

**FREQUENCY DISTRIBUTIONS OF
ENGLISH TETRAGRAPHS**

Frequency distributions of English tetragraphs appearing in 50,000 letters of government plaintext telegrams.

Table C-1. The 54 tetragraphs appearing 50 or more times, arranged by absolute frequencies, accompanied by the logarithms of their assigned probabilities.

F	L ₁₀ (F)	L ₂₄₄ (F)	F	L ₁₀ (F)	L ₂₄₄ (F)	F	L ₁₀ (F)	L ₂₄₄ (F)
TION	218	2.34 .99	THIR.....	104	2.02 .87	ASHT	64	1.81 .79
EVEN.....	168	2.23 .95	EENT.....	102	2.01 .87	HUND	64	1.81 .79
TEEN.....	163	2.21 .94	REQU.....	98	1.99 .86	DRED.....	63	1.80 .79
ENTY.....	161	2.21 .94	HIRT.....	97	1.99 .86	RIOD.....	63	1.80 .79
STOP	154	2.19 .93	COMM	93	1.97 .85	ENTS.....	62	1.79 .78
NINE	153	2.18 .93	QUES.....	87	1.94 .84	FFIC	62	1.79 .78
WENT.....	153	2.18 .93	UEST.....	87	1.94 .84	IVED.....	62	1.79 .78
TWEN.....	152	2.18 .93	EQUE.....	86	1.93 .84	FROM	59	1.77 .78
THRE.....	149	2.17 .93	NDRE	77	1.89 .82	IRTY.....	59	1.77 .78
FOUR.....	144	2.16 .92	LLAR	71	1.85 .81	RTEE.....	59	1.77 .78
IGHT	140	2.15 .92	OMMA	71	1.85 .81	UNDR	59	1.77 .78
FIVE	135	2.13 .91	OLLA	70	1.85 .81	NAUG	56	1.75 .77
HREE.....	134	2.13 .91	VENT.....	70	1.85 .81	OURT.....	56	1.75 .77
DASH.....	132	2.12 .91	DOLL.....	68	1.83 .80	UGHT.....	56	1.75 .77
EIGH	132	2.12 .91	LARS	68	1.83 .80	STAT	54	1.73 .76
SEVE	121	2.08 .89	THIS	68	1.83 .80	AUGH	52	1.72 .76
ENTH.....	114	2.06 .89	PERI.....	67	1.83 .80	CENT.....	52	1.72 .76
MENT.....	111	2.05 .88	ERIO.....	66	1.82 .80	FICE.....	50	1.70 .75

Table C-2. The 54 tetragraphs appearing 50 or more times, arranged in alphabetic order by their first letters, then by absolute frequencies, accompanied by the logarithms of their assigned probabilities.

	F	L ₁₀ (F)	L ₂₄₄ (F)		F	L ₁₀ (F)	L ₂₄₄ (F)		F	L ₁₀ (F)	L ₂₄₄ (F)
ASHT.....	64	1.81	.79	HREE.....	134	2.13	.91	REQU.....	98	1.99	.86
AUGH.....	52	1.72	.76	HIRT.....	97	1.99	.86	RIOD.....	63	1.80	.79
				HUND.....	64	1.81	.79	RTEE.....	59	1.77	.78
COMM.....	93	1.97	.85					STOP.....	154	2.19	.93
CENT.....	52	1.72	.76	IGHT.....	140	2.15	.92	SEVE.....	121	2.08	.89
				IVED.....	62	1.79	.78	STAT.....	54	1.73	.76
DASH.....	132	2.12	.91	IRTY.....	59	1.77	.78				
DOLL.....	68	1.83	.80					TION.....	218	2.34	.99
DRED.....	63	1.80	.79	LLAR.....	71	1.85	.81	TEEN.....	163	2.21	.94
				LARS.....	68	1.83	.80	TWEN.....	152	2.18	.93
EVEN.....	168	2.23	.95					THRE.....	149	2.17	.93
ENTY.....	161	2.21	.94	MENT.....	111	2.05	.88	THIR.....	104	2.02	.87
EIGH.....	132	2.12	.91					THIS.....	68	1.83	.80
ENTH.....	114	2.06	.89	NINE.....	153	2.18	.93				
EENT.....	102	2.01	.87	NDRE.....	77	1.89	.82	UEST.....	87	1.94	.84
EQUE.....	86	1.93	.84	NAUG.....	56	1.75	.77	UNDR.....	59	1.77	.78
ERIO.....	66	1.82	.80					UGHT.....	56	1.75	.77
ENTS.....	62	1.79	.78	OMMA.....	71	1.85	.81				
				OLLA.....	70	1.85	.81	VENT.....	70	1.85	.81
FOUR.....	144	2.16	.92	OURT.....	56	1.75	.77				
FIVE.....	135	2.13	.91					WENT.....	153	2.18	.93
FFIC.....	62	1.79	.78	PERI.....	67	1.83	.80				
FROM.....	59	1.77	.78								
FICE.....	50	1.70	.75	QUES.....	87	1.94	.84				

