

deNEUF. KITCHIN. WALTERS. ANDERSON. FOLKMAN. DICKOW. MUNDT. GEISEL. CADY. COOKSON. WILLIAMS. MILLER

GREEK		RUSSIAN		ARABIC		TURKISH		INTER-NATIONAL CODE		MORSE CODE	
GREEK LETTER	MORSE SYMBOL	RUSSIAN LETTER	MORSE SYMBOL	ARABIC LETTER	MORSE SYMBOL						Used on land lines
A	.. Alpha	A	..	ا	.. Alif	A	..	A	..	A	..
B	.... Beta	Б	....	ب	.... Ba	B	....	B	....	B	....
Γ	--- Gamma	В	---	ت	--- Ta	С	---	C	....	C	....
Δ	... Delta	Г	---	ث	--- Tha	Ç	---	D	....	D	....
E	.. Epsilon	Д	---	ج	--- Jeem	D	...	E	..	E	..
Z	.... Zeta	З	....	ح	.... Ha	E	..	F	....	F	....
H	.... Eta	И	....	خ	.... Kha	F	....	G	....	G	....
Θ	.. Theta	Э	---	د	--- Dal	G	---	H	....	H	....
I	.. Iota	Н	..	ذ	--- Dhal	H	....	I	..	I	..
K	--- Kappa	Ж	---	ر	--- Ra	I	..	J	....	J	....
Λ	.. Lambda	К	---	ز	--- Zay	J	....	K	---	K	---
M	.. Mu	Л	....	س	--- Seen	L	....	L	....	L	....
N	.. Nu	М	---	ش	--- Sheen	M	..	M	..	M	..
Ξ	.... Xi	Н	..	ص	--- Sad	N	..	N	..	N	..
O	.... Omicron	О	....	ض	--- Dad	O	---	O	---	O	---
Π	.... Pi	П	....	ط	--- Ta	Ö	---	P	....	P	....
P	.... Rho	Р	....	ظ	--- Za	Ö	---	R	....	R	....
Σ	... Sigma	С	---	ع	--- Ain	P	....	S	...	S	...
T	.. Tau	Т	---	غ	--- Ghain	S	...	T	..	T	..
Υ	.... Ypsilon	У	---	ف	--- Fa	T	..	U	...	U	...
Φ	.... Phi	Ф	....	ق	--- Qal	U	...	V	....	V	....
Ψ	.... Psi	Ц	....	ك	--- Kal	V	....	Y	....	Y	....
Ω	.. Omega	Ч	....	ل	--- Lam	Y	....	Z	....	Z	....
HY	.... Eta Ypsilon	Ш	---	م	--- Meem	Z	....			
YI	.... Ypsilon Iota	Щ	---	ن	--- Noon						
OY	.... Omicron Ypsilon	Ъ, б	---	ه	--- He						
AI	.... Alpha Iota	Ы	---	و	--- Waw						
AY	.... Alpha Ypsilon	Ю	---	لام-اليف	--- Lam-Alif						
EY	.... Epsilon Ypsilon	Я	---	ي	.. Ya						
OI	.... Omicron Iota			ي	.. Ya						

Codes of the World

The story about the "CODES OF THE WORLD" is of great interest to many of us. Regretfully, it would take many books to do the subject full justice. We think that the full history of codes is a very absorbing one and we plan to bring further coverage of the subject in future books that we will issue from time to time. We wish to thank the many authors who contributed material to this edition. Some of their names are noted above.

Students of the subject may note some apparent inaccuracies in the codes listed here and those they may have available for checking or comparison. Please keep in mind that many changes and refinements have been made over the years for one reason or another in many codes, hence you can expect to find code listings which do not agree with those you may read in another book.

Bill Brier



KA TA KA NA



The Japanese Code

ア
タ
カ
ナ



ア カ サ タ ナ ハ マ ヤ ラ ワ イ キ シ チ ニ ヒ ミ イ リ ヌ ウ ク

THE KATA KANA CODE OF THE JAPANESE

The Kata Kana Code commonly referred to as simply "Kana" is the code used by the Japanese in radio and telegraphic communication. It is based on what is known as Romaji, a form in which an abbreviated Japanese alphabet appears phonetically in English - as for instance, Sayonara (goodbye). This word consists of 4 letters, SA YO NA RA, and is written on Japanese typewriters by 4 keys.

The Romaji alphabet uses all English vowels and the one consonant (N) as complete individual characters. With a few exceptions which will be noted later, other Romaji characters consist of a consonant followed by a vowel, in some cases followed by one of two modifiers known as the Nagori and the Hanagori, also explained later. The Japanese typewriters use the Hiragana characters and the Japanese operators who become proficient on the mill use it instead of the brush or pencil. Hiragana is a sort of shorthand language.

Actually, there are four forms of writing Japanese, ie: 1. Kanji characters derived from Chinese, 2. Katakana or "stiff hand", 3. Hiragana, the cursive form and 4. Romaji, the English rendition of the Japanese character. A combination of the first with either the second or third can be used as, for example, tomodachi (friend): Katakana hiragana but katakana should not be mixed with hiragana.

Kanji is of Chinese origin and comprises some 1812 characters, each usually representing an entire word or idea, whereas Katakana and Hiragana are Japanese and in reality syllabaries. Katakana is used as a rule for all foreign phrases and words. All messages presented in Japan for transmission are presented in Katakana - at least by the Japanese.

