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CLASS CHARACTERISTICS OF FOREIGN TYPEWRITERS AND TYPEFACES

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The ever increasing number of foreign made typewriters imported into the United States, as well as the usage of foreign made typefaces on American made typewriters, has caused a basic change in the document examiner's approach to typewriter classification and differentiation. The earlier schemes for American typewriters based upon gross form differences no longer suffice. While the primary problem in typewriting case-work has been, and will continue to be, the individualization and identification of specific typewriters, the problem of classification and differentiation of typewriting on the basis of manufacturing origin remains of frequent investigatory significance.

It is the purpose of this paper to codify and classify all the available data on foreign typewriters and foreign typefaces so as to provide a scheme for differentiation. No coverage is provided for American made typewriters equipped with American made typefaces. This paper supercedes all prior compilations by the author on foreign typewriter differentiation. (3, 4, 5) While every effort has been made to provide comprehensive coverage of the subject, no claim is made or implied of complete coverage of all past and present foreign typewriters and/or typefaces.

Until the early 1950's, a knowledge of the common American made typefaces, i. e., Royal, Remington, Underwood, Woodstock, Smith-Corona, and IBM, sufficed for most document examiners in the United States. With certain exceptions, each of the major American companies produced its own distinctive typefaces and made periodic changes in its typeface designs. While it was expected that Royal typefaces, for example, would be found only on a Royal typewriter, this

situation did not always obtain. The Smith-Corona company, to cite one manufacturer, made "matched" typefaces for years which approximated the designs of competitive typefaces. Over the years, several typewriter manufacturers have supplied "Tower" typewriter models, marketed by Sears, Roebuck & Company. The typefaces used on these machines, all bearing the same "Tower" brand name, are the current typefaces used by the particular typewriter manufacturer. It is known that the major typewriter manufacturers have sold typewriters equipped with typeface designs of their competitors in order to comply with specific customer preference. Further, one should note the manufacture of some Underwood and Monarch noiseless typewriters by Remington, using parts and typefaces identical to corresponding Remington models.

In spite of the fact that one could only distinguish typeface designs rather than typewriter manufacturers, the problems in classification were relatively easy in the pre-1950 era. The American typewriters in the pica and elite size were all spaced 10 characters to the horizontal inch and 12 characters to the horizontal inch, or a unit spacing of 2.54 mm and 2.12 mm per character, respectively. Differentiation was usually based upon gross characteristics, rarely upon subtle differences, assuming all pertinent characters were represented in the exemplar. The published schemes of Hilton serve this purpose admirably. (11, 12)

Foreign made typewriters began to enter the United States in quantity in the early 1950's. As the import of European typewriters increased, the production of American typewriters, particularly portables, declined in volume. American typewriter companies began to manufacture type-

writers in European factories and to market these typewriters in the United States under their own brand names. Certain American typewriter companies started buying European typefaces for use on American made typewriters, also marketed under their own brand name. A consequential number of European typewriter manufacturers initiated models with a unit spacing of 2.54 mm and 2.12 mm, a departure from their usual unit spacing. The consideration of European typewriters as a problem separate and distinct from American typewriters ended, for all practical purposes, in 1955 when the R. C. Allen Company imported Ransmayer and Rodrian typefaces from Germany for use on the Allen typewriters.

In the post-World War II era, typewriter production outside the United States was centered in Western Europe, Central Europe, and Italy. In the last few years, the Japanese have entered into large scale typewriter production and concurrent export to the United States. (1) In the last year, a new development has taken place. German typewriter manufacturers have sold or transferred their manufacturing facilities to areas with lower labor costs, i. e., Portugal and Yugoslavia. (10) It is to be expected that further developments in typewriter manufacture will follow this trend toward production in areas with lower production costs.

Appendix 1 lists all the known foreign typewriter manufacturers, the country where manufactured, and the dates when produced, plus a cross-index of alternate brand names. It is to be noted that in addition to each typewriter manufacturer using multiple brand names, in some cases, several different typewriter manufacturers have used the same brand name, i. e., "AMC". Typewriters bearing an "AMC" nameplate could have been made by Alpina, Japy, or Orga. Furthermore, the products of the overseas factories of American typewriter manufacturers must be considered separate and apart from American produced typewriters.

The classification and differentiation of foreign typewriters and foreign typefaces involves several new factors, not normally encountered in American made typewriters.

a. Some foreign typewriter manufacturers buy their typefaces from typeface manufacturers, i. e., Torpedo.

b. Some foreign typewriter manufacturers have manufactured their own typefaces and have not

sold these typefaces to other typewriter manufacturers, i. e., Consul.

c. Some foreign typewriter manufacturers have manufactured their own typefaces and have sold typefaces to other typewriter manufacturers, i. e., Olivetti.

d. Some foreign typewriter manufacturers have produced their own typefaces at one time in their corporate existence and have brought typefaces from typeface manufacturers at other times, i. e., Adler.

e. Some foreign typewriter manufacturers have bought typefaces from several different typeface manufacturers, sometimes at different times and sometimes concurrently, i. e., European Remington.

f. Foreign typeface manufacturers sell their products to many different typewriter manufacturers, i. e., Setag.

g. Foreign typeface manufacturers introduce changes occasionally in their typeface designs, i. e., Ransmayer and Rodrian (RaRo).

h. Foreign typeface manufacturers do not ordinarily strive toward individuality in typeface designs, but prefer to make their typeface designs quite similar to other typefaces on the market, i. e., Tangens and RaRo.

i. Foreign typewriter manufacturers use a spectrum of letter spacings based upon the metric scale. For elite sized type, the following unit spacings or pitches are used;

2.00 mm, 2.10 mm, 2.12 mm, 2.17 mm, 2.20 mm, 2.23 mm, 2.25 mm, 2.30 mm, 2.35 mm, 2.50 mm, 2.54 mm, and 2.60 mm

For pica sized type, the following unit spacings are used:

2.50 mm, 2.53 mm, 2.54 mm, 2.55 mm, 2.60 mm, and a variety of spacings 2.60 mm plus.

j. Foreign typewriter manufacturers tend to show some consistency in the unit spacings used on their typewriters. Typewriter manufacturers may produce typewriters with several different unit spacings, but not all the possible spacings.

k. The same typeface design of a typeface manufacturer may be found on several different brand name typewriters with varied unit spacings.

Tables 1 and 2 correlates the known usage of typefaces produced by the various major typeface manufacturers with usage by the specific typewriter manufacturers with the indicated unit spacings. The pattern of pitch usage and typeface usage can be used for extrapolative and predictive

TABLE 1—ELITE SIZE
TYPEFACE AND UNIT SPACING USAGE BY TYPEWRITER MANUFACTURERS

Typeface Manufacturer	Unit Spacing							
	2.00 mm	2.10 mm	2.12 mm	2.20 mm	2.23 mm	2.25 mm	2.30 mm	
Adler, West German	Adler							
Barlock, English		Barlock						
Brother, Japanese**	Brother							
Caracteres S.A. (CSA), Swiss	Hermes	Patria Swissa	Halda Facit			Halda Facit		
"East", East German			Rheinmetall	Fortuna Urania Rheinmetall	Continental Groma	Rheinmetall Groma Erika Ideal Brilliant	Mercedes	
Empire, English			Empire					
Everest, Italian			Everest		Everest Brilliant	Everest		
Iris, West German				Mercedes Urania Rheinmetall	Everest		Mercedes Adler Triumph	
Nippo, Japanese				Nippo				
Oliver, English			Oliver					
Olivetti, Italian	Hermes	Patria Swissa Olivetti	Olivetti		Olivetti Everest Underwood			
Olympia, East (Optima), East German						Optima	Olympia Diplomat DM Kappel	
Olympia West, West German			Olympia				Olympia Orbis	

Ransmayer & Rodrian* (RaRo), West German	Hermes	Torpedo Remington Adler Patria Rooy	Stoever R. C. Allen Halda Facit Royal Triumph Olympia Adler	Mercedes Rheinmetall Urania Fortuna Orga Gossen Superia Adler Triumph Torpedo	Continental Groma Kappel Siemag Brosette Olivetti Kappel	Halda Facit ABC	Triumph Merz Diana Royal Adler Olympia Princess Alpina Voss Siemag Torpedo
Seidel & Neumann (S&N), East German						Ideal Erika	Erika
Setag, Swiss	Hermes Japy Calanda	Patria Swissa Remington Patria (Sp.)	Halberg Oliver Hermes Remington	Royal	Halberg		Juwel Princess
J. H. Shand, English			Empire-Corona Smith-Corona				
Tangens, West German		Torpedo Remington Rooy Singer	Remington Rooy			ABC	Voss Alpina Juwel
Union, West German							Princess
G. Webb, English	Imperial		Imperial				
Zeta, Czech		Consul	Consul				

* 2.17 mm Pitch, RaRo Typeface is found on Torpedo.