Table C-3. The 54 tetragraphs appearing 50 or more times, arranged in alphabetic order by their second letters, and then according to their absolute frequencies, accompanied by the logarithms of their assigned probabilities.

F	L ₁₀ (F)	L ₂₄₄ (F)	F	L ₁₀ (F)	L ₂₄₄ (F)	F	L ₁₀ (F)	L ₂₄₄ (F)			
DASH.....	132	2.12	.91	TION	218	2.34	.99	HREE.....	134	2.13	.91
LARS	68	1.83	.80	NINE	153	2.18	.93	ERIO	66	1.82	.80
NAUG	56	1.75	.77	FIVE	135	2.13	.91	DRED.....	63	1.80	.79
				EIGH	132	2.12	.91	FROM	59	1.77	.78
NDRE	77	1.89	.82	HIRT.....	97	1.99	.86	IRTY	59	1.77	.78
				RIOD.....	63	1.80	.79				
TEEN.....	163	2.21	.94	FICE	50	1.70	.75	ASHT	64	1.81	.79
WENT.....	153	2.18	.93								
SEVE	121	2.08	.89	LLAR	71	1.85	.81				
MENT.....	111	2.05	.88	OLLA	70	1.85	.81	STOP	154	2.19	.93
EENT.....	102	2.01	.87					RTEE.....	59	1.77	.78
REQU.....	98	1.99	.86	OMMA	71	1.85	.81	STAT	54	1.73	.76
UEST	87	1.94	.84								
VENT.....	70	1.85	.81	ENTY.....	161	2.21	.94	QUES.....	87	1.94	.84
PERI	67	1.83	.80	ENTH	114	2.06	.89	HUND.....	64	1.81	.79
CENT.....	52	1.72	.76	ENTS.....	62	1.79	.78	OURT.....	56	1.75	.77
				UNDR	59	1.77	.78	AUGH	52	1.72	.76
FFIC	62	1.79	.78								
IGHT	140	2.15	.92	FOUR.....	144	2.16	.92	EVEN.....	168	2.23	.95
UGHT	56	1.75	.77	COMM	93	1.97	.85	IVED	62	1.79	.78
				DOLL.....	68	1.83	.80				
THRE.....	149	2.17	.93					TWEN.....	152	2.18	.93
THIR.....	104	2.02	.87	EQUE.....	86	1.93	.84				
THIS.....	68	1.83	.80								

Table C-4. The 54 tetragraphs appearing 50 or more times, arranged in alphabetic order by their third letters, then by absolute frequencies, accompanied by the logarithms of their assigned probabilities.

