

Riddle of the script: how the world's most difficult puzzle was solved

Linear B, the mysterious language discovered on Bronze Age tablets unearthed in 1900, had baffled linguists for decades. Then along came a 21-year-old graduate named Alice Kober... Margalit Fox tells the remarkable story.



Linguistic puzzler: One of the clay tablets excavated at Knossos, inscribed with the mysterious 'Linear B' Photo: Alamy

By Margalit Fox

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It was one of the most captivating mysteries of the modern age, requiring three detectives and 52 years to solve. Along the way, there was magnificent obsession, bitter disappointment, world-shaking triumph and swift, unexplained death.

At the centre of the mystery lay a set of clay tablets from the ancient Aegean, inscribed more than 3,000 years ago and discovered at the dawn of the 20th century amid the ruins of a lavish Bronze Age palace.

Written by royal scribes, the tablets teemed with writing like none ever seen: tiny pictograms in the shapes of swords, horses' heads, pots and pans, plus a set of far more cryptic characters whose meaning is still debated today.

The tablets were unearthed in the spring of 1900 by the great English archaeologist Arthur Evans. Digging at Knossos, Crete, he discovered a sprawling palace larger than Buckingham Palace,

comprising grand staircases, artisans' workshops, once-bubbling fountains and hundreds of rooms linked by a network of twisting passages.

Evans named the vast edifice the Palace of Minos, for surely, he reasoned, it was the historic basis of the Classical Greek myth of the labyrinth, built for King Minos by the architect Daedalus and housing at its centre the fearful Minotaur - half-man, half-bull.

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From the ruins, Evans unearthed crumbling murals in still vivid hues, exquisitely worked gold jewellery and a massive alabaster throne, the oldest throne in Europe.

But these treasures paled beside the tablets, which first came to light on the excavation's eighth day. Set down in wet clay in about 1450BC, they were, when Evans found them, Europe's oldest written records. As he was painfully aware, there was no swift way of telling what the strange inscriptions said or which language they recorded. Evans named the curious writing Linear Script Class B – Linear B for short. (At Knossos, he would later unearth tablets bearing a somewhat older script, still undeciphered, which he called Linear A.)

Evans had uncovered the first European bureaucracy, and the tablets, he knew, were the palace's account books. If they could be deciphered, they would illuminate a thriving, wealthy and literate civilisation that had flourished in the Aegean a full millennium before the glories of classical Athens.



Buried treasures: The archaeologist Arthur Evans led the 1900 dig that uncovered the vast Bronze Age palace of Knossos, Crete, above (Press Association Images)

Oxford educated, vastly wealthy and used to getting his way, Evans vowed to solve the riddle of the script. But though his work at Knossos - which, restored under his direction, is today a bustling tourist attraction - earned him a knighthood in 1911, he proved no match for Linear B.

Though Evans tried ferociously to decipher the tablets, he was unable to do so – or even to determine what language the tablets recorded – before he died in 1941, at 90. As a result, Linear B gained a reputation as one of the most intractable puzzles in history, a locked-room mystery with almost no possibility of procuring a key.

Then along came Alice Kober. The story of Linear B has long been a British masculine triumphal narrative, bracketed by two remarkable Englishmen: Evans and Michael Ventris, the dashing young amateur who, against all odds, deciphered the script in 1952.

But at the narrative's centre there stands an equally remarkable American woman: Kober, an overworked, underpaid classics professor at Brooklyn College in New York City. For it was she, sitting night after night at her dining table, who hunted down the hidden patterns within the script that would furnish the long-sought key.

Though the full extent of her work remained unknown for decades (Kober's private writings became available only recently), scholars of the decipherment now believe that without her painstaking analysis, Linear B would never have been deciphered when it was, if ever.

The daughter of Hungarian immigrants, Alice Elizabeth Kober was born in Manhattan in 1906. Her childhood had none of Evans's privilege or even Ventris's middle-class certainties: Her father was an upholsterer and in later years an apartment-building superintendent.