Basically Japanese is one of the world's simplest languages to pronounce. All 5 basic vowel sounds are without variation. They are pronounced as in Italian, Spanish or other "Romance" Languages. The hard sounds and semi-hard sounds are characterized by a small mark written to the top right by two small short lines ("). A small circle indicates a semi-hard sound (o). When Xmtg CW., the addition of two dots sent as a separate letter indicates the preceding letter or syllable is hard and consequently two short lines are added to it.

add: (Honogori ••)
(Negori •• - - -)

In the code table on the right, the table at left is Romaji, center is the code groups and at right is Hiragana characters:

Kata Kana Radio Code			
A ----	P あ	HA ----	ハ は
I --	イ い	HI ----	ヒ ひ
U ---	ウ う	FU ----	フ ふ
E ----	エ え	HE .	ヘ へ
O ----	オ お	HO ---	ホ ほ
N ----	ン ン	MA ----	マ ま
KA ----	カ か	MI ----	ミ み
KI ----	キ き	MU -	ム む
KU ----	ク く	ME ----	メ め
KE -.-	ケ け	MO ----	モ も
KO ----	コ こ	YA ---	ヤ や
SA ----	サ さ	(Y)I --	イ い
SHI ----	シ し	IU ----	ユ ゆ
SU ----	ス す	(Y)E ----	エ え
SE ----	セ せ	YO --	ヨ よ
SO ---	ソ そ	RA ...	ラ ら
TA --	タ た	RI ---	リ り
CHI	チ ち	RU ----	ル る
TSU	ツ つ	RE ---	レ れ
TE ----	テ て	RO ----	ロ ろ
TO ----	ト と	WA ---	ワ わ
NA ...	ナ な	(W)I ----	ヰ ゐ
NI ----	ニ ね	(W)U ---	ヱ う
NU	ヌ ぬ	(W)E ----	ヰ ゐ
NE ----	ネ ぬ	(W)O ---	ヲ お
NO ----	ノ の		

NIGORI: By adding the nigori sign (like a ditto mark) to any character the following changes are made in the groups with the letters shown below. That is, HA" changes HA to BA, HI" changes Hi to Bi, HU" changes HU to BU, etc.

H" changes to BA BI BU BE BO
K" changes to GA GI GU GE GO
S" changes to ZA ZI ZU ZE ZO
T" changes to DA DI DZU DE DO

The code signal for nigori is •• and it follows the character thus — •• •• which is written BA. The small circle used with H in the last line of the table opposite is called "maru" or "handaku" and is signalled — •• — •• — •• thus indicating that HO is to be written PO.

There are of course grammatical rules, such as verb conjugations, as in any language which are too complex to be dealt with in a brief listing of the code.

However, if the code signal is written down in romaji a romaji-English dictionary will be a great help in translating although the grammatical construction will not be apparent.

FIGURES: For the numbers 1 to 10 inclusive there are two sets or words, the code signals being the same as in English. The characters for the figures are the same as those used by the Chinese therefore by learning the characters one can read price tags in both China and Japan although, of course, the Chinese give them different names.

1	ichi	hitotsu	一
2	ni	futatsu	二
3	san	mitsu	三
4	shi	yoku	四
5	go	itsutsu	五
6	roku	mutsu	六
7	shichi	nanatsu	七
8	hachi	yatsu	八
9	ku	kokonotsu	九
10	ju	to	十

Above 10 there is only one set: ichi, ni, san, etc., and 11 therefore becomes ju, ichi; then ju ni, ju san, etc.

Hundred (hyaku) 百

Thousand (sen) 千

Examples of writing numbers:

15 十五

27 二十七

238 二百三十八

496 四百九十六

Following are some of the code abbreviations that may be used to express yourself in the Japanese code as furnished by members George R. Mackin and Robert J. Miller:

HA " TU	Departed
HA " TA	Service Dispatch
U NA	Priority sign
YO RE	From
HO SO	At ___ time I am going to Bdc. on ___ Kc.
FU NA	Answer quickly, I have rush traffic.
U NA	Urgent - Priority
SA RA	I am going to repeat
HA YA	Send faster
HO U SO U	Bdc coming up (for)
FU	No - Negat
FU A	Very bad - (Static or QRM)
KA N	Do you hear me?
KU 2	Send double
KO N	I am being interfered with
MA TE	Wait
MU NI	Repeat back
TO YU	I am shifting to ___ KCS.
WO TU	Answer on ___ KCS.
YU FU	I have traffic for you.

Expressions - run together code groups

Thanks	(Arigato)	MW G LJ UI U
Yokohama	-----	M OT B X
Kobe	-----	OT U EI
G.M.	(Ohayo)	AS B M
G.N.	(Oyasumi)	AS W OA UA

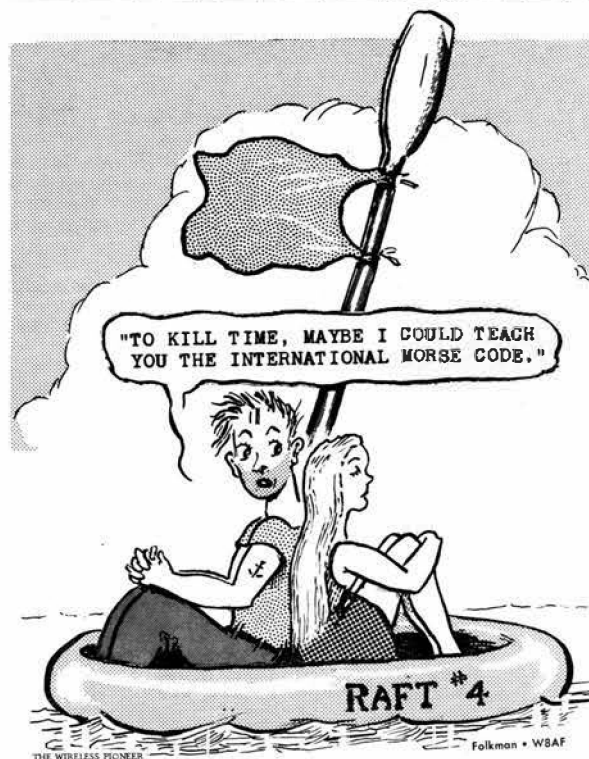


CREDIT

Special thanks and recognition to the following members for furnishing data on the Japanese Code. They are all experts in the field of communication intelligence for the American or Canadian governments during the war periods.