** Brother typefaces appear on Brothers typewriter equipped with 2.35 mm pitch.

TABLE 2—PICA SIZE
TYPEFACE AND UNIT SPACING USAGE BY TYPEWRITER MANUFACTURERS

Typeface Manufacturer	Unit Spacing			
	2.5 mm	2.54 mm	2.55 mm	2.6 mm
Adler, West German	Adler			Adler
Barlock, English		Barlock Bar-let		
Brother, Japanese	Brother			
Caracteres S. A. (CSA), Swiss	Hermes	Halda Facit Norden		
"East", East German				Groma Rheinmetall Erika Mercedes Ideal Fortuna Urania Combina
Empire, English		Empire		
Everest, Italian	Montana	Everest		Everest
Iris, West German	Everest Hermes			Wanderer Rheinmetall Kappel Invicta Urania Mercedes Torpedo Adler Swissa
Oliver, English		Oliver		Oliver
Olivetti, Italian	Hermes Japy Montana	Olivetti Antares Montana SIM Capri	SIM	Olivetti Everest Japy Patria Underwood
Olympia East* (Optima), East German	SIM AEG		SIM AEG Olympia	Olympia Rheinmetall Optima
Olympia West, West German				Olympia
Ransmayer & Rodrian (RaRo), West German	Montana Hermes ABC Princess Japy Rooy	R.C. Allen Hermes Halda Facit Antares Royal Olivetti Remington Smith-Corona Jaguar Singer Nippo		Torpedo Rooy ABC Silver Reed Gossen Princess Voss Brosette Siemag Alpina Adler Olympia Royal Diana Remington Groma Triumph

* 2.53 mm pitch, Olympia East (Optima) typeface is found on some SIM machines.

TABLE 2—Continued

Typeface Manufacturer	Unit Spacing			
	2.5 mm	2.54 mm	2.55 mm	2.6 mm
Ransmeyer & Rodrian (cont.)				Continental Urania Mercedes Everest Superia Halberg Orga Patria Regina SIM Swissa Kappel MAP Norden Oliver Consul Halda Olivetti Ideal Invicta Japy Juwel
Rooy, French				Rooy
Seidel & Neumann, (S&N), East German)				Erika Ideal Groma
Setag, Swiss	Hermes Royal Calanda Japy Princess Halberg Underwood Singer	Antares Underwood		Diana Royal AMC Japy Patria (Sp.) Swissa Siemag Halberg Juwel Remington Meteor
J. H. Shand, English	Royal	Empire-Corona Smith-Corona		
Tangens, West German	ABC Hermes	Remington Singer		Remington Voss Alpina Adler Rooy Torpedo Juwel
Union, West German	Princess			Alpina Princess Halberg Voss
G. Webb, English		Imperial		
Zeta, Czech	Consul Forto Claudia			Consul

TABLE 3A—ELITE SIZE TYPEFACES
KNOWN USAGE OF SPECIFIC TYPEFACE FORMATIONS

Typeface Formation	Typewriters Using It	Typeface Formation	Typewriters Using It
2.00 mm Pitch		2.10 mm Pitch (cont.)	
CSA 2A.....	Hermes Std and Port 1942-51	Setag 7.....	Patria Port 1949 Swissa Port 1950- Remington Travelriter Port Patria Port (Spanish)
CSA 2B.....	Hermes Std and Port 1949-54	Tangens 12B.....	Torpedo Port 1954- Remington Travelriter Port 1953- Rooy
Olivetti 7A.....	Hermes Std and Port 1940-50	Tangens 12C.....	Singer Graduate (Remington) Port 1963-D
RaRo 7B.....	Hermes Std and Port 1931-60	Zeta 2.....	Consul Std and Port 1946-
RaRo 7C.....	Standard RaRo typeface 1958- 62		2.12 mm Pitch
RaRo 7D.....	Standard RaRo typeface 1961- 65	Barlock 4.....	Barlock Std
RaRo 7D1.....	Standard RaRo typeface 1961- 65	Barlock 5.....	Barlock Std
RaRo 7E.....	Standard RaRo typeface 1964- D	CSA 2A.....	Halda Std 1942-50
RaRo 7E1.....	Standard RaRo typeface 1964- D	CSA 2B.....	Halda Std 1950-51 Facit Std
Setag 7.....	Hermes Std and Port 1948-D Japy Std Calanda	CSA 29.....	Facit Std and Port -D
Setag 7A.....	Hermes	East 3BA.....	Rheinmetall
Webb 3.....	Imperial	Empire 4.....	British Empire
		Empire 5.....	Empire
2.10 mm Pitch		Everest 7C.....	Everest Std 1961-
Adler 4.....	Adler Std and Port 1920-45	Olivetti 7A.....	Olivetti Std 1959-
Brother 2.....	Brother Port 1962-D	Olivetti 7B.....	Olivetti Electric Port
CSA 2A.....	Patria Port 1945-49 Swissa Port 1950-53	Oliver 5.....	Oliver Model 15 (English)
CSA 2B.....	Patria Port 1949 Swissa Port 1950-	Olympia W8C.....	Olympia Std 1957-
Olivetti 7A.....	Patria Port 1945-49 Swissa Port 1950 Olivetti Port (Spanish)	Olympia W8D.....	Olympia Std 1967-
RaRo 7B.....	Torpedo Port 1930-58 Remington Port 1946-53; 1957- 58 Adler Std and Port 1929-58 Patria Port Rooy	RaRo 7A.....	Stoewer Std 1920-30
RaRo 7B3.....	Torpedo Port 1957-	RaRo 7B.....	R. C. Allen 1955 only Stoewer Std 1929-30 Halda Std 1930-40; 1950-58 Royal Std (German) 1957-59 Triumph
RaRo 7C.....	Standard RaRo typeface 1958- 52 Torpedo Port 1958-62 Remington Port 1958-62	RaRo 7B1.....	Olympia Std 1958-
RaRo 7D.....	Standard RaRo typeface 1961- 65 Adler Std	RaRo 7B2.....	R. C. Allen 1955-
RaRo 7D1.....	Standard RaRo typeface 1961- 65	RaRo 7C.....	Standard RaRo typeface 1958- 62 Facit Std and Port 1958-62 Royal Std 1958-62 Triumph
RaRo 7E.....	Standard RaRo typeface 1964- D	RaRo 7C3.....	Olympia Std
RaRo 7E1.....	Standard RaRo typeface 1964- D	RaRo 7D.....	Standard RaRo typeface 1961- 65
		RaRo 7D1.....	Standard RaRo typeface 1961- 65 Adler Port 1962-D
		RaRo 7E.....	Standard RaRo typeface 1964- D

