAM KING**  
**YOUNG LOVELACE**  
**OLDER ADA LOVELACE**  
**MARY SOMERVILLE**  
**AUGUSTUS De MORGAN**  
**ISAMBARD KINGDOM BRUNEL**  
**JOSEPH CLEMENT**  
**NEW YORK TIMES REPORTER**

*17 speaking parts.*

*RUNNING TIME approximately 30 minutes.*

## THE BIRTH OF COMPUTERS

*(A classroom. Modern on one side, with chairs, tables, and an interactive white board linked to a laptop, upstage centre. Next to it is FIZZY's 'Time Machine' a 'control' box with large red button. On the other side of the stage is an old fashioned table and chair, with inkwell (pretend ink), paper and nibbed pen.)*

*(The class is waiting for the arrival of FIZZY and MISS SMITH.)*

JESS

Are you doing anything this weekend, Mary?

MARY

*(She is playing a game on her smartphone.)* Just a minute, I'm trying to get to the end of this level.

GEORGE

Do you want my help? That game's dead easy.

MARY

No I don't, George! I can do it myself.

JESS

Just because you're a computer geek doesn't mean you have to play other people's games for them.

MARY

Oh. You've made me go wrong now, I'll have to start all over again.

SALLY

See what you've done now, George, you've upset Mary. She's been trying win that game for days.

GEORGE

More reason for me to help.

PETER

The idea is to win the game yourself. What's the point of having someone else win it for you?

*(FIZZY and MISS SMITH enter)*

FIZZY

What's going on here?

PETER

Nothing really, Mr Fitz. Just the merits of winning computer games.

SMITH

Are there any merits in winning?

SALLY

Yes, Miss Smith. Man – or woman, against the machine. Can you outwit the computer?

FIZZY

The computer can't think for itself, you know. It's programmed to follow a preordained algorithm but it can accomplish an immense amount work in a very short time. It's one step up from a calculating machine.

SMITH

Do you know who invented the first computer?

*(Shaking heads.)*

FIZZY

Well, perhaps we should take a trip back in time to find out. Take your seats and we'll begin.

*(FIZZY presses the large button on a control box on his desk and with the sound of the wind the classroom is transported to its destination.)*

FIZZY

Well, here we are. The date is 1814, just over two hundred years ago.

GEORGE

Two hundred years ago? I thought computers began with Bill Gates in the 1970s!

*(Laughter from the class.)*

FIZZY

No, George. Bill Gates and Microsoft are software developers. They don't make computers, they created the operating system that enables others to use computers easily and productively.

JESS

You're not quite as geeky as you thought, George.

PETER

So who are we going to meet?

FIZZY

Well, Peter. We shall first meet a twenty three year old man called Charles Babbage. He has just graduated from Cambridge University with a bachelor's

degree. His subjects are analytical mathematics, particularly calculus, astronomy and chemistry. Here he is with his friend John Herschel, also a mathematician, who then became an astronomer and also contributed to the birth of photography – but that’s another story. Babbage, Herschel and other mathematicians had formed the Analytical Society, which met to debate developments in maths and science.

**JESS** (*sarcastically*)

Wow. I bet that was a fun society to belong to!

**FIZZY**

Ah, Jess, don’t be too harsh on the world of mathematics! Mathematicians have been responsible for many of the things that we take for granted in the modern world

**JESS**

Like what, sir?

**SMITH**

Computers, transport, television, photography, engineering...The list is endless. All advances in technology – all kinds of technology – would not be possible without mathematics.

**FIZZY**

Right. So back to the birth of computers. Meet Charles Babbage and John Herschel.

*(BABBAGE and HERSCHEL enter.)*

**BABBAGE**

Georgiana and I are moving to London after our marriage. I feel Cambridge is a bit small now and the academia of London will have broader horizons, John.

**HERSCHEL**

The Analytical Society will miss you, Charles. And my father will miss your interest in his astronomical studies, especially his discovery of the planet Uranus.

**BABBAGE**

He’s so interesting, and I shall miss him too, and you, of course. Will you follow in your father’s footsteps?

**HERSCHEL**

Well, astronomy is in the family’s blood. I don’t think I could escape it even if I tried. But I shall turn my hand to other professions first.

*(They both laugh.)*

BABBAGE

I must go now John. I'll write to you with our new address when we are settled and I hope you will visit when you can.

HERSCHEL

I will indeed Charles, if only to read you the minutes of the Analytical Society.

*(They both exit laughing.)*

SMITH

Charles and John remained friends for the whole of their lives.