KITCHIN, James E.
MACKIN, George R.
deNEUF, Don
ANDERSON, Ray

WALTERS, Dr. John E.
MILLER, Robert D.
WILLIAMS, Paul
MUNDT, Carlos S.



THE WIRELESS PIONEER

Folkman • WBAF

CONVERSION of KANA to—from INTERNATIONAL

MERCHANT CODE				JAPANESE CODES			
Cont.	Jap.	Cont.	Jap.	Cont.	Jap.	Cont.	Jap.
A	I	ND I	GI	GM	A	Z	GU
AA	YO	NI	DA	L	KA	ZI	BU
AS	WG	NN	NI	LA	GA	ZII	PU
AU	WI	NG	RU	KA	SA	T	MU
AW	TE	NU	NU	NR I	ZA	NW	YU
AWI	DE	NU	ME	N	TA	NG	RU
		O	RE	NI	DA	NO	E
		OA	SU	NA	NA	YI	KE
B	HA	OA I	DEU	RA	RA	AG	GE
BI	BA	OC	GO	RI	PA	WN I	SE
BUN	FA	P	TSU	RI I	WA	RM I	ZE
		PI	DZU	S	WA	RM	TE
D	HO	Q	NE	K	WA	NE	NE
DI	BO	SHI		KI	WA	HE	HE
DM	YU			TO	WA	BE	BE
DN	KO			CE I	SHI	DA	FE
DUN	PO			O EY	CH I	UT I	RE
		R	NA	F	CH I	O	RA
E	HE	RA I	NG	C	NI	MM	MM
EUN	PE	RN	RA	ZI	PI	MM I	GO
		S	MU	ZI I	GA I	MM I	SO
F	CHI	T		KA	VI	MM I	TO
	DJI	U	KU	G	U	IM	DO
G	RI	U	MI	U	KU	D	HO
GL	RI	UI	TO	V	GU	DI I	PO
GN I	RI	UN	O	VI	TSU	DN	MO
GM	FA			W	TSU	M	RO
WIM	NG	V		Y	NU	J	WO
J	O	W	YE				
K	WA	WN I	ZE				
KA	KI	X	MA				
KI	KA	Y	KE				
L	GA	YI	GE				
		YT	YE				
M	YO	Z	FU				
MM	SO	ZI	BU				
MM I	GO	ZI I	PI				
	GU	ZUN	FU				
N	TA						

SOCIETY OF WIRELESS PIONEERS

THE RUSSIAN CODE

By James E. Kitchin 84 P VE7KN

The Russian letters below are given in the "printed" style as used in books and newspapers. Handwriting varies, as in any language. Where no "small" letter is given these are the same as the "capital" letter but smaller in size. No code for *ë* and *б* as *е* is used for *ё*. *ъ* and *ы* have no pronunciation as they only indicate that the preceding consonant is pronounced hard and soft respectively. *ь* is called ee-kratkohyeh; *ѭ* is tvyordeeznak; *Ѯ* is myahkeyznak. The English equivalent letter "y" is pronounced as the y in "boy". Pronounce the equivalent English J as the S in "pleasure". E and j are both one dot as the difference in pronunciation is almost negligible.

Russian letter

Name

Code

English equivalent

А а	ah	..	ah	Р р	er	---	r
Б б	beh	----	b	С с	ess	---	s
В в	veh	---	v	Т т	teh	-	t
Г г	gheh	---	g	У у	oo	---	oo
Д д	deh	---	d	ъ ы	eff	----	f
Е е	yeh	.	eh	Х х	khah	----	kh
Ё ё	yoh		yoh	Ц ц	tsah	----	tz
Ж ж	zheh	----	j	Ч ч	chah	----	ch
З з	zeh	----	z	Ш ш	shah	----	sh
И и	es	..	i	Щ щ	shchah	----	shch
Й й		----	y	Ъ ѱ		----	
К к	kah	---	k	Ы ы	yehres	----	ih
Л л	ell	----	l	Ь ь			
М м	em	---	m	Э э	eh	.	e
Н н	en	---	n	Ю ю	yoo	----	yu
О о	oh	---	o	Я я	yah	----	yah
П п	peh	----	p				

Conversion Chart

А	А	---	Ж	Й	----	Р	Р	---	Ш	----
Б	Б	----	К	К	----	С	С	---	Щ	----
В	В	---	Л	Л	----	Т	Т	---	Ы	----
Г	Г	---	М	М	---	У	У	---	Ь	----
Д	Д	---	Н	Н	---	Ф	Ф	---	Э	---
Е	Е	---	О	О	---	Х	Х	---	Ю	----
Ж	Ж	---	П	П	----	Ц	Ц	---	Я	----
З	З	---				Ч	Ч	----		
И	И	---								

THE VISUAL CODE SYSTEM

SEMAPHORE



S



A



J



T



B



K



U



C

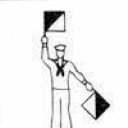


ANSWERING SIGN

L



V



D



M



W



E



N



X



F



O



Y



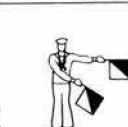
G



P



Z



H



Q



ATTENTION SIGN

I



R



BREAK SIGN



Telegraph Codes of the World

SOCIETY OF WIRELESS PIONEERS

The following story about the "Codes of the World" was written some sixty years ago and appeared in a publication called "Railroad Man's Magazine" (Vol. 28, No. 4 of Dec. 1915). Its author was Mr Donald McNicol who at the time was an engineer for the Postal Telegraph Co. "DM" was an outstanding authority on World Codes in the early days. He later became editor for Telegraph & Telephone Age, circa 1925 and later was an instructor in Communication Engineering at Columbia Univ. of New York. His collection of books (over 1000) on Communication Engineering and associated subjects was donated to the Kingston Univ. Kingston, Ontario - one of the world's largest, on the subject.