TABLE 3A—Continued

Typeface Formation	Typewriters Using It	Typeface Formation	Typewriters Using It
2.12 mm. Pitch (cont.)		2.20 mm Pitch (cont.)	
RaRo 7E1.....	Standard RaRo typeface 1964-D	RaRo 7A.....	Mercedes Std 1920-25 Rheinmetall Std 1920-29 Urania Std 1920-32 Fortuna Std 1923-33 Orga Std 1923-35
Ransmayer RA.....	Stoewer Std 1920-25	RaRo 7B.....	Urania Std and Port 1931-50 Gossen Tippa Port 1948-58 Superia Std 1950-53 Adler Tippa Port 1956-58 Triumph Tippa Port 1956-58 Torpedo Port 1938-58 Fortuna Std 1930-48 Orga Std 1933-50
Setag 7.....	Traveler Port Oliver Std and Port (English) 1956- Hermes Std Remington Travelriter Port	RaRo 7B3.....	Torpedo Port 1957-
Shand 1E.....	Empire-Corona Skyriter 1958-	RaRo 7C.....	Standard RaRo typeface 1958-62 Torpedo Port 1958-62 Adler Tippa Port 1958-62 Triumph Tippa Port 1958-62
Shand 2E.....	Smith-Corona Port Sears Scout Port	RaRo 7D.....	Standard RaRo typeface 1961-65 Torpedo Port 1961-66 Nippo Port 1961-
Tangens 12C.....	Remington Std (U.S. and Italian) Remington Port (Dutch) 1961-D Rooy Torpedo Port	RaRo 7D1.....	Standard RaRo typeface 1961-65
Webb 4.....	Imperial Std and Port	RaRo 7E.....	Standard RaRo typeface 1964-D Torpedo Port
Webb 5.....	Imperial Good Companion Port Imperial Model 66	RaRo 7E1.....	Standard RaRo typeface 1964-D
Zeta 2.....	Consul Std and Port 1946-	Ransmayer RA.....	Mercedes Std 1920-25 Urania Std 1920-31 Rheinmetall Std 1920-29 Orga Std 1923-34
Zeta 3.....	Century Port (Czech)	Setag 7.....	Royalite Port (Dutch) 1955-D
2.17 mm Pitch		2.23 mm Pitch	
Ransmayer RA.....	Torpedo Std 1920-32	East 3A.....	Continental Std 1946-56 Groma Std and Port 1946-56
RaRo 7A.....	Torpedo Std 1920-32	East 3B.....	Groma Kolibri Port 1957- Groma Combina Port 1957-
RaRo 7B.....	Torpedo Std 1930-60	Everest 7A.....	Everest Std and Port 1948- Brillant Port 1958-
RaRo 7C.....	Torpedo Std 1958-60	Everest 7B.....	Everest
RaRo 7B3.....	Torpedo Std 1957-60	Iris 133.....	Everest
RaRo 7D.....	Standard RaRo typeface 1961-65	Olivetti 7A.....	Olivetti Std and Port 1935- Everest Std and Port 1937-52 Underwood Port
RaRo 7D1.....	Standard RaRo typeface 1961-65	Olivetti 7B.....	Olivetti Port 1960-D
RaRo 7E.....	Standard RaRo typeface 1964-D	RaRo 7A.....	Continental Std 1920-32 Groma Std 1924-35 Kappel 1920-34
RaRo 7E1.....	Standard RaRo typeface 1964-D		
2.20 mm Pitch			
East 3A.....	Fortuna Std 1946-50 Urania Std and Port 1946-54 Rheinmetall Port 1950-56		
East 3B.....	Rheinmetall Port 1954-		
Iris 3.....	Mercedes Std 1924-30 Rheinmetall Std 1928-33 Urania Std and Port 1928-33		
Iris 133.....	Mercedes Std 1928-30 Urania Std and Port 1937-51 Rheinmetall Std and Port 1932-45		
Nippo.....	Nippo Port		

TABLE 3A—Continued

Typeface Formation	Typewriters Using It	Typeface Formation	Typewriters Using It
2.23 mm Pitch (cont.)		2.25 mm Pitch (cont.)	
RaRo 7B.....	Siemag Std 1949-59 Continental Std and Port 1930-56 Kappel Std 1930-45 Brosette Port 1953-59 Groma Std and Port 1931-45 Olivetti Std and Port 1931-37: 1957-59	RaRo 7D.....	Standard RaRo typeface 1961-65
RaRo 7C.....	Standard RaRo typeface 1958-62 Siemag Std 1958-62 Brosette Port 1958-62 Olivetti Std and Port 1958-62	RaRo 7D1.....	Standard RaRo typeface 1961-65
RaRo 7B3.....	Olivetti Port 1957-	RaRo 7E.....	Standard RaRo typeface 1964-D
RaRo 7D.....	Standard RaRo typeface 1961-65	RaRo 7E1.....	Standard RaRo typeface 1964-D
RaRo 7D1.....	Standard RaRo typeface 1961-65	S&N 104A.....	Ideal Std 1920-32 Erika Port 1920-32
RaRo 7E.....	Standard RaRo typeface 1964-D	S&N 104B.....	Ideal Std 1931-45 Erika Port 1932-48
RaRo 7E1.....	Standard RaRo typeface 1964-D	S&N 104C.....	Erika Port 1948- Ideal Std 1954-
Ransmayer RA.....	Kappel Std 1920-30 Continental Std 1920-32	Tangens 12B.....	ABC Port 1955-57
Setag 7.....	Halberg-Traveler Port	2.30 mm Pitch	
2.25 mm Pitch		East 3A.....	Mercedes Std and Port 1946-56
CSA 2B.....	Halda-Facit Std and Port 1951-60	East 3B.....	Mercedes Std and Port 1954-
CSA 29.....	Halda Port Facit Std	Iris 3.....	Mercedes Std 1930-34
East 3A.....	Rheinmetall Std 1948-56 Groma-Gromina Port 1951-56	Iris 133.....	Mercedes Std and Port 1930-50 Adler Std and Port 1938-45 Triumph Std and Port 1935-48
East 3B.....	Rheinmetall Std 1954- Groma-Kolibri Port 1955- Erika Port 1955- Groma-Gromina Port 1954- Ideal Std 1955- Brillant Port 1958-	Olympia E8.....	Olympia Std and Port 1930-52 Diplomat Std and Port 1931-45 DM Std and Port 1931-45 Kappel Port 1931-45
East 3BA.....	Rheinmetall	Olympia W8B.....	Orbis Port 1949 Olympia Std and Port 1949-
Everest 7A.....	Everest Std	Olympia W8C.....	Olympia Std and Port 1957-
Olympia E8A.....	Optima Std and Port 1951-56	Olympia W8D.....	Olympia Std and Port 1967-
Olympia E8B.....	Optima Std and Port 1955-	RaRo 7A.....	Triumph Std 1920-31 Merz Port 1926-34
Olympia E8C.....	Optima Std and Port 1957-	RaRo 7B.....	Diana-Royal Administrator Port 1952-58 Triumph Std and Port 1929-58 Adler Std and Port 1931-58 Olympia Std 1953-58 Princess Port 1954-58 Merz Port 1931-39 Alpina Port 1951-58 Voss Port 1948-58 Siemag Std 1958-59
RaRo 7B.....	Halda-Facit Std and Port 1950-58 ABC Port 1956-58	RaRo 7B1.....	Olympia Port 1958-
RaRo 7C.....	Standard RaRo typeface 1958-62 Facit Std 1958-62 ABC Port 1958-62	RaRo 7B2.....	Triumph Electric Std
		RaRo 7C.....	Standard RaRo typeface 1958-62 Torpedo 1960- Royal Century Port (Dutch) Siemag Std 1958-62 Triumph Std and Port 1958-62

