

Footnote Ciphers: Chapter 7 -- *The Obsidian Island*

Running Key Cipher

Plaintext: (FN5, p263)

L B Q T A H M A K
 A F P F A P G O J M
 U P B A N G R N J L

Key Phrase:

- FN1 (p259) -- Jen makes note of the use of the word “impenetrable”.
- Margin note (p263) -- Eric (green ink) notes that FN1 uses “impenetrable” as does the obituary mentioned in FN1. He then quotes that part of the obituary:

-- SO DOES THE OBIT (“THE IMPENETRABLE CORIOLIS AND THE SACCHARINE WINGED SHOES.”) START FROM THERE?

Decryption:

| | | | | | | | | | |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Ciphertext | L | B | Q | T | A | H | M | A | K |
| Key Phrase | <i>T</i> | <i>H</i> | <i>E</i> | <i>I</i> | <i>M</i> | <i>P</i> | <i>E</i> | <i>N</i> | <i>E</i> |
| Plaintext | S | U | M | L | O | S | I | N | G |

| | | | | | | | | | | |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Ciphertext | A | F | P | F | A | P | G | O | J | M |
| Key Phrase | <i>T</i> | <i>R</i> | <i>A</i> | <i>B</i> | <i>L</i> | <i>E</i> | <i>C</i> | <i>O</i> | <i>R</i> | <i>O</i> |
| Plaintext | H | O | P | E | P | L | E | A | S | E |

| | | | | | | | | | | |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Ciphertext | U | P | B | A | N | G | R | N | J | L |
| Key Phrase | <i>O</i> | <i>L</i> | <i>I</i> | <i>S</i> | <i>A</i> | <i>N</i> | <i>D</i> | <i>T</i> | <i>H</i> | <i>E</i> |
| Plaintext | G | E | T | I | N | T | O | U | C | H |

Explanation:

A Running Key cipher is a polyalphabetic substitution with variable shift (similar to the Vigenère cipher) that uses a Key Phrase from a pre-chosen book (or alternatively an essay, article, poem - in this case an obituary) instead of a just a Keyword. You can think of it as a variable Ceasar cipher, with the shift changed for every letter. The shift for each letter of plaintext is determined by the corresponding letter in the keyphrase, so in a sense you are “adding” letters when you encode. (You can calculate/count out the shift or read it off of a Tabula Recta.)

To decode, you shift from the ciphertext backward (the size of the shift again depending on the corresponding letter of the keyphrase) so that you are “subtracting” letters. This can again be read off of a Tabula Recta or calculated/counted.

Using the Tabula Recta to decrypt:

1. Go to the row that begins with the letter from the Key Phrase.
2. Find where the letter of ciphertext occurs within that row, then read up to the top row to find the plaintext.

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| B | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A |
| C | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B |
| D | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C |
| E | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D |
| F | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E |
| G | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F |
| H | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G |
| I | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H |
| J | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I |
| K | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J |
| L | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K |
| M | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L |
| N | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M |
| O | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
| P | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
| Q | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P |
| R | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |
| S | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R |
| T | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S |
| U | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T |
| V | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U |
| W | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V |
| X | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W |
| Y | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X |
| Z | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |

See the example above for our first letter set: Key Phrase = T, Ciphertext = L, Plaintext = S

Alternatively, you can use a calculation to decrypt:

→ Assign numeric values to the alphabet (A=1, B=2 ... Z=26)

→ Plaintext = [Ciphertext - KeyPhraseLetter] + 1

→ When the resulting value for the plaintext is a negative number, just add it to 26.

→ So for our first letter set: L=12, T=20

$$[12 - 20] + 1 = -7 \implies -7 + 26 = 19 \implies 19 = S$$