Mr. McNicol became a "Silent Key" in Sept. 1953. He was a very brilliant man and a true gentleman.

The story "TELEGRAPH CODES OF THE WORLD" was furnished to us by member Donald K. de Neuf, (117-P) as it records for history and posterity an important segment of our heritage. We owe "Don" a debt of gratitude for sending us this early day record from his historical collection. Those who read it will always honor the name of Donald McNicol in their memories.



From the beginning the mind of man has ever been concerned with the problem of devising symbols or signs which could be used in conveying thoughts and ideas to the minds of other men. History tell us that in all ages and in all lands the people of the period had their own peculiar methods of communication--in the less civilized countries by means of signs manifested by gesticulation of the hands and arms, and among more highly developed peoples by means of inscribed marks or symbols.

In the writings of Homer "the lambent flame which shone round the head of Achilles" is compared to the signals made in besieged cities by clouds of smoke in the daytime, and by bright fires at night--signals which were employed in calling for assistance and in notifying friendly cities of the imminence of hostile attack.

Signaling-systems employing alternately obscured and exposed lighted torches were used by Polybius in the Punic war, B.C. 264. Flag and semaphore signaling systems were employed by Washington's army in the War of the Revolution; and before and immediately after that time many ingenious signaling-systems were proposed which consisted mainly of symbols representing certain prearranged groups of words.

The necessity for a universal signaling-alphabet having a symbol for each of the letters that form the elements of written language had been recognized from very early times.

The Francis Bacon alphabet of 1605 A.D. is the first successful attempt of which there is record, having as its basis "dimension" and "duration" of the elements of the signal. It was a far cry, however, from this early alphabet to the scientific arrangement adopted by Morse in the year 1844.

It would task the comprehension of a seer to grasp the wealth of significance contained in those three simple words, "the Morse Alphabet." Today the language of the wire, the language of the rail, the universal language of the sea are made up of the mystic symbols which comprise the telegraph alphabet.

In the minds of many the idea prevails that the first telegraph code was devised by Professor S.F. B. Morse, the inventor of the electromagnetic telegraph, with the aid of his assistant, Alfred Vail. It is true that both Morse and Vail performed a vast amount of painstaking labor in devising a satisfactory signaling-code for the Morse telegraph system introduced in the year 1844; but it has since been learned that had Morse known of the work along the same lines done by prior scientists he would have found ready at hand an alphabet answering his requirements better than the first code arrangement which he employed.

In the year 1605 Francis Bacon, in his "Advancement of Learning," discussing cryptography, submits a form of bilateral alphabet which may be made up of all things which are capable of two differences.

Employing dots and dashes in the composition of this alphabet, the letters were designated as follows:

BACON'S CODE OF 1605

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

The omission of the letters J and U is due to the fact that these letters of the English alphabet had not at that date been differentiated from I and V.

REE'S CODE

In a cyclopedia published by Dr. Abraham Rees in 1809 there appears an alphabet in which the first nine letters are represented identically with Bacon's code. In the Rees alphabet the inclusion of the letters J and U necessitated a shift forward of the signs. With the exception of the letters X, Y, and Z, this alphabet is the same as that of Bacon.

WORLD CODES

SWAIM'S CODE

James Swaim, of Philadelphia, in the year 1829 described an "acoustic" alphabet which could be employed in telegraphing along or through a wall. As shown herewith this alphabet is represented in conventional dots and dashes; but as originally devised the dots were represented by a letter T (meaning "tap"), while the dashes were represented by a letter S (meaning "scratch").

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

It is evident that this alphabet was not carefully designed, as with four signs only a sufficient number of combinations could have been made to represent thirty letters or characters. The employment of spaces between the elements of two-thirds of the total number of letters makes this alphabet somewhat cumbersome and difficult to memorize.

LOST CODES

The alphabet employed by Lomond in France in the operation of his pith-ball telegraph in the year 1787 has evidently been lost to telegraphic history, as also is that used by Harrison Gray Dyar in the United States in the operation of his electrochemical telegraph in the year 1828.

SCHILLING'S CODE

The alphabet employed by Baron Schilling, whose telegraph was constructed in St. Petersburg, Russia, in the latter part of 1832, consisted of elements indicative of the position—to the left or to the right—of a vertical pointer whose movements were controlled electrically from a distant station.

As usually shown this alphabet consists of combinations of the letters R and L, meaning "right" and "left." For example, in transmitting the letter N the sending lever is moved to the left once and to the right once. At the receiving-station the indicating-needle would swing first to the left and then to the right; this would be translated as the letter N.

The Schilling alphabet as shown herewith is made up of dots and dashes so that the various letter-combinations may be compared with later alphabets made up of similar elements. A dot represents a swing of the needle to the right, and a dash a swing to the left.

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

GAUSS & WEBER'S CODE

In 1833 Gauss and Weber, of Germany, introduced a telegraph system employing a galvanometer with a reflecting mirror, the movements of the mirror to the left or to the right being observed by means of a telescope. The alphabet used is shown herewith, a dot representing a movement of the mirror to the right and a dash a movement to the left:

A .	H - - -	P
B - -	I . .	R . . . -
C . . .	K . . .	S - - .
D . . -	L - . . .	T
E -	M - . -	U - .
F . - .	N . - -	V . . .
G - . .	O . -	W - . . .
		Z - - -

In this alphabet C and K have the same symbol, as also have F and V.