TABLE 3A—Continued

Typeface Formation	Typewriters Using It	Typeface Formation	Typewriters Using It
2.30 mm Pitch (cont.)		2.50 mm Pitch (Elite) (cont.)	
RaRo 7C (cont.)	Princess Port 1958-62 Adler Std and Port 1958-62 Alpina Port 1958-62 Royal Diana Port (German) 1958-59 Royaluxe Port 1959-62	Setag 7.....	Hermes Std 1948- Princess Port 1951-52 Calanda Japy
RaRo 7C1.....	Olympia Port 1957-	2.54 mm Pitch (Elite)	
RaRo 7D.....	Standard RaRo typeface 1961-65	CSA 2A.....	Halda Std 1942-51
RaRo 7D1.....	Standard RaRo typeface 1961-65 Triumph Std and Port 1959- Adler Std and Port 1959-	CSA 2B.....	Halda-Facit 1950-60
RaRo 7D2.....	Olympia Std and Port 1958-	RaRo 7B.....	Antares-Jolson Alma Port Halda Norden
RaRo 7E.....	Standard RaRo typeface 1964-D Adler Std and Port Triumph Std and Port Princess Port	RaRo 7C.....	Standard RaRo typeface 1958-62
RaRo 7E1.....	Standard RaRo typeface 1964-D	RaRo 7D.....	Standard RaRo typeface 1961-65
Ransmayer RA.....	Triumph Std 1920-31	RaRo 7D1.....	Standard RaRo typeface 1961-65
S&N 104C.....	Erika-Aztec Port 1954-	RaRo 7E.....	Standard RaRo typeface 1964-D
Setag 4.....	Juwel Port 1955-	RaRo 7E1.....	Standard RaRo typeface 1964-D
Setag 7.....	Princess Port 1952-55	S&N 104B.....	Erika Port
Tangens 12A.....	Voss Port 1951-52	2.60 mm Pitch (Elite)	
Tangens 12B.....	Voss Port 1951- Alpina Port 1951- Juwel Port 1960-	CSA 2A.....	Patria Port 1945-49 Swissa Port 1950-53
Union 8,34.....	Princess Port 1952-	CSA 2B.....	Patria Port 1949 Swissa Port 1950-
2.35 mm Pitch		Olivetti 7A.....	Patria Port 1945-49 Swissa Port 1950-
Brother 1.....	Brother Port 1962-D	RaRo 7B.....	Voss Port 1948-50 Olivetti Std and Port 1931-37
2.50 mm Pitch (Elite)		RaRo 7C.....	Standard RaRo typeface 1958-62
CSA 2A.....	Hermes Std 1942-51	RaRo 7C2.....	Swissa Port
CSA 2B.....	Hermes Std 1949-51	RaRo 7D.....	Standard RaRo typeface 1961-65
RaRo 7B.....	Hermes Std 1931-50 Montana Port 1951-59	RaRo 7D1.....	Standard RaRo typeface 1961-65
RaRo 7C.....	Montana Port 1958-62	RaRo 7E.....	Standard RaRo typeface 1964-D
RaRo 7D.....	Standard RaRo typeface 1961-65	RaRo 7E1.....	Standard RaRo typeface 1964-D
RaRo 7D1.....	Standard RaRo typeface 1961-65	Setag 7.....	Patria Port 1949 Swissa Port 1950- Japy Port
RaRo 7E.....	Standard RaRo typeface 1964-D	Tangens 12A.....	Voss Port 1950-52
RaRo 7E1.....	Standard RaRo typeface 1964-D	Tangens 12B.....	Voss Port 1951-52

TABLE 3B—PICA SIZE TYPEFACES

Typeface Formation	Typewriters Using It	Typeface Formation	Typewriters Using It
	2.50 mm Pitch		2.50 mm Pitch (cont.)
Adler 2.....	Adler Std to 1948	Tangens 19.....	ABC Port 1955-58 Hermes
Adler 3.....	Adler Std and Port to 1948	Union 16.....	Princess Port 1954-59
Brother 3.....	Brother Port 1962-D	Zeta 1.....	Consul Port (Czech) 1946- Forto Port (Dutch)
CSA 4.....	Hermes Port	Zeta 1A.....	Claudia Port (Czech)
CSA 5.....	Hermes Port	Zeta 1B.....	Zeta
CSA 6.....	Hermes Port	Type L.....	Urania Perkeo Port
Everest.....	Montana Port	Type N.....	Juventa Port
Iris 8.....	Everest Port		2.53 mm Pitch
Iris 207.....	Hermes Port 1935-54 Hermes Std 1942-55	Olympia E1.....	SIM Port
Olivetti 1.....	Hermes Std Japy Montana		2.54 mm Pitch
Olympia E1.....	SIM Port AEG Std	Barlock 1.....	Barlock Std
RaRo 1A.....	Montana Port 1950-58 Hermes Port ABC Port 1957- Princess Port to 1954 Japy Rooy	Barlock 2.....	Barlock Std
RaRo 1B.....	Standard RaRo typeface 1958- 62 Rooy Port 1958-62 Montana Port 1958-62	Barlock 3.....	Bar-let Port
RaRo 1C.....	Standard RaRo typeface 1961- 64	CSA 4.....	Halda Norden Facit Std
RaRo 1C1.....	Standard RaRo typeface 1961- 64	CSA 5.....	Halda Std and Port Facit Std and Port
RaRo 1D.....	Standard RaRo typeface 1964- D	CSA 6.....	Halda Std and Port Facit Std and Port
RaRo 1D1.....	Standard RaRo typeface 1964- D	Empire 1.....	Empire
Setag 6B.....	Hermes Port-D Possibly: Royal Calanda Japy Princess	Empire 2.....	Empire
Setag 6C.....	Hermes Std and Port 1947-D Japy Std Princess Port to 1954 Halberg Port Underwood 18 (Antares) Port Possibly: Royal Calanda	Empire 3.....	Empire
Setag 6D.....	Royal Port (Dutch) 1962-D Singer Scholastic Port	Everest.....	Everest Std 1948-
Setag 6E.....	Princess Port	Oliver 1.....	Oliver Std (English)
Shand 1P.....	Royal Port (Dutch) 1959-	Oliver 2.....	Oliver Std and Port (English)
		Oliver 3.....	Oliver Std (English)
		Olivetti 1.....	Olivetti Std 1959- Antares Port SIM-Montana Port Capri Port (Italian)
		RaRo 1A.....	R. C. Allen 1955 only Hermes Port Halda Std and Port 1930-40; 1950-58
		RaRo 1B.....	Standard RaRo typeface 1958- 62 Antares Port 1958-62 Royal Std (Dutch) 1958-62 Facit Std and Port 1958-62 Possibly: Olivetti Remington Smith-Corona
		RaRo 1B1.....	Smith-Corona Galaxie Port (Canadian)

TABLE 3B—Continued

Typeface Formation	Typewriters Using It	Typeface Formation	Typewriters Using It
2.54 mm Pitch (cont.)		2.60 mm Pitch (cont.)	
RaRo 1B1 (cont.)	Jaguar Port (Japanese) Singer Graduate Port (French)	Everest 1.....	Everest Std and Port 1948— Wanderer Port
RaRo 1A1.....	R. C. Allen 1955—	Iris 8.....	Rheinmetall Std 1930—34 Kappel Invicta
RaRo 1C.....	Standard RaRo typeface 1961— 64 Nippo P-100 Port 1965—D Royalite		Urania Std and Port 1928—34 Mercedes Std 1930—34 Torpedo Std 1927—30 Torpedo Port 1927—47
RaRo 1C1.....	Standard RaRo typeface 1961— 64	Iris 117.....	Adler Port Mercedes Std and Port 1931—50 Rheinmetall Std and Port 1932— 37
RaRo 1D.....	Standard RaRo typeface 1964— D	Iris 201.....	Swissa Port 1944—
RaRo 1D1.....	Standard RaRo typeface 1964— D	Oliver 2.....	Oliver Port (English)
Setag 6D.....	Antares-Underwood Port 1961— D	Olivetti 1.....	Olivetti Std and Port 1932—D Everest Jolson Port 1948—56 Japy Patria Port Underwood-Olivetti Port
Shand 1P.....	Empire-Corona Port 1958— Sears-Tower Port	Olympia E1.....	Olympia Std and Port 1928—49 Rheinmetall 1945—48
Shand 2P.....	Smith-Corona Port Sears Tutor Port	Olympia E2.....	Optima Port 1949— Optima Std 1947—
Tangens 11.....	Remington Port Remington Std (U. S. and Italian) Singer Graduate Port (Dutch) 1963—D	Olympia E2A.....	Optima Std
Tangens 19.....	Remington Port 1961—D Torpedo Port	Olympia W1.....	Olympia Port 1949—52
Webb 1.....	Imperial Std and Port	Olympia W2.....	Olympia Std and Port 1952—
Webb 2.....	Imperial	Olympia W3.....	Olympia Port 1959—62
Type K.....	Orga	Olympia W3A.....	Olympia Port ca. 1962—
		Olympia W4A.....	Olympia Std to 1960
		Olympia W4B.....	Olympia Std 1960—
		Olympia W4C.....	Olympia Std and Port 1967—
		RaRo 1A.....	Torpedo Std and Port 1930—58 Gossen Tippa Port 1948—58 Princess Port 1954—58 Voss Port 1947—58 Brosette Port Siemag Alpina 1951—58 Adler 1931—58 Olympia Std Diana-Royal Administrator Port European Remington Port 1964—53 Groma 1924—45 Triumph Std and Port Continental Std Royal Port (Dutch) Possibly: Urania, Mercedes, Everest, Superia,
	2.55 mm Pitch		
Olivetti 2.....	SIM Port		
Olympia E1.....	SIM Port Olympia Std 1928—40 AEG Std		
	2.60 mm Pitch		
Adler 1.....	Adler Noiseless to 1948		
Adler 2.....	Adler Std and Port to 1948		
East 1.....	Kolibri Port 1955— Groma Port 1950— Rheinmetall Port 1950— Combina Port 1957 Erika Port 1953— Mercedes Port 1950— Ideal Std 1955— Possibly: Fortuna Urania		
East 2.....	Rheinmetall Std and Port Combina Port		