PETER

So John Herschel was the son of the famous astronomer, William Herschel?

SMITH

Yes, he was.

FIZZY

Babbage lived in London for seven years. It was a period that began to shape his thinking towards creating a machine that would replace men calculating complex tables by hand. It would be quicker and more accurate than manual calculations. We just have to fast forward a few years. *(Presses red button, whooshing noise, everyone holds on.)*

*(BABBAGE enters.)*

BABBAGE *(To the class.)*

My time in London has been very interesting. It has shown me, among other things, that the calculation of mathematical data is very time consuming and also subject to errors. In a recent trip to Paris, I encountered a man, Gaspard de Prony, who had to employ *ninety* men to create a large set of logarithm and trigonometry tables. An admirable feat. But because of the frailty of the human worker there were errors and finding all the errors entailed checking every calculation and doubling the cost.

HERSCHEL

*(Enters)* Hello Charles. I just heard you talking about your Paris venture.

BABBAGE

Glad to see you John. Yes, most enlightening. It made me consider the problems of producing mathematical tables, mainly the time it takes, and the problem with accuracy.

HERSCHEL

I hear you're one of the founder members of the Astronomical Society along with my father.

**BABBAGE**

Yes, the Society's only been in existence a couple of months and I've already been asked if I'll produce some tables for the Nautical Almanac. Now I'll have the same problems as de Prony had.

**HERSCHEL**

What a task! I don't envy you!

**PETER**

Wait a minute, wait a minute! Would someone mind explaining what the Nautical Almanac is? And what the tables in this Almanac were for?

**HERSCHEL** *(to the audience) (Image 1. on whiteboard. SEE PRODUCTION NOTES)*

Of course. You appreciate that in 1820 there are no mechanical instruments for measuring distance and position. So mariners, the military, land surveyors, map makers – those sorts of people - depend on mathematical tables in the Nautical Almanac to help them manually calculate distance and position. This almanac contained tabulations of the distances of the Moon's centre from the Sun and from the bright stars for every three hours, so that the navigator could determine Greenwich time and hence his longitude from observations of such lunar distances.

**PETER**

I see. *(To FIZZY)* So they are doing the maths that a computerised Sat Nav in a car would do now?

**FIZZY**

Precisely.

**HERSCHEL**

A what?

**BABBAGE**

Enough John! Stop whiling away time in idle chit chat. I need your help. The importance of the tables demands they are accurate. They need constant re-calculating each year and an army of clerks to produce. We have no other choice.

*(BABBAGE produces sheets of paper from a file and starts handing them round the class and the two teachers.)*

**HERSCHEL**

Right! Now we have provided the formulae and we need you to work out the figures.

GEORGE

I'll have a go! *(He starts reading and muttering to himself)*

*(Soon, everyone, including FIZZY and SMITH, are arguing with each other about the figures and saying things like – “No, that figure goes there!”, “No, you’ve got that wrong!”, “I make it this – what do you make it?” and so on. BABBAGE shouts to get their attention and everyone is silent.)*

BABBAGE

Stop! Stop this unholy row! Let me look at your calculations!

*(Everyone gives him their papers and he leafs through them in annoyance.)*

No! That’s wrong! That’s not bad – but you’ve missed out a digit. That’s completely wrong! In fact I think you’ve just written down the formula for bicarbonate of soda! This is hopeless! There has to be a better way of doing things! Human being are hopeless! Until we can develop a machine to do calculations like these, we are doomed! Wait! I have an idea!

*(BABBAGE rushes off. HERSCHEL looks a little embarrassed and sidles up to the class)*

HERSCHEL

Sorry. Charles has always been a bit temperamental, you know. He’s a bit of a perfectionist. Mathematicians are like that. Nature of the job.

*(Lots of sounds of hammering and sawing and BABBAGE, offstage. Occasionally shouting things like “No, no! That’s not working!” and “Wrong size of nut!”, then, finally “That’s it! I’ve got it!”. Then he appears with something covered up on a tea tray.)*

BABBAGE

I call it the Difference Engine. It calculates polynomial numbers which allow the curves and arcs followed by heavenly bodies to be calculated with extreme accuracy. It means that tables can be calculated far quicker and with greater confidence in their accuracy than by human endeavour.

HERSCHEL

Is this still an idea or do you have a machine?

BABBAGE

I have a model, a small section of the engine which has proved its capabilities but the complete engine must be built to realise its full potential.

*(He reveals a small mechanical object. See Image 2 in SEE PRODUCTION NOTES.)*