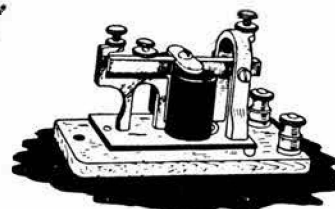
STEINHILL'S CODE

The alphabet employed by Steinhill in Germany in 1856 was as follows:

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

It will be noted that I and J have the same symbol, also U and V, and that the letters Q, X and Y were dispensed with.

PORTS O' CALL



DEVELOPMENT OF MORSE CODE

Professor Morse's first idea of a telegraphic alphabet was that a dictionary of words could be made up, giving to each word a numerical reference, thus: Alabama, 123; Arkansas, 321, et cetera. The dot-and-dash code used to represent each figure was as follows:

1 .	6 .—
2 ..	7 ..—
3 ...	8 ...—
4	9—
5	0

It is apparent that a very long list of words may be arranged with these ten figures in different relations; but the time required, first to compose the words of the message to be transmitted into groups of figures, and then to translate these groups into written words at the receiving station, caused delay which resulted in the early abandonment of this method of telegraphing.

The first complete alphabet devised by Professor Morse in which each letter was given a dot-and-dash symbol was that used in the year 1838.

MORSE 1838 CODE

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

It will be noted that the same symbol has been given to G and J, to I and Y, and to S and Z. The Morse alphabet used in the year 1844—which is still in use unchanged in the United States and in Canada—consisted of a rearrangement of the symbols, avoiding duplication.

MORSE 1844 CODE

(Present Day Commercial Use)

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

MORSE'S 1844 ALPHABET (Cont.)

1 .— .	6
2 ..— .	7 —. —.
3 ...— .	8 —. —.
4— .	9 —. —.
5 — — —	0 — — —
. Period	..— .
: Colon	— . . .
Paragraph	— — — —
- Fraction line	.
; Semi-Colon	... .
, Comma	— . —
? Interrogation	— . — .
() Parenthesis	— . . .
! Exclamation	— — — .

A person might well be pardoned for not at first sight observing that the Morse alphabet is a scientific arrangement of dots and dashes composed with the object of providing short signals for those letters which occur most frequently in English words, and also with the object of arranging letter-signs sufficiently dissimilar to prevent or at least lessen the likelihood of confusion.

The symbols are arranged from three elements—the dot, the dash, and the space—having the following relative values:

The dot	1 unit
The space between the elements of a letter	1 unit
The space employed in the "spaced" letters	2 units
The space between letters	3 units
The space between words	6 units
The short dash	3 units
The long dash	6 units

THE BAIN CODE

Edward Davy in England in 1839, and Alexander Bain of Scotland in 1846, employed the alphabet shown herewith:

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

In the years 1849 and 1850 Bain electro-chemical telegraph-lines were in operation between New York and Boston, New York and Washington, and New York and Buffalo.

WORLD CODES

The numerals used with the Bain alphabet were:

1 . - - - -	6 - - - - .
2 . - - - -	7 - - - - .
3 . - - - -	8 - - - - .
4 . - - - -	9 - - - - .
5 . - - - -	0 - - - - .

AUSTRO-GERMANIC CODE OF 1854

The alphabet and system of notating numerals and punctuation, as employed in European countries, is given herewith:

A . - -	J . - - -	S . . .
Ä -	K . - -	T -
B . - . .	L . - . .	U . . -
C . - . .	M - -	U . . - -
D . - .	N - -	V . . . -
E .	O - - -	W . - -
F	Ö - - - .	X . . . -
G . - . .	P . - . .	Y - - - -
H	Q . - - -	Z . - . .
I . .	R . - -	CH - - - -
1 . - - - -	6 . - . . .	
2 . - - - -	7 . - . . .	
3 . - - - -	8 . - - . .	
4 . - . . .	9 . - - - .	
5	0 . - - - -	
. Period	. . . . .
, Comma	. -	
: Colon	- - - . . .	
' Apostrophe	- - - . . .	
? Question mark	. . - . . .	
! Exclamation	- - - . . .	
; Semi-Colon	. -	
- Fraction mark	- - - . . .	

CONTINENTAL (INTERNATIONAL) CODE

The Austro-Germanic alphabet was first compiled at the telegraph conference held in Berlin, Germany, in 1851. This alphabet is still in use and is known variously as the Continental, international, or universal code. It is employed on European Morse lines, and is used almost universally in radiotelegraphic service as well as in submarine cable service throughout the world.



CONTINENTAL CODE SIGNALS

In addition to the symbols shown as constituting the Austro-Germanic code, the Continental alphabet of the present day includes the following signals:

- Fraction line	-
- Hyphen	-
/ Shilling	. . .
. Decimal point	. - - . .
"" Quotation	. -
End of Quotation	. -
% Percent	- - -
Italics or underline	. -
Paragraph	- - -
() Parenthesis	- . - . . .
E (French)	. . - . .
N (Spanish)	- -
A (Spanish-Scandinavian)	. -

The Continental alphabet as made up in 1851 was supposed to embody the best features of all then existing telegraph alphabets. As an indication of how the various alphabets were picked over to form the international code it may be seen that the symbols for E, H, O, and P were taken from Steinhil's alphabet; the letter X and the numerals 1, 2, 3, 4, and 5 from the Bain alphabet, while the numerals 6, 7, 8, and 9 also were taken from the Bain alphabet, but were arranged in reverse order. The letters C, F, L, and R were taken from an obsolete pamphlet used in Germany and known as Gerke's while twelve of the remaining letters were taken from the American Morse alphabet of 1844.