TABLE 3B—Continued

Typeface Formation	Typewriters Using It	Typeface Formation	Typewriters Using It
2.60 mm Pitch (cont.)		2.60 mm Pitch (cont.)	
RaRo 1A (cont.)	Halberg, Orga, Patria, Regina, SIM, Swissa, Kappel, MAP, Norden, Oliver, Consul, Halda, Olivetti, Ideal, Japy, Imperial, Invicta, Juwel	Setag 6C.....	AMC Port 1956-58 Japy Port Patria Port (Spanish) 1948-56 Swissa Port 1950- Siemag Halberg Port Juwel Remington Travelriter Port Royal Meteor (Spanish)
RaRo 1B.....	Standard RaRo typeface 1958-62 Diana-Royal Administrator Port 1958-62 Rooy Port 1958-62 Triumph Std and Port 1958-62 Torpedo Std and Port 1958-62 Siemag Std 1958-62 Voss Port 1958-62 Princess Port 1958-62 ABC Port 1957- Alpina 1958- Adler Std and Port 1958-62 European Royal Std Royal Port (Dutch)	RaRo 1D1.....	Standard RaRo typeface 1964-D Adler Port Triumph Port
RaRo 1B1.....	Triumph Std	Tangens 11.....	Remington Travelriter Port 1953- Voss Port Alpina Port 1951-D Adler 1949 Rooy Possibly: Torpedo
RaRo 1B2.....	Olympia Std 1957-	Tangens 19.....	Juwel Starlet Port 1960-
RaRo 1C.....	Standard RaRo typeface 1961-64 Torpedo Std and Port Triumph Std and Port	Union 16.....	Alpina Princess Halberg Port Possibly: Voss
RaRo 1C1.....	Standard RaRo typeface 1961-64	Zeta 1.....	Consul Port 1949-D
RaRo 1D.....	Standard RaRo typeface 1964-D Silver Reed Port (Japanese) 1966-D Adler Std and Port Princess Port Triumph Std and Port ABC Std and Port	Type B.....	Erika Port Wanderer Port Mercedes
RaRo 12.....	Olympia Std	Type C.....	Mercedes Std
Rooy.....	Rooy Port 1940-60	Type D.....	Rheinmetall
S&N 120A.....	Erika Port 1931-56 Ideal Std 1932-45 Groma and Gromina 1951-54	Type F.....	Wanderer Port
S&N 120B.....	Erika Port 1955-	Type G.....	Wanderer Port
Setag 6A.....	Diana-Royal Port	Type A.....	Ideal Std
		Type J.....	Continental Std
		Type M.....	Urania Port
		Type P.....	Kappel
		2.60 mm plus Pitch	
		Adler 2.....	Adler Std
		CSA 5.....	Halda Port
		Iris 8.....	Merz
		Type B.....	Orga Privat Port

purposes. From the tables it can be noted, for example, that 2.17 mm pitch and 2.35 mm pitch are used only by two typewriter manufacturers, Torpedo and Brother, respectively, regardless of

typeface design. On the other hand, RaRo typefaces can be found on a broad selection of typewriters, regardless of pitch, while Caracteres S. A. (CSA) typefaces are used by only a few typewriter

manufacturers, i. e., Hermes, Patria-Swiss, and Halda-Facit, each with a different pitch.

Tables 3A and 3B lists by pitch the known usage of the various typeface designs by the indicated typewriter manufacturers. The type of machine, i. e., standard (office) or portable, as well as the dates of usage are given when known. The usage data have been derived from comparison of specimens, inspection of machines, and from available data. Credit for much of the outstanding work in this field must be given to two diligent document examiners—Kriminalhauptkommissar Josef Haas, of Stuttgart, Germany, and Mr. Jan Beck of Seattle, Washington. (1, 2, 6, 7, 8, 9)

The designations of the various typeface formations are somewhat arbitrary. In some cases, the designation conforms with the typeface manufacturer's symbol on the typeblock, i. e., "CSA 29", in other cases, the designation is an arbitrary designation by the author, i. e., "RaRo 7E1". Some attempt has been made to follow the designations used by Haas; however, complete comparability has not been possible. Wherever possible, the name of the typeface manufacturer has been used in designating the same of a typeface formation. The name of the typewriter manufacturer is used where it is known that the typewriter manufacturer produces or has produced his own typefaces. In some instances, typeface designs which can be differentiated from all other known typeface formations have become available only as specimen strike-ups. In the absence of information on typeblock symbols, these typeface formations have been designated "Type A", etc. Should information become available as to the source of the typefaces, then the designation can be changed to indicate the manufacturer.

Because of the ubiquitous usage of RaRo type and the need for extrapolation, recent RaRo typefaces are listed in each pitch category even though no data are available to indicate that any typewriter manufacturer has used these RaRo typefaces in that unit spacing. It should be stressed again that these tables are not absolutely complete or all-encompassing in the sense that they can be used for purposes of exclusion. These tables reflect all the data currently available from public and private sources. No coverage is provided for minor typeface manufacturers such as Feiler.

Table 4 presents a dichotomous-type scheme for differentiating all the typeface designs referred to in Table 3. These schemes were predicated upon the basis of full strike-ups being available for pur-

poses of differentiation. The following characters are used for this purpose:

Upper Case: M, E, T, N, S, D, R

Lower Case: a, w, m, f, i, g, p, z, d, j, t, r, n

Numerals: 3, 4, 7, $\frac{1}{2}$

It is recognized that the letter "z" and the symbol " $\frac{1}{2}$ " have a very low frequency in the average questioned document. However, because of the complexities of differentiating foreign typefaces, the author has found specific need of these characters to differentiate similar appearing type fonts. It is a fact that the foreign typeface manufacturers have striven to make their designs similar rather than distinctive. The only broad exceptions to this practice have been the Olympia typefaces, both East (E) and West (W). The format used is not the only way of presenting data, but it is the clearest, considering the problems involved.

The following list illustrates and summarizes the differences between the various designs of characters used for differentiation.

Upper Case

M 1a M 1b M

2a M 2b M 2c M 2d M

3 M

- M—1a Low center, unbalanced feet
 1b Low center, balanced feet
 2a High center with short connections from staff to diagonals
 2b High center without connections
 2c Very shallow center portion
 2d Normal depth of center portion
 3 Middle section staff

E 1 E 2 E

- E—1 Normal serif on center bar
 2 Shortened serif on center bar

T 1 T 2 T

- T—1 Vertical serifs on top cross bar
 2 Canted serifs on top cross bar

N 1 N 2 N

- N—1 Wide form
 2 Narrow form

S 1 **S** 2 **S**

- S—1 Terminus and serif project to left of upper curve
2 Terminus and serif flush with upper curve

D 1 **D** 2 **D**

- D—1 Long serifs
2 Short serifs

R 1 **R** 2 **R**

- R—1 Right leg inset with rounded connection to foot
2 Right leg only slightly inset with angular connection to foot

