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Departure from Handwriting System

Document examiners are often heard to make the statement that a certain letter is significant because it *varies from system in design*. This statement immediately brings to mind two obvious questions:

1. From what system does it vary?
2. How would the examiner answer during cross-examination if asked, "Mr. Witness, you have made the statement that this letter varies from system—would you please tell the court from what system it varies and what system did this person use when learning to write?"

Probably the witness had meant to say that the letter varied from the commonly found forms or from the several styles normally taught in the various commercial systems. The difference between what he meant to say and what he actually said might seem slight to us, but an unfortunate, poorly worded phrase can often be used to weaken or discredit otherwise effective testimony.

Consideration of this line of thought led to the central theme of this inquiry. From an examination of a handwriting specimen, is it possible to determine what system of handwriting was used for the instruction of the writer? A natural outgrowth of this first question was a second question: What effect does the age, sex, education, profession, or job type have on a person's writing? A number of other questions seemed to be relevant: How often do writers have breaks in their cursive writings? How rare are short or long upper extensions and lower extensions? How often are certain unusual lower case letters found? What writing instruments are used or preferred? How much writing does each person do? What percentage of people use a garland, arcade, or sawtooth style? What percentage of the writers slant their writing left, vertical, or right? What effect does occupation, age, or sex have on the skill of the writer? On the speed of the writer? The list of possible questions seemed endless but it was decided to limit this survey to the ones stated above.

In the past, a number of document examiners have made statements on these problems in their writings. Most of their observations have been speculative or general in nature; none gave any statistical basis for their statements. While it is recognized that the number of handwriting samples used in this survey is limited, it is felt that the statistical evidence developed does form a basis for some conclusions that have not been documented before. Hopefully it will also set forth several findings that might not have been observed or were misunderstood by many examiners.

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The Occurrence of Handwriting Change

Harrison recognizes that a great deal of change from the system a person has been taught is to be expected. He states,² "By the time adolescence is past and the handwriting has assumed the character it will certainly retain until senility or ill-health take their toll, it may well be that comparatively few letters will conform at all closely to the original copybook designs." In commenting on the reasons for changes he further says, "Handwriting bristles with formations which not only halt the forward motion of the pen, but actually demand the reversal of its motion to form the retraces which are essential features of many letter designs. It is consequently not surprising that when the pupil sets out to apply his newly acquired handwriting to practical purposes, he feels impatience at the relatively slow pace of his handwriting as his pen slowly traces out the elaborate outlines of the letter designs he has been taught. Little time is lost before this impatience is given an outlet by the deliberate slurring of parts of certain letter designs and modifications of others with the object of both speeding and easing the production of the writing script. This means that once handwriting is used for practical purposes, gross deviations from the copybook letter designs are introduced."

A. J. Quirke³ writes that, "No matter how conventional a handwriting style may be, the number of its adherents who conform to it 100 percent in their handwriting is amazingly small." This general statement teases the reader into asking how small a percentage follow the system: 50 percent, 10 percent, or none at all? What letters vary the most, what letters the least? A. S. Osborn has written⁴ the following: "The framework or general character of the handwriting of the average writer is the style or design acquired in youth and in general use during the formative period of life. This style usually is greatly modified by individual taste, degree of manual dexterity, occupation and environment, but through all these changes the original system will to some extent visibly protrude . . . It will thus be understood how important it is in the identification of a handwriting to classify it by putting it into its proper general division as to date, system and nationality."

This was written in 1910 when handwriting ability was more a matter of pride than it is today. The influence of the Round Hand, taught up to approximately 1840, the Modified Round Hand of the 1840 to 1860 period, the Spencerian system of 1860 to 1890, and the Vertical Hand of the 1890 to 1900 period were all to be found at that time. Starting in approximately 1880 the various modern commercial styles made their appearance. Now, 90 years later, nearly all writing examined will have been done by persons who have been taught one of these systems. Writers group these latter-day systems under the general heading of *commercial style*. They do this because for the most part they are all similar in design, that is, all are attempts to simplify or modify the various letters so that there is an economy of effort and motion in their formation.

A recent study by V. E. Harrick⁵ reported in detail a survey by publishers and teachers of penmanship. This survey discovered that 19 commercial systems were being taught. They were believed to include most, if not all, of the programs of instruction then available in the elementary schools of the United States. Four of these systems were used in approximately one half of all of the schools and nine of the systems accounted for three fourths of all the systems being taught. The fact that these systems are all similar in design is another impediment to identifying the system taught. A great deal of overlap in

² *Suspect Documents*.

³ *Forged Anonymous and Suspect Documents*.

⁴ *Questioned Documents*, 2nd ed.

⁵ "Comparison of Practices in Handwriting," Committee on Resources in Basic Skills, Univ. of Wisconsin, 1960.

letter design was found in these various systems. In the 19 different systems, the upper case cursive *O* was found in one style in 18 systems and in a second style in 1 system. The upper case letter *F* was taught with the most variety of style. Ten variations were shown, but the distinctions between them were so slight that they could be reduced to five styles. The very fact that such similarity exists between these different copybook styles would seem to make style identification difficult if the variations were major and impossible if they were only minor.

