





# CODE BREAKER

Words by **TOM WHIPPLE** Science Editor at *The Times*

**T**raditionally, history says the Germans lost the First World War on 11 November 1918 – when in a converted train carriage on the battlefields of France, the armistice was signed. You could argue, though, that the Germans really lost the First World War almost two years earlier, on 19 January 1917.

That was when a coded telegram was sent under the Atlantic, via Sweden, to the German ambassador in Mexico. It instructed the German ambassador to make an offer to the Mexicans – and this offer was, to say the least, explosive.

In the brief, shouty capital letters of a telegram this message declared that if the USA declared war on Germany, Germany would support the Mexicans in war against the USA. The Germans were prepared to give Mexico money and supplies to regain their 'lost' territory of Texas, New Mexico and Arizona.

In other words, the Germans were pledging to help the Mexicans double the size of their country, at America's expense. Unfortunately for the Germans, Britain intercepted the telegram. Even more unfortunately, by then the Royal Navy had cracked the German codes.

There are lots of types of code. The simplest is called letter-substitution. You could, for instance, say that

'a' is 1, 'b' is 2, 'c' is 3... and so on. Then the word 'code' would be written, '3-15-4-5'. The problem with that code is it is too easy to crack.

You can make it harder by jumbling up the numbers randomly so that they don't correspond to in alphabetical order – say, 'a' is 14, 'b' is 1, 'c' is 22, and so on.

But that is still too easy to break, and the reason why is that our letters aren't all used the same amount. The letters 'e' and 's' are used loads (they appeared eighteen times in the last sentence), while 'x' and 'q' aren't used much at all (they didn't appear at all in the last sentence).

So if you have a really long message, or lots of messages, and if your enemy is using a letter-substitution code, all you have to do is look for the most common number – and you can have a good guess that that is probably 'e'. Look for the least common number and it probably stands for 'x'. Very quickly, you will fill in the letters in between and guess the code.

That was why in the First World War the Germans used more sophisticated codes. Instead of replacing letters with numbers, they replaced whole words with numbers – tens of thousands of them. So look in the code dictionary and the word 'word' might be coded as 5298, the word 'uncrackable' by 3029. People sending



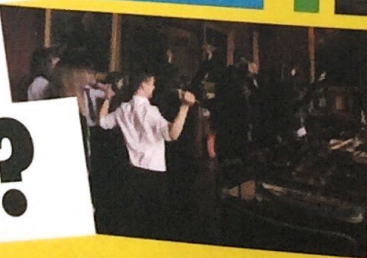
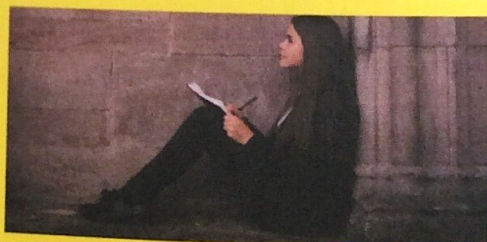
the message would look up the number for each word and write that instead. People receiving the message would look up the word for each number and decrypt it.


The Germans thought it was indeed uncrackable; they were wrong. Over the course of the war, Britain intercepted millions of words written in this code. The weakness was not the code itself, but the world it described. Sometimes, the messages might have been sent after a big tank battle; then the British had a good idea they would include the word 'tank'. Sometimes, the messages were sent on 25 December – and they guessed people would wish each other a happy Christmas.


Slowly, in this way, the code-breakers worked out each word. It was incredibly hard, and often dull, but it paid off. Because it meant that when the Germans sent their telegram across the Atlantic to their Mexican ambassador, the British were able to read it. They had the most valuable document ever captured in war – a telegram that showed the Germans were planning to support an invasion of the USA.

A few months later, in large part because of seeing the telegram, the USA would finally enter the war and help defeat the Germans. And the Mexican invasion never came. ③

# FANCY AN ADVENTURE IN TIME TRAVEL?



 @walterscottprize

 @walterscottprize

 @waltscottprize

The UK's only creative writing prize for young writers interested in history is now open. If you're aged between 11 and 19 and have a story to tell, set before the time you were born, you could enter and win a weekend at next year's Borders Book Festival and a travel grant of £500.