Lower Case

a 1 **a** 2 **a**

- a—1 Terminus does not curve upward
2 Terminus curves upward

w 1a **W** 1b **W**

2 **W**

3a **W** 3b **W**

- w—1a Low center, median height
1b Low center, very low
2 High center without center serif
3a High center with middle serif, normal width
3b High center with middle serif, narrow form

m 1 **m**

2a **m** 2b **m**

- m—1 No serif on center leg
2a Serif on center leg, balanced feet
2b Serif on center leg, unbalanced feet

f 1a **f** 1b **f** 1c **f**

2 **f**

- f—1a Center bar as wide as foot
1b Center bar as wide as foot, narrow form

- 1c Center bar as wide as foot on left side, shorter on right side
2 Center bar shorter on left side

i 1a **i** 1b **i** 1c **i** 1d **i**

2 **i**

- i—1a Upper serif flush with foot
1b Upper serif flush with foot, narrow form
1c Upper serif flush with foot, dot placed high
1d Upper serif flush with foot, dot centered to left
2 Upper serif shorter than foot

g 1 **g**

2a **g** 2b **g** 2c **g**

- g—1 Gooseneck form
2a Slanted left back
2b Straight left back
2c Inset connector

p 1 **p** 2 **p**

- p—1 Balanced foot
2 Unbalanced foot

z 1 **Z** 2 **Z**

- z—1 Normal width
2 Narrow form

d 1 **d** 2 **d**

- d—1 Normal upper serif
2 Short upper serif

j 1 **j** 2 **j**

- j—1 Dot centered over staff
2 Dot to left of staff

t 1a **t** 1b **t**

2a **t** 2b **t**

- t—1a Short balanced cross bar
1b Wide balanced crossbar
2a Broad unbalanced crossbar
2b Moderate sized unbalanced crossbar

TABLE 4A—ELITE DIFFERENTIATION SCHEME

a ₁ . w ₁ . 3 ₃	Olympia E8B
3 ₄ . t ₁	Olympia E8C
t ₂ . i _{1a}	Olympia W8C
i _{1c}	Olympia W8D
w ₃ . M ₃	Olympia 8
M ₂ . g ₁	East 3A
g _{2a} . 4 ₅	Brother 2
4 ₁ . f _{1c}	Brother 1
f _{1a} . S ₁	Olympia W8B
S ₂	Olympia E8A
M ₁ . 4 ₃ . t ₁	Oliver 5
t ₂	S&N 104A
4 ₁	Webb 3
4 ₂	Iris 133
a ₂ . w ₂ . g _{2a} . f _{1b}	Adler 4
f _{1c}	Empire 5
g ₁ . r ₁	RaRo 7C2
r ₂	Setag 4
w ₁ . m ₁	Everest 7C
m ₂ . t ₁ . 4 ₄	Shand 1E
4 ₂	Olivetti 7B
t ₂ . 3 ₃	S&N 104C
3 ₄ . 4 ₁ . f ₁	RaRo 7B1
f ₂ . r _{1a}	RaRo 7C3
r ₁	RaRo 7D2
4 ₂ . f ₁ . m _{2b}	Tangens 12A
m _{2a} . r _{1a}	RaRo 7B2
r _{1b} . 3 _{4b}	Setag 7
3 _{4a} . M _{2a}	Setag 7A
M _{2b}	CSA 2B
f ₂ . i ₁ . p ₂	Nippo
p ₁	RaRo 7D1
i ₂	RaRo 7E1
w ₃ * . 3 _{2a} . w _{2a}	Barlock 5
w _{3b} . 7 ₁	East 3B
7 ₂	East 3BA
3 ₁	Zeta 3
3 ₂ . f ₂	RaRo 7A
f ₁ . g ₁	Iris 3
g _{2a} . t ₁	Barlock 4
t ₂	S&N 104B
3 _{2b} . T ₁	RaRo 7B3
T ₂ . t _{2a}	Everest 7B
t _{2b} . N ₁	Everest 7A
N ₂	Olivetti 7A
3 _{4b} . 2 ₂	Zeta 2
z ₁ . j ₁	CSA 2A
j ₂	CSA 29
3 _{4a} . 4 ₁ . f ₂	RaRo 7C1
f ₁ . g ₁	Webb 5
g _{2c}	Webb 4
4 ₂ . f ₂ . r _{1b} . j ₁	RaRo 7D
i ₂	RaRo 7E
r _{1a} . n ₁	Shand 2E
n ₂	RaRo 7C
f ₁ . r _{1a} . r ₁	RaRo 7B
r ₂	Union 8,34
r _{1b} . j _{1b} . d ₂	Empire 4
d ₁	Ransmayer RA
i _{1a} . 1/2 ₁	Tangens 12B
1/2 ₂	Tangens 12C

* w₃ includes both subgroups w_{3a} and w_{3b}, high center with middle serif.

TABLE 4B—PICA DIFFERENTIATION SCHEME

$a_1..w_2..3_1$	Zeta 1
3_3	Zeta 1B
3_4	Zeta 1A
$w_1..M_{2d}..E_1$	Olympia W3
E_2	Olympia W3A
$M_{2c}..E_1$	Olympia W4A
$E_2..i_{1a}$	Olympia W4B
i_{1o}	Olympia W4C
$w_3..g_{2b}..f_1..i_1$	Olympia E1
i_2	Olympia W1
$f_2..E_1$	Olympia W2
E_2	RaRo 12
$g_{2a}..f_2..i_{1b}..4_1$	Iris 117A
4_2	Type D
i_{1a}	Brother 3
$f_1..t_{1a}$	Webb 1
$t_2..3_4$	Olympia E2
3_3	Olympia E2A
3_2	Type C
$a_2..w_2..r_3$	Empire 1
$r_1..t_2$	Adler 2
t_1	Adler 3
$w_1..m_1$	Everest 1
$m_2..r_3$	S&N 120B
$r_1..f_{1a}..i_{1b}$	CSA 6
$i_{1a}..r_{1o}$	Setag 6D
$r_{1a}..j_2$	RaRo 1A1
j_1	Setag 6C
$f_{1b}..t_1$	Setag 6E
$t_2..w_{1a}$	Setag 6B
w_{1b}	CSA 5
$f_2..4_2..r_{1a}$	RaRo 1B1
$r_{1b}..i_1$	RaRo 1C1
i_2	RaRo 1D1
4_1	RaRo 1B2
$w_3..M_2$	Shand 1P
$M_1..g_2..t_{1a}..i_{1b}$	Oliver 1
$i_{1a}..3_2$	Type N
3_3	Barlock 1
3_4	Type R
$t_{1b}..r_1$	Webb 2
$r_3..T_1$	S&N 120A
T_2	Union 16
$t_2..3_3..4_2$	East 1
4_1	East 2
$3_4..i_2$	Type B
$i_1..f_2$	Type G
$f_1..t_{2b}$	Type A
$t_{2a}..r_3$	Iris 8
r_1	Type K
$3_2..j_1$	Oliver 3
$j_2..r_3$	Empire 2
$r_1..i_{1d}$	Type J
i_{1a}	Type P

TABLE 4B—Continued

a ₂ . w ₃ . M ₁ . g ₁ . t ₁ . p ₁ . f ₂	Shand 2P
f ₁	Oliver 2
p ₂ . 7 _{1b}	Rooy 1
7 _{1a}	CSA 4
t ₂ . 3 ₃ . r ₁	Olivetti 1
r ₂	Olivetti 2
3 ₂ . p ₂ . i _{1a}	Type F
i _{1b}	Type L
p ₁ . n ₁	Barlock 2
n ₂	Barlock 3
3 ₄ . f ₁ . r _{1a} . p ₁ . i _{1b}	Empire 3
i _{1a} . M _{1b} . ½ ₂₁	Tangens 11
½ ₂₂	Setag 6A
M _{1a}	Iris 201
p ₂ . t _{2a} . i ₂	Type M
i ₁	RaRo 1A
t _{2b}	Iris 207
r _{1b}	Adler 1
f ₂ . r _{1a} . D ₂	Tangens 19
D ₁	RaRo 1B
r _{2b} . i ₁	RaRo 1C
i ₂	RaRo 1D

n 1 **n** 2 **n**

- n—1 Balanced right foot
- 2 Unbalanced right foot

r 1a **r** 1b **r** 1c **r**

2 **r**

3 **r**

- r—1a Balanced foot, upper serif flush with left side of foot
- 1b Flush left side, unbalanced foot
- 1c Flush left side, narrow foot
- 2 Short upper serif
- 3 pump handle projection

Numerals

3 1 **3** 2 **3**

3a **3** 3b **3**

4a **3** 4b **3**

- 3—1 Round top with terminal dot
- 2 Flat top with terminal dot

- 3a Round top with downward openings
- 3b Round top with horizontal openings
- 4a Flat top without projection
- 4b Flat top with downward projection

4 1 **4** 2 **4** 3 **4**

4 **4** 5 **4**

- 4—1 Open top, straight cross bar
- 2 Closed top, without foot
- 3 Closed top, with foot
- 4 Cross bar with reverse curve
- 5 Small gap between staff and diagonal

7 1a **7** 1b **7**

2 **7**

- 7—1a Simple diagonal staff with slight projection
- 1b Simple diagonal staff with long projection
- 2 Compound diagonal staff

½ 1 **½** 2 **½**

- ½—1 Diagonal bar
- 2 Horizontal bar

It should be noted that the pertinent characters in all the type fonts covered fit into only one of the categories for each character. While the "4" in a specimen might not look precisely like the illustrations of the various types of "4"s, it can be placed in only one of the categories by virtue of the listed differentiating criteria. If just a "2" is used in the scheme to denote a style of letter, rather than subdivisions "2a", "2b", or "2c", etc., for example, it covers all the described subdivisions.