Operators in submarine cable service use abbreviated symbols for the numerals of the Continental code, as shown in the subjoined table:

1 . -	6 -
2 . . -	7 - - . . .
3 . . . -	8 - . . .
4	9 - . . .
5 .	0 - - - -

UNITED STATES NAVY CODE

Until a few years ago when the Continental code was adopted as standard in the radio service of the United States army and navy the navy had a code of its own, as follows:

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

1	....	6	----
2	----	7	.....
3	....-	8	----
4	----	9	.....
5	....-	0	----

PHILLIP'S CODE PUNCTUATIONS

As before stated the Morse alphabet of 1844 is at present the standard telegraph code used on the land lines, both commercial and railroad, in the United States and Canada. The punctuation marks and special symbols employed, however, are those composed by Walter P. Phillips in the year 1876. They are shown herewith:

. Period	..----
: Colon	....
, Comma-
-- Dash	....
- Hyphen	....
/ Shilling-
d Pence	....
\$ Dollars	....
c Cents	....
% Percent	....
" Quotation	....
() Brackets	....
:-- Colon Dash	....
' Apostrophe	....
End of Quotation within Quotation	....
Italics or Underline	....
Capitalized Letter	....
End of Quotation	....
Quotation within a Quotation	....
() Parenthesis	....
: " Colon followed by Quotation	....
? Interrogation	....
-- Fraction Line	.
; Semi-Colon	....
£ Pound Sterling	....
. Decimal Point	....
Paragraph	----
! Exclamation	----

JAPANESE TELEGRAPH CODE

The Morse symbols employed in transmitting telegrams which are written in regulation Japanese characters are fifty in number, in addition to these used to represent figures and punctuation marks.

Approximately 3.6 Japanese letters are equal to one English word of 4.67 Morse letters.

The 50 symbols making up the alphabet have been taken from the American Morse and Continental alphabets, to which additional combinations of dots and dashes have been added to represent the extra 24 letters of the Japanese alphabet.

TURKISH TELEGRAPH CODE

In the Turkish Empire two telegraph codes are in use. One of these, the Continental code previously shown, is employed in communication with foreign telegraph administrations, and when necessary in internal communication. The other alphabet used is known as the Turkish government private code, being used chiefly for official business. It is shown herewith:

A	..-	ZE	----	K	----
B	....	S	...	Q	----
P	----	SH	----	L	----
T	-	X	----	M	----
C	....	DAT	----	N	----
DJ	----	TI	...	V	----
H	....	ZI	----	E	----
D	----	AIN	----	IA	----
ZEL	----	CAIN	----	I	..
R	----	F	....	O	----

Since the adoption of the Continental alphabet on European land lines in 1851 there has been an almost continual, although unofficial, agitation in the United States, having for its object the substitution of the Continental alphabet in place of the Morse alphabet on American lines. On March 20, 1873, a vote was taken in the main operating-room of the Western Union Telegraph Company at 145 Broadway, New York, to determine whether or not American telegraphers favored a change to the Continental alphabet. The result of the ballot indicated a pronounced sentiment in favor of retaining the Morse code.

On various occasions in the past fifty years the controversy has resulted in the production of a mass of testimony and opinion for and against the adoption of the Continental alphabet as a universal code. Sifted down, the chief arguments favoring the retention of the Morse alphabet seem to be based on sentiment and upon the slightly superior speed possibilities of the Morse alphabet, while those advocating the adoption of the Continental code base their opinions upon greater accuracy of transmission and upon the desirability of having but one alphabet in use on telegraph lines, cables, and in radio service throughout the world.

The American Morse alphabet--26 letters--has a total of 77 elements, or 2.9615 average signals per letter and 14.807 average signals per word of five letters--an average English word. The Continental alphabet--26 letters--has a total of 82 elements, or 3.1538 average signals per letter and 15.769 average signals per word of five letters.

Including spaces, the average five-letter word--American Morse--contains 36.59 dot elements, or practically five per cent less than a five-letter word composed of Continental signs. A sending speed of 25 words per minute means 394.22 signals per minute in the case of the European alphabet, and 370.17 signals per minute in the case of the American Morse, exclusive of space elements between words.

Regardless of the fact that a considerable amount of the opinion favoring the change to the Continental alphabet comes from highly intelligent and progressive sources, nothing has so far been done in an official way to bring about the change. In-

In August, 1914, Mr. W. P. Phillips proposed the following code as a substitute for the American Morse, believing that its adoption in America would not violate the prevailing sentiment attached to the Morse alphabet and that its make-up successfully disposes of the objections to the spaced dot letters of the Morse code—C. O. R. Y, and Z.

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

1	• — — •	4	fr — • — — •	7	sv • • • — — —
2	• • — — •	5	fv — • • — —	8	ait — • — —
3	— — — •	6	• • • • •	9	nin — • — —

Most modern printing-telegraph systems employ a code having symbols made up of five elements or current impulses, each letter, figure, and punctuation-mark requiring the same amount of line-time for transmission. It is not intended that these signals shall be intelligible on a Morse sounder, as the alternate positive and negative impulses transmitted from the sending end are required only to operate type-printing mechanism at the receiving end.

In the three following alphabets the letter P represents a positive impulse and the letter N a negative impulse, each impulse having unit duration:

"PORTS O' CALL" (Vol. 4)

A	ppnnn	L	npnnn	W	ppnnp
B	nnppp	M	nnnpn	X	ppnpn
C	nnppp	N	pnnpn	Y	nnnpn
D	pppnn	O	nnnnn	Z	npnpn
E	ppppn	P	nnppp		, nnnnn
F	nnppp	Q	pnppp		Space pppnp
G	ppnpn	R	nnppn		Figure nppppp
H	pnnnn	S	npnpn		Release pppppp
I	pnppn	T	ppnpn		Back ppppn
J	pnnpn	U	nnnpn		Line npppn
K	npnpn	V	ppppp		

In both the Morkrum and W. U. multiplex alphabets the figures and punctuations are made by means of an upper-case shift, employing symbols which are duplicates of those used in forming some of the letters.

