

Known plaintext attack on Playfair cipher

Known plaintext:

The eminent British scientist Charles Wheatstone invented the Wheatstone bridge which is a device for measuring electrical resistance. He also invented a digraphic cipher which was popularized by Baron Lyon Playfair and used by British forces in the Boer War and World War One.

Corresponding ciphertext:

④ the eminent british scientist charles wheatstone
 UFBVL EKOGI QFQKQ OUDRD QBOSN QRFEM WCGOZ CLMUT
 ⑤
 ①
 ②
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 ㊽
 ㊾
 ㊿

Determine the key square. What's the keyword?

①

$$ON = PO$$

NOP

②

$$PU = UZ$$

-- NOP
----- u
----- z

-- NOP
qrst u
vwxyz

③

$$OW = WL$$

- | - - -
- - - - -
-- NOP
qrst u
vwxyz

④

$$th = UF$$

- | - p - h
- - - - -
-- NOP
qrst u
vwxyz

- | - - -
- - - p - h
-- NOP
qrst u
vwxyz

⑤

$$zc = WH$$

- | - - -
- c - p - h
-- NOP
qrst u
vwxyz

⑥

$ta = YF$

-		-	a	-	
-	-	-	r	h	
-	-	-	n	o	p
q	r	s	t	u	
v	w	x	y	z	

⑦

$ro = TK$

-		-	a	-		
-	-	-	r	h		
-	-	-	k	n	o	p
q	r	s	t	u		
v	w	x	y	z		

-		-	a	-	
-	-	-	r	h	
i	s	k	n	o	p
q	r	s	t	u	
v	w	x	y	z	

⑧

$ap = NO$

-		-	a	a	
-	-	-	r	h	
i	s	k	n	o	p
q	r	s	t	u	
v	w	x	y	z	

⑨

$aw = GO$

-		-	g	a	a
-	-	-	r	h	
i	s	k	n	o	p
q	r	s	t	u	
v	w	x	y	z	

⑩ $oe = IA$

e	l	g	a	a
i	k	v	p	k
q	r	s	t	s
v	w	x	y	z

⑪ $ca = FL$

e	l	g	a	a
i	k	v	p	k
q	r	s	t	s
v	w	x	y	z

⑫ $ie = \Phi B$

e	l	g	a	a
b	c	v	p	k
i	k	v	p	k
q	r	s	t	s
v	w	x	y	z

key square

e	l	g	a	a
b	c	d	p	k
i	k	v	o	p
q	r	s	t	s
v	w	x	y	z

key word elgalal
(a public key cryptosystem)