As an undergraduate at Hunter College, part of the city's public university system, Kober took a course in early Greek life, and it appears to have been there that she encountered Linear B. On her





graduation in 1928, the 21 year-old confidently announced that she would one day decipher the script. No one believed her, but she very nearly kept her word.



Hunting the script: Alice Kober spent 20 years searching for hidden patterns in Linear B (Brooklyn Public Library, Brooklyn Collection)

At Evans's death, only a few facts about Linear B had been established. It was written from left to right and employed about about 85 basic characters. The number of characters revealed Linear B to be a syllabic script, in which each character stood for a distinct syllable of the ancient language, like *ma* or *pa*, *bo* or *do*, *tam* or *kam*.

Many of the tablets were inventories, counting everything in the palace storehouses from chariot wheels (broken and unbroken) to cattle to litres of wine. The Linear B numerical system was easily understood. A base-10 system like ours, it was notated by means of five characters (denoting 1, 10, 100, 1,000 and 10,000), which could be used in combination. The tablets also contained pictograms, which stood for whole words and showed the objects inventoried. Many were understandable, including these, the last two of which would be at home today on any lavatory door in the world:

 'Horse';  'pig';  'helmet';  'man';  'woman.'

And yet, when it came to the non-pictographic signs that littered Linear B, which appeared in small strings called "sign-groups", Evans was flummoxed. When he died, the meaning of only a single Linear B word was known. The word was "total", revealed by the fact that it appeared regularly at the bottom of inventories, just before the tally. All in all, one word was not much to show for 40 years' work.

For the decipherment to advance, as Kober declared in a 1948 lecture, it would be necessary "to develop a science of graphics". It was just such a science that she, working uncompensated and largely unheralded, set out to construct.

Alice Kober never married, nor is there evidence she ever had a romantic partner. Her life was her work, and what a great deal of work there was. Night after night, after her classes were taught and her papers graded, she sat at the table in the house in Brooklyn she shared with her widowed mother and pored over the strange Cretan inscriptions.

Her first order of business was frequency analysis: the creation of statistics “of the kind so successfully used in the deciphering and decoding of secret messages,” as she wrote, for every character of the script. Anyone who has solved a Sunday paper cryptogram has met frequency analysis head-on. At its simplest, it entails pure counting, with the decipherer tabulating the number of times a particular character appears in a particular text. If the text is long enough, the frequency count for each letter should mirror its statistical frequency in the language as a whole. Kober compiled statistics on each character, tabulating its incidence at the beginnings of words, the middles, the ends, in combination with every other character and much else.

When she began her work in the early Thirties, Kober kept her statistics in a series of notebooks. But during the Second World War and for years afterwards, paper was scarce, and she could no longer get notebooks. Undaunted, she scissored by hand an immense set of “index cards” from any spare paper she could find - the backs of church circulars and greeting cards and a great many checkout slips she discreetly pinched from the Brooklyn College library.

Her dedication almost defies belief. In a letter to a colleague in 1947, Kober itemised the time it took to compile a single statistic: “You can figure out for yourself how long it will take to compare each of 78 signs with 78 other signs, at 15 minutes (with luck) for each comparison. Let’s see, 78 times 77 times 15 minutes – that’s about 1,500 hours.”

Over the years, Kober cut and annotated 180,000 cards, storing them in empty cigarette cartons, the one paper product of which, sadly, she seemed to have no shortage. Even now, to open one of her ersatz file boxes is to be met with the faint whiff of midcentury tobacco.



Heroic efforts: Alice Kober annotated 180,000 index cards in her quest to uncover Linear B, storing them in empty cigarette cartons, above

From the start, Kober approached the decipherment differently than other investigators. To her great disgust, most scholars persisted in looking at the problem through the wrong end of the telescope, seeking first to identify the language the Minoans spoke and only afterwards to unravel the script. Everyone, or so it seemed, had a theory about what language the tablets recorded. Ventris was convinced it was the lost Etruscan tongue, and clung steadfastly to the idea until weeks before the decipherment. Others held even stranger notions. "It is possible to prove, quite logically, that the Cretans spoke any language whatever known to have existed at that time – provided only that one disregards the fact that half a dozen other possibilities are equally logical and equally likely," Kober said in a 1948 lecture. "One of my correspondents maintains that they were Celts, on their way to Ireland and England, and another insists that they are related to the Polynesians of the Pacific." Rather than speculating on the language of the script, or on how to pronounce its symbols, Kober analysed those symbols as abstract objects of pure form. She was willing to inhabit, as she evocatively wrote, a world of "form without meaning" for however long it took.