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

Type shift \rightarrow : —

Paper feed — — —

Car. ret. - - -

As in the case of the other printer alphabets, punctuations, figures, and special characters are made by means of the type-shift key. By this means the same symbol serves for C and colon, Q and 1. R and 4, T and 5, et cetera.

The symbols shown above are those composing the Barclay arrangement of the Buckingham alphabet. In the original Buckingham alphabet the symbol for V was - - - and for X . . .

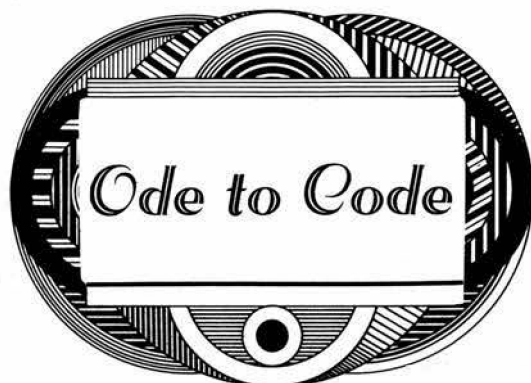
The alphabet used in the operation of Delaney's chemical automatic system of telegraphy is the American Morse, or that hereinbefore described as the Morse alphabet of 1844.

A pqrtr
B pqrtr
C pqrtr
D pqrtr
E pqrtr
F pqrtr
G pqrtr
H pqrtr
I pqrtr
J pqrtr
K pqrtr
L pqrtr
M pqrtr
N pqrtr
O pqrtr
P pqrtr
Q pqrtr
R pqrtr
S pqrtr

FIGURES	(1)	↑	⊕	⊗	/	3	←	↘	↓	8	↖	↙	⊙	9	∅	1	4	BILL	MILL	5	7	⊖	2	/	6	+	-	RATE	LETTER	FOOT	SHEET	CARTRIDGE	RETURN	LINER	PAGE				
	(2)	—	5/8	1/8	5	3	1/4	&	8	*	1/2	3/4	*	7/4	9	D	1	4	BILL	MILL	5	7	3/8	2	/	6	H	BASE	LETTER	FOOT	SHEET	CARTRIDGE	RETURN	LINER	PAGE				
	(3)	—	?	:	5	3	!	&	#	'	{	}	-	x	9	0	1	4	BILL	MILL	5	7	:	2	/	6	H	BASE	LETTER	FOOT	SHEET	CARTRIDGE	RETURN	LINER	PAGE				
LETTERS		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	SYMBOLS ABOVE DON'T TAKE SPACES											
	1	●	●		●	●	●					●	●					●	●	●		●		●	●	●	●			●	●								
	2	●		●															●	●				●	●	●	●			●	●				●				
	3				●			●		●	●		●		●			●	●			●	●	●	●	●				●	●								
	4		●	●	●			●				●	●		●	●			●					●		●					●	●			●				
	5		●						●	●				●	●		●	●			●		●	●	●	●	●				●	●							
		(1)	WEATHER										(2)	FRACTIONS										(3)	COMMUNICATIONS														

T ոոոոոո
U քքքք
V օօօօօ
W քքոոք
X քոքքք
Y քոքոք
Z քոոոո

Car. ret.	nnnpn
Line feed	npnnn
Let. shift	ppppp
Fig. shift	pnpnp
Space	nnpnn



By - Don de Neuf

The word "Ode" is not really correct. The following isn't going to be poetry in any sense.

Telecommunications is always fascinating--especially the matter of the use of codes. Of course, we all use a variety of codes to communicate our thoughts to others. For instance, a writing instrument comprised of a stick of graphite we know in English as a "pencil" is known as a "lapiz" by the Spanish speaking, a "bleistift" in German, a "crayon" in French, an "empitsu" in Japanese, a "karandash" in Russian, and to the Italians a "matita," etc. Exactly the same item and thought is expressed but a different "code signal" is employed for each language. Then there are all sorts of variations orally - a Brooklynite will usually pronounce Long Island as "lon-guyland." A South Carolinian may refer to a "poke" - known to the northerners as a "bag" or "sack." Some oral "codes" utilize various inflections in a single word to convey different meanings, such as that used in the Chinese language. Of course, even in English we do this - every mother knows that a child addressing her as "mother" may use half a dozen inflections - conveying thoughts or feelings of anger, humor, impatience, fear, sadness, etc. In the written word many languages use additional "codes" to indicate a change in pronunciation, such as the "umlaut" over the letter "o" in German which flattens the sound, and the "tilda" over a Spanish "n" to indicate it has a "nyeh" sound.

Well, from a telecommunications standpoint, in 1837 Morse and Vail collaborated on a telegraphic code made up of dots and dashes. But, it really was not very well thought out . . . seven years later they revised it giving the most commonly used letters the shortest signals. Then reception was carried out by visually reading an inked strip of paper on which appeared the dots and dashes. Interestingly enough, some years passed before operators discovered they could decipher the signals much faster by ear by listening to the solenoid operating the pen. Thus the "sounder" was born. But in Europe telegraph systems developed with the use of the English "needle telegraph" invented by Cooke and Wheatstone. The existing Morse code with some of its letters (C, O, R, Y, Z) having spacing within the letters themselves was not suitable as a code for this device. Just who in Europe developed the "International Code" (still used today) seems lost in history but all telegraphic communications outside America employed it*, including "wireless" when it came into being. The American Morse code was as distinctly American as apple pie and baseball and it continued to be used on all telegraph lines (WU, Postal, Railroads, Press, etc.) until the gradual replacement of Morse

by the teleprinter. Some non-European countries developed special codes for their telegraph systems to accommodate their own alphabets--notably Russian, Japanese, Arabic, Greek and Turkish. With the old American Morse code and its spacing within letters, sloppy senders and/or receivers sometimes produced weird messages for the addressees. One famous text was received by the addressee as "COG HOG TO ROG JAGS IS NOT 100" instead of "COME HOME TO ROME JOE IS NOT WELL." (Credit to Dick Hilferty.)