The practicalities of coping with the differentiation of foreign typewriters involves two determinations—that of pitch and of typeface design. Each of these will serve to limit the possibilities as outlined in Tables 1 and 2. Pitch determination is ordinarily accomplished using specially ruled glass plates. Accurate plates are a necessity since the difference between 2.10 mm and 2.12 mm, for example, is very slight. One should be very cautious in making any pitch determinations with photocopies, unless they are exactly one to one in size. In some of the reproductive processes there is a slight but significant change in the relative size of the copy.

In the absence of all the significant characters necessary for complete typeface differentiation, much can be done otherwise. Classification first by pitch will delimit the possibilities so that the entire scheme in Tables 4A and 4B need not be necessary. The list of possible typeface designs for each specific pitch can be determined from Table 3. Using this restricted list of typeface possibilities, the scheme in Tables 4A and 4B may become more workable in the light of the characters available for use in differentiation. In any event, reasoned extrapolations can be made with the data available in this paper.

Accurate determination of typeface designs should involve comparison of all characters with a complete strike-up of the typeface design. Specimens on hand should be categorized by pitch and typeface design so that they can be used for this purpose. Defects in the examiner's reference file should be made up as is possible. In collecting specimens, care should be taken to include a sketch of the typeblock symbol for use in determining typeface manufacturer. A study of full strike-ups of the various designs will reveal other characters

which can be used for differentiation, if less than the total number of known typeface designs is under consideration.

In communicating the results of examinations, it is best to report that the document was prepared on a typewriter equipped with RaRo style typefaces, for example, and that with a specific unit spacing, certain typewriters have been equipped with this typeface design. Reporting that a document was typed on a certain brand typewriter could lead to problems if "copied" type is involved or alternate brand names. Because of the lack of complete data it is always well to include a clause such as "and possibly other foreign made typewriters", after the listing of typewriter manufacturers known to have used a certain typeface design.

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APPENDIX 1

FOREIGN TYPEWRITER PRODUCTION AND BRAND NAME CROSS-INDEX

Name	Produced	Dates
ABC	West Germany	1955-1966
ABC Standard	Portugal	1967-
Adler	West Germany	1900-D ("date")
Admiral (see Montana)		
Alba (see Antares)		
Amima (see Torpedo)		
Administrator (see European Royal)		
ADS (see ABC)		
AEG	Germany	1914-1930
Agar (see Juventa)		
Aigle (see Adler)		
Ajax (see Imperial)		
Ala (see Hermes)		
Al Ahram (see Rheinmetall)		
Alfa (see Minerva)		
Amata	Austria	1923-1925
Ambassador (see Hermes)		
AMC (see Alpina, Japy, or Orga)		
Annabelle (see Antares)		
Antares	Italy	1954-D
Archo	Germany	1920-1941
Aristocrat (see Empire or Urania)		
Astoria (see SIM-Montana)		
Athena (see European Remington (Holland))		
Atlantida (see Japy)		
Atlas	Japan	1935-?
Augusta (see SIM-Montana)		
Avona (see ABC, Alpina, or Juwel)		
Aztec (see Erika)		
Azzurra (see Hermes)		
Baby (see Hermes or Torpedo)		
Baka V (see Stoewer)		
Balilla (see Montana)		
Baltica (see Norden)		
Bambino (see Olympia (East))		
Bar-let (see Barlock)		
Barlock	England	1887-1953
Bart Stevens Deluxe (see Consul)		
Beaucourt (see Japy)		
Bel Air (see European Remington)		
Beta (see Consul)		
Bijou (see Erika or Rooy)		
Blitz (see Juwel)		
Blue Bird (see Torpedo)		
Bradford (see Brother)		
Brillant (see ABC, Everest, or Groma)		
Briton (see Imperial)		
Brosette	West Germany	1953-1959
Brother	Japan	1961-D
Byron	England	1952-1954?
Byron (see also Japy or Swissa)		

APPENDIX 1—*Continued*

Name	Produced	Dates
Calanda	Switzerland	1942-1956
Campus	Japan	post-war
Capri (see Antares)		
Century (see Consul or European Royal)		
Champion (see Consul)		
Cicero (see European Remington (Holland) or Halda-Facit)		
Cito (see Stoewer)		
Classic (see Torpedo)		
Claudia (see Consul)		
Cole Steel (see ABC)		
Collegiate (see ABC)		
Combina (see Groma)		
Comet (see Consul, European Remington, or Halberg)		
Commodore (see Consul)		
Concentia (see Orga)		
Concord (see Merz)		
Concordia (see Urania)		
Condor	Japan	unknown
Consul	Czechoslovakia	1949-D
Contin	France	1922-1933
Continental	East Germany	1904-1956
Cosmopolitan (see Mercedes)		
Courier	Austria	1903-1927
Courier (see also Japy)		
Crisler (see Rooy)		
CZ (see Consul)		
Dankers	Germany	1935-1939
Dansk (see Norden)		
Dart (see European Royal (Holland))		
Davis (see Empire)		
Definitiv (see Alpina)		
DeJur (see Triumph)		
De-Lux (see Olympia (West))		
De Luxe (see Siemag)		
Deutschland	Germany	1909-1926
Diana (see European Royal)		
Diaspron (see Olivetti)		
Diplomat (see Olympia (East))		
DM (see Olympia (East))		
Domus (see Antares)		
Drake-London (see Mercedes)		
Durabel (see Triumph)		
Dynacord (see Torpedo)		
Edida (see Triumph)		
El Dorado (see European Royal)		
Electa (see Invicta)		
Elektra (see Mercedes)		
Elematic (see Everest)		
E.M.A. (see European Remington)		
Emona	Yugoslavia	1952-
Empire	England	1897-1958
Empire-Canadian (see Empire)		
Empire-Corona	England	1958-D

APPENDIX 1—Continued

Name	Produced	Dates
Engadine	Italy	Current production
Erika	East Germany	1910-D
European Remington	England, Holland, France, Italy	1946-D
European Royal	West Germany	1933-1961
European Royal	Holland	1955-D
Everest	Italy, Argentina	1937-D
Everlux (see Antares)		
Express (see Mercedes)		
Facit (Ex-Halda)	Sweden	1957-D
Fairbanks-Ward (see Consul)		
Favorit (see Adler or Mercedes)		
Filius (see Juwel)		
Fix (see Juwel)		
F.K.	Poland	1932-1939
F.K. Mala	Poland	1938-1939
F.K. Mala (see also Hermes)		
Flott (see Juwel)		
F.N. (see MAP)		
Forto	Holland	Dutch assembly of Consul
Fortuna	Germany	1922-1950 ?
Fortuna (see also SIM-Montana)		
Forward (see European Royal)		
Futura (see Princess)		
Gabrielle (see Adler or Triumph)		
Gallia (see Urania)		
Gazelle (see Japy)		
Good Companion (see Imperial)		
Gossen	West Germany	1948-1958
Grand Chariot (see Rooy)		
Graphika (see Olivetti)		
Groma	East Germany	1924-D
Gromina (see Groma)		
Haddad (see Urania)		
Halda	Sweden	1902-1958
Halberg	Holland	1952-1954
Harrods (see Olivetti)		
Hermes	Switzerland	1921-D
Hispano (see Olivetti)		
Holiday (see European Remington or Torpedo)		
Hosraito	Japan	unknown
Ideal	East Germany	1900-D
Imperator (see Urania)		
Imperia (see SIM)		
Imperial	England	1908-D
Invicta	Italy	1921-1950
Iris (see Montana)		
Ivriah (see Olivetti)		
Jaguar	Japan	Current production
Japy	France	1910-D
Jolson Alma (see Antares)		
Jolson Everest (see Everest)		
Junior (see ABC, Adler, or Swissa)		
Juventa	Germany	1923-1928
Juwel	West Germany	1936-D