A haunting riddle from my childhood gives a taste of what it's like to dwell in that world. And, by coincidence, its solution is all too relevant to Alice Kober's life:

*A crossbar, and a circle complete,
An upright where two half-circles meet,
A triangle standing on its own two feet,
Two half-circles,
And a circle complete.*

The riddle describes written symbols. To solve it, think of each line as invoking one or more of those symbols as objects of pure form, with neither sound nor meaning attached. The answer is this: T O B A C C O.

Inhabiting the world of form without meaning let Kober make vital discoveries. Her first, in the mid-1940s, was that the language of Linear B was inflected: that is, it relied on word endings, or suffixes, to give its sentences grammar, much as Latin, German or Spanish does.

The discovery was born of her relentless search for patterns. Among those she identified were three-word sets sharing similar suffixes, which Ventris would waggishly name "Kober's triplets". These "triplets" let Kober pinpoint critical relationships among the characters of Linear B - relationships that come to the fore, as she discovered, whenever an inflected language is written with syllabic script. Kober next drew up a 5-by-2 grid of these related characters. As she knew, if the phonetic values of even a few characters could be determined, the interdependencies she plotted would let the whole grid fill itself in, in a domino reaction. And it was precisely these relationships that let Ventris, after reading her published articles in the late Forties, make a crucial intuitive leap and then, using the web of interdependencies she had set up, unlock the mystery of Linear B.

It could so easily have been Kober who solved the 50-year riddle. But on May 16 1950, Alice Kober died, aged 43. No one knows what she died from, but it seems probable, given her heavy smoking, that she had some form of cancer.

In June 1952, Ventris, just shy of his 30th birthday, solved the riddle of Linear B. Ventris was an architect who had never been to university. But he had a prodigy's gift for languages and an obsession with the tablets that dated to his youth. Everyone knew that the tablets were the municipal documents of a Bronze Age Cretan kingdom. What if, Ventris wondered, some of the related words in Kober's "triplets" were actually related forms of Cretan place names – forms analogous to English words such as "Britain/Briton/British"?

With this in mind, he began plugging phonetic values into the triplets. One word in particular reared up seductively. Ventris's analysis suggested that the first character stood for the syllable "ko", the next for "no", and the third for "so". "Ko-no-so" recalled a particular place – and not just any place, but Knossos, the chief city of Cretan antiquity.

On the strength of this word, Ventris started plugging sound values into other words on the tablets. They too yielded Cretan place names, spelled syllabically, including "a-mi-ni-so" (Amnisos) and "tu-ri-so" (Tulissos). As predicted, each correct sound value generated new ones in a chain reaction. As Ventris was able to read more and more words on the tablets, the solution massed before his eyes.



Cracking the code: The architect Michael Ventris, above, made the leap that would finally decipher Linear B in 1952 (Getty Images)

On June 1 1952, Ventris took the microphone at BBC Radio to announce his discovery: Linear B recorded a very early Greek dialect – spoken long before Hellenic peoples were known to have existed, 500 years before Homer and seven centuries before the advent of the Greek alphabet. His great triumph would end in tragedy. Beset by self-doubt as he was invited to speak before the world's greatest learned bodies, Ventris died four years later, at 34, in a swift, strange car crash that some observers believe was suicide.

“I don’t like the idea of getting paid for scholarly writing,” Alice Kober had said in 1948, two years before her own untimely death. “If I wanted to make money writing, I’d write detective stories.” That, as it turns out, is precisely what she was writing: read today, her work is a forensic playbook for archaeological decipherment. And it is something even more valuable besides: the story of an unsung heroine that can, at last, be properly told