*Perhaps American Morse Code should really be termed "North American" since it was also used on lines in Canada and Mexico growing as extensions circuits from the U.S.

Then there was the old Morse "Number Code" to conserve time and space. Each represented not just a word but a complete standardized sentence. Not all remained popular but the following were in general use some 40 years ago:

- 4 - Where was I? (Used after an interruption or when the sender lost his place.)
- 9 - Wire Chief Calling. Drop everything and do what I tell you.
- 13 - Do you understand?
- 17 - The following is for all stations on the line.
- 25 - I'm busy now; call me later.
- 30 - That's all for today (or tonight). *
- 73 - My best regards to you. *
- 95 - The following is very urgent.



Thanks to Leslie Funston - 1903-V

*Contrary to views in the past as to how 30 and 73 originated some old timers claim that the old number code gave birth to them.

Old Morse operators, when the receivers wrote in a fast scrawl, ran at about 22 words per minute. Speed increased considerably when the receiving operators began using typewriters, known only as "mills" in those days. The telegraphers' handwriting was very distinctive - young men imitated the old. It was called "telegrapher's script." Thomas A. Edison's famous signature was a classical example.

"PORTS O' CALL" (Vol. 4)

ODE TO CODE—Don de Neuf

After the introduction of the typewriter in telegraphy, Walter P. Phillips, who headed the Associated Press Washington Bureau from 1879 to 1882 devised a set of abbreviations for speeding up telegraphy — especially press messages — which immediately became known as "The Phillips Code." APC stood for appreciate. PLS for Please. XNL was constitutional, XXN cross-examination, etc. etc. POX stood for police. There some comical blunders were committed when operators allowed their minds to wander. One AP operator in Florida turned out a bulletin which read "Small police had broken out in one part of the state." ●●

International telecommunications introduced a number of different operating codes. There were five letter codes using pronounceable words such as WAJIV for "Give better attention;" SIZIZ for "second request;" SOCUR for "third request," etc. GUHOR meant "You are fading badly." Then there were a whole set of "Z" signals for operating purposes — "ZHC" for "How are receiving conditions," "ZOK" for "Receiving OK," "ZLS" for "Lightning storm here," ZSF meant "send faster" of course, and ZSS "send slower." Although almost all transmission was by means of punched paper tape, reception was either by ear or visually by undulator tape, depending upon the quality of received signals. Contrary to the much earlier development where operators found they could copy by ear faster than by deciphering the inked tape, such was not the case on undulator tape as against aural reception. Highly skilled operators could copy visually, on a typewriter of course, undulator tape at speeds of 70 wpm when the language was plain text (not five or ten letter "code"). *

Here again was another set of codes used by businessmen to reduce the number of words in an international telegram, because there was a special rate per word for recognized commercial business five letter codes, which was less than plain English. For example one code book carries the 5 letters EFUSD which meant "We can not deliver the exact material you request at the present time but offer to you the following substitution."

*Undulator tape employed a continuous inked line which moved upward with the presence of a signal forming visible dots and dashes on the top. This was quite different from "cable tape" recorders used on underseas cable circuits . . . here the "no signal" condition kept the pen in the center of the tape. + DC current was used for dots which caused the pen to rise above the center line, whereas for dashes a negative DC current pulled the pen below the line. Visually it was quite a different "language."

The Citizens Band reveals all kinds of weird distortions of established signal codes. A standard police code "10-4" means "message received OK." You'll hear a CB operator saying, "That's a big 10-4" when he presumably means "I agree with you." The funniest to me are the ones who sign off with "threes and eights to you" — presumably derived from 73 and 88, in some fashion but I'll bet few of them know what 88 used to stand for!!!

—D. K. deNeuf

Add the following (insert per legend as marked):

● but it was adopted at the Austro-German Telegraph Conference held in Berlin in 1851.

● in 1884.

● An important increase in telegraphy speed came along in 1904 when the semi-automatic sending machine or "bug" became an important tool to the telegrapher. The combination of the typewriter, the Phillips Code, and the bug increased manual telegraphic speeds to 50 or more words per minute.

(Corrections by Author Don deNeuf)



Author and contributor DONALD K. de NEUF, SOWP Charter Member 117-P has had a very distinguished career in Telecommunications since taking his first assignment on the Matson Liner SS LURLINE/WML back in 1925. Following a career at sea on some of our larger ships, he held many important assignments shoreside, becoming President of PRESS WIRELESS, INC. He has been decorated by foreign governments for his humanitarian efforts. He has also received many awards and citations for his outstanding ability and knowledge of the communications field and ability to 'get things done'.

He was one of the early holders of the coveted "Pink" Ticket (Number Four) and one of the few (if any) Americans who were ever issued an operators license by the Cuban Government.

The above photograph shows Don, circa 1925 on duty handling a 'hot' job on the SS MATSONIA/WMP on the run from S.F. to Honolulu. Traffic was always heavy on WMP and WMR (SS Maui - Sister Ship). We served as primary relay stations — collecting traffic for RCA (KPH and KSE in those days when competition was very keen. 'Ye Ed' should know as he preceded Don by five years at the key of WMP. We are sure our members will enjoy these fine contributions by "Don" from his store of knowledge about our favorite subject—Communications.

—W.A.B.