APPENDIX 1—Continued

Name	Produced	Dates
Kappel	Germany	1914-1945
Kappel-Fips (see Olympia (East))		
Kappel-Knirps (see Olympia (East))		
Karin (see Voss)		
Kenbar (see Rheinmetall)		
Koh-i-nor (see Triumph)		
Kolibri (see Groma)		
Kolumbus (see Mercedes)		
Lafayette (see Torpedo)		
Leoma (see Alpina)		
Lettera (see Olivetti)		
Lexicon (see Olivetti)		
Libelle (see Consul)		
Liberte (see Japy)		
Littoria (see Invicta or SIM-Montana)		
Lloyd (see Imerpial or Stoewer)		
Majestic (see Alpina or Brother)		
MAP	France	1922-1954
Marion (see Consul)		
MAS (see SIM-Montana)		
Master (see Rooy)		
Masteriter (see European Remington (Holland))		
Matura (see Triumph)		
MBM Mercury (see Consul)		
Mead (see Torpedo)		
Media (see Hermes or Montana)		
Meister (see Erika)		
Meisterin (see Siemag)		
Melitta (see Mercedes)		
Mercedes	East Germany	1907-D
Merz	Germany	1926-1939
Messa (Ex-ABC)	Portugal	1967-
Messa (see also Siemag)		
Meteor	Spain	Current production
Micro (see Antares)		
Mignon	France	1904-1932
Mirian (see Montana)		
Mitex (see Barlock)		
Mobdiale (see Triumph)		
Monarch (see European Remington)		
Monica (see Olympia (West))		
Montana (Ex-SIM)	Italy	1950-1966
Montana (see also SIM)		
Nagri (see Orga)		
Nippo	Japan	1961-D
Norden	Denmark	1928-?
Norma (see Princess)		
Nuova-Levi (see SIM)		
Odoma	Germany	1921-1937
Ofrex (see Everest)		
Oliver	England	1928-1959 ?
Oliver (see also Fortuna, Halda, Japy, or SIM)		
Olivetti	Italy, Argentina	1911-D
Olympia (East (Ex-AEG))	East Germany	1930-1950
Olympia-Erfurt (see Olympia (East) and Optima)		

APPENDIX 1—Continued

Name	Produced	Dates
Olympia (West)	West Germany	1949-D
Optima (Ex-Olympia-E)	East Germany	1950-D
Orbis (see Olympia (West))		
Orga	West Germany	1923-1950
Orga (see also European Royal (German))		
Orga Privat (see European Royal (German))		
Oriette (see Olympia (West))		
Orven (see Atlas)		
P-100 (see Nippo)		
Paretto	Japan	unknown
Parva (see Antares)		
Passat	France	1948-1950
Patria	Switzerland	1937-1950
Patria (Spanish)	Spain	1948-D
Patria (see also Japy, SIM, or Swissa)		
Patricia (see Japy)		
Perfect (see Empire)		
Perfekt (see Triumph)		
Perkeo	Germany	1912-1933
Perkeo (see also Urania)		
Piccola (see Adler, Erika, Swissa, or Urania)		
Pilot (see Gossen)		
Plana (see Olympia (East))		
Pluma (see Olivetti)		
Pontiac Minor (see Montana)		
Porto-rite (see Torpedo)		
Prestige (see Brother)		
Prima (see Mercedes)		
Primus (see Adler or Triumph)		
Princess	West Germany	1948-D
Privat (see Adler, Orga, Triumph, or Voss)		
Professional (see Consul)		
Progress (see Olympia (East))		
Protos (see Mercedes)		
Queen (see Rooy)		
Racer (see Rooy)		
Rapid (see Juwel)		
Rapide (see Empire)		
Rapid-riter (see European Remington)		
Record (see Adler)		
Referent (see Olympia (East))		
Regent (see Hermes)		
Regina	Germany	1902-1934
Rekord (see Stoewer)		
Rembrandt (see European Remington)		
Remington Junioriter	Holland	1933-?
Remington Masteriter	Holland	1950-D
Remington Quietriter	England, Norway	1951-?
Remington Senioriter (see Torpedo)		
Remington Superiter	England, France, Norway, Japan, Holland, Italy	1950-D
Remington Travelriter (Ex-Halberg)	Holland	1933-?
Rem-riter (see European Remington (Holland))		
Remtor (see Torpedo)		

APPENDIX 1—Continued

Name	Produced	Dates
Rheinmetall	East Germany	1920-D
Rheinmetall (see also Stoewer)		
Rocket (see Hermes)		
Rooy	France	1937-D
Rosanta (see Triumph)		
Roxy (see Rooy)		
Royal Express (see Empire)		
Royalite (see European Royal (Holland))		
Royaluxe (see European Royal (Holland))		
RUF (see Alpina)		
Sabaudia (see Invicta)		
Saleem (see Urania)		
Salter (see Empire)		
Sava (see Alpina)		
Sava (Ex-Alpina)	Yugoslavia	1967-
Scholastic (see European Remington)		
Scribe (see Olivetti)		
Scriva (see Triumph)		
Select (see Japy)		
Selecta (see Mercedes)		
Serio (see Everest)		
Siemag	West Germany	1948-1966
Signature (see Brother)		
Signet (see European Royal)		
Silenta (see Continental or Olympia (East))		
Silver Reed	Japan	Current production
SIM	Italy	1931-1951
SIM (see also Montana)		
Simplex (see Adler, Erika, Groma, Merz, or Torpedo)		
Simtype (see SIM-Montana)		
Singer Graduate (see European Remington (Holland))		
Singer Scholastic (see European Royal (Holland))		
Skylark (see European Remington)		
Skyriter (see Empire-Corona)		
Splendid (see Olympia (West))		
Solid (see Siemag)		
Solitaire (see Torpedo)		
Star (see Halda-Facit)		
Star-tab (see European Remington)		
Starfire (see European Remington)		
Starlet	Germany	1958-
Starlet (see also Juwel)		
Sterling (see Siemag)		
Stoewer	Germany	1903-1930
Studio (see Olivetti)		
Style (see Japy)		
Superba (see Mercedes)		
Superia	West Germany	1950-1953
Superia (see also European Royal (German))		
Supermetall (see Rheinmetall)		
Supra (see Montana)		
Swift (see Stoewer)		
Swissa (Ex-Swiss Patria)	Switzerland	1950-D
Tell (see Barlock)		
Tippa (see Adler, Gossen, or Triumph)		

APPENDIX 1—Continued

Name	Produced	Dates
Torpedo Toshiba Tower Attache (see Empire-Corona) Tower Capri (see European Remington) Tower Centurion (see European Remington) Tower Script (see Japy) Traveler (see Halberg) Travelriter (see European Remington (Holland))	West Germany Japan	1907-1966 post-war
Triumph TVB (see Brother) Typo (see Japy) UHU (see Alpina) Ujlaki (see Urania)	West Germany	1909-D
Urania Urania (see also Erika) Underwood (see Olivetti) Underwood 18 (see Antares) Unitype (see Torpedo) Universal (see Adler or Merz) Urdu (see Urania) US Mirsa (see Ideal) Valiant (see Brother) Viking (see Montana)	East Germany	1909-1954
Voss Wanamaker (see Empire) Wanderer (see Continental) Wards Signature (see Brother) Webster (see Brother) Wizard Tru-Type (see Brother) Z-2 (see Consul) Zbojovka-2 (see Consul) Zeta (see Consul)	West Germany	1947-D