STAY..... 94	1.75	.70	THIS..... 68	1.85	.80	THRE..... 149	2.17	.93
FICE..... 50	1.70	.75	ERIO..... 66	1.82	.80	HIRT..... 97	1.99	.86
UNDR..... 59	1.77	.78	FFIC..... 62	1.79	.78	NDRE..... 77	1.89	.82
EVEN..... 168	2.23	.95	OLLA..... 70	1.85	.81	LARS..... 68	1.83	.80
TEEN..... 163	2.21	.94	DOLL..... 68	1.83	.80	PERI..... 67	1.83	.80
TWEN..... 152	2.18	.93	COMM..... 93	1.97	.85	OURT..... 56	1.75	.77
HREE..... 134	2.13	.91	OMMA..... 71	1.85	.81	DASH..... 132	2.12	.91
QUES..... 87	1.94	.84	NINE..... 153	2.18	.93	UEST..... 87	1.94	.84
DRED..... 63	1.80	.79	WENT..... 153	2.18	.93	ENTY..... 161	2.21	.94
IVED..... 62	1.79	.78	MENT..... 111	2.05	.88	ENTH..... 114	2.06	.89
RTEE..... 59	1.77	.78	EENT..... 102	2.01	.87	ENTS..... 62	1.79	.78
EIGH..... 132	2.12	.91	VENT..... 70	1.85	.81	IRTY..... 59	1.77	.78
AUGH..... 52	1.72	.76	HUND..... 64	1.81	.79	FOUR..... 144	2.16	.92
IGHT..... 140	2.15	.92	CENT..... 52	1.72	.76	EQUE..... 86	1.93	.84
ASHT..... 64	1.81	.79	TION..... 218	2.34	.99	NAUG..... 56	1.75	.77
UGHT..... 56	1.75	.77	STOP..... 154	2.19	.93	FIVE..... 135	2.13	.91
			RIOD..... 63	1.80	.79	SEVE..... 121	2.08	.89
			FROM..... 59	1.77	.78			

Table C-5. The tetragraphs appearing 50 or more times, arranged in alphabetic order by their fourth letters, then by absolute frequencies, accompanied by the logarithms of their assigned probabilities.

	F	L ₁₀ (F)	L ₂₄₄ (F)		F	L ₁₀ (F)	L ₂₄₄ (F)		F	L ₁₀ (F)	L ₂₄₄ (F)
OMMA	71	1.85	.81	DASH.....	132	2.12	.91	QUES	87	1.94	.84
OLLA	70	1.85	.81	EIGH	132	2.12	.91	LARS	68	1.83	.80
				ENTH	114	2.06	.89	THIS	68	1.83	.80
FFIC	62	1.79	.78	AUGH	52	1.72	.76	ENTS	62	1.79	.78
				PERI	67	1.83	.80				
HUND.....	64	1.81	.79	DOLL.....	68	1.83	.80	WENT.....	153	2.18	.93
DRED.....	63	1.80	.79					IGHT	140	2.15	.92
RIOD.....	63	1.80	.79	COMM	93	1.97	.85	MENT.....	111	2.05	.88
IVED.....	62	1.79	.78	FROM	59	1.77	.78	EENT.....	102	2.01	.87
								HIRT.....	97	1.99	.86
NINE	153	2.18	.93	TION	218	2.34	.99	UEST	87	1.94	.84
THRE.....	149	2.17	.93	EVEN.....	168	2.23	.95	VENT.....	70	1.85	.81
FIVE	135	2.13	.91	TEEN.....	163	2.21	.94	ASHT.....	64	1.81	.79
HREE.....	134	2.13	.91	TWEN.....	152	2.18	.93	OURT.....	56	1.75	.77
SEVE	121	2.08	.89	ERIO	66	1.82	.80	UGHT	56	1.75	.77
EQUE.....	86	1.93	.84					STAT	54	1.73	.76
NDRE	77	1.89	.82	STOP	154	2.19	.93	CENT.....	52	1.72	.76
RTEE.....	59	1.77	.78	FOUR.....	144	2.16	.92				
FICE	50	1.70	.75	THIR.....	104	2.02	.87	REQU.....	98	1.99	.86
				LLAR	71	1.85	.81				
NAUG	56	1.75	.77	UNDR	59	1.77	.78	ENTY.....	161	2.21	.94
								IRTY	59	1.77	.78