Within the limits imposed by the small number of samples used, it would seem that this investigation provides some statistical basis for the long-held belief of document examiners that the handwriting of most persons varies greatly in style from the copybook system they were taught. It also provides a basis for the belief that there is an accelerated change in the writing as writers pass from their school years into the adult years of their lives. Some questions regarding the weight that can be assigned to the presence of certain letter designs, which have been thought to be of little value for identification purposes, also arise. Perhaps the most significant outcome is the demonstration that it is virtually impossible to give a correct opinion regarding the system of handwriting a mature person was taught.

Survey

Selection of Subjects

Several factors influenced the selection of the subjects used in the survey. Generally, a group of persons who conformed as closely as possible with the following criteria were sought: (1) they should all be from a single school, having been taught over the years by teachers using similar methods and techniques, and (2) the school should have operated continually for over 50 years. These criteria meant that, first, a group of persons was to be tested ranging from current 7th and 8th graders to persons over 60 years of age and, second, persons in all of these age groups had to have been exposed to a similar style or quality of instruction.

A group representing the broadest possible span of middle-class America in regards to economic and cultural attainment was also deemed desirable. Consequently, a parochial school located in a middle-class residential area of Washington, D.C., was selected. This school has been in constant operation since 1909. During that time all of the instruction has been provided by a single order of teaching nuns. The neighborhood was made up of persons spanning the range from moderately low to moderately high level of attainment in education, income, and culture.

The original restriction of examining a school that had taught a single system over a long period of years had to be relaxed. The parochial school selected had taught the Palmer system to all students who were born prior to 1930. In 1936 they changed to the Zaner Bloser system for first grade students, gradually phasing out the Palmer system. This type of change actually was fortunate as far as this survey was concerned, because it meant that all persons born prior to 1930 had studied the Palmer system exclusively and all persons born in and after 1930 had studied the Zaner Bloser system exclusively. Addresses for a total of 274 persons who had graduated from the school were obtained. The mailing consisted of a letter of introduction, an explanation of the project, and three handwriting survey forms.

Description of Form Used

The survey form was printed on an 8½ by 14 in. sheet of paper. It requested each participant to write names beginning with each letter of the alphabet (for example, Albert

Bennett). Those chosen ensured that each lower case letter was written several times in the interior of the names and that most appeared at some time in an ending position. In addition, each person was asked to write the alphabet in cursive upper case letters and print the alphabet in upper and lower case forms. Each person was then asked to answer the following questions:

Date of birth, sex, race.

Highest grade completed—Occupation.

Do you now or did you use handwriting regularly in your work?

Estimate how many pages you write in longhand each week.

What type of things do you usually write?

What type of writing instrument do you usually use?

What type of writing instrument do you write best with?

What percentage of your writing is longhand?

What hand did you use to write this specimen?

Have you learned to write with the other hand?

If so, why did you learn this skill?

Is your signature fancy, unusual, or different from your other writings?

If you recall why you changed the style or design of any of your letters, please explain in the space below.

Response to Survey

From the original mailing of 274 questionnaires, 46 were returned because the addressee had moved or was unknown. From the 228 responses that were actually delivered, a total of 128 completed responses were returned before the cutoff date of 10 June 1970. The low number of returns was disappointing. Each of the mailings had contained three specimen forms, and each addressee was asked to fill out one form and pass the other two along to persons they knew who had been students of the school for all of the grades 1 through 8. If the entire original mailing of 274 envelopes, with three specimen forms each, had been delivered and passed on to qualified persons, we would have had a maximum return of 822 responses. The actual return of 128 (approximately 16 percent) was only about one half of the total return hoped for.

Responses from females outnumbered those from males 79 to 49. The breakdown by age and sex is as follows:

Age Group	Males	Females
Born prior to 1910	2	8
Born 1910-1919	0	6
Born 1920-1929	17	17
Born 1930-1939	14	25
Born 1940-1949	4	5
Born 1950-1959	12	18
Total	49	79

It was hoped that the responses would be evenly divided between males and females in each of the age groups and that the various age groups would be similar in number. Perhaps the low response of males born prior to 1920 is due to the greater longevity of the females. The low response of males and females born in the 1940s was also disappointing. Even so, the results of this limited sample are consistent with the more numerous returns of the 1930s and 1950s.

Experimental Controls

Separate take-off sheets were prepared for males and females in each of the six age groups with separate columns for recording the following information:

1. Style—three columns, Garland, Arcade, Sawtooth
2. Slant—three columns, Right, Left, Vertical
3. Skill—five columns, Poor, 2, Medium, 4, Excellent
4. Speed—four columns, Slow, 2, 3, Fast
5. Breaks between lower case letters—three columns, None, Some, Many
6. Extensions—three columns, Short, Medium, Long
above the line: length of letters b, d, f, h, k, l, and t
below the line: length of letters f, g, j, p, q, y, and z
7. Classic letter design—twenty-six columns, one for each letter to be checked, only if the letter varied from copybook design
8. Special lower case letter forms—six columns to record the presence of special shapes of the letters e, p, r, s, t; any other unusual forms
9. Hand used to write—three columns, Left, Right, Both
10. Regular use of writing at work—two columns, Yes, No
11. Number of pages written per week—three columns, 0/5, 6/10, 11/+
12. Percentages handwritten and handprinted—two columns
13. Types of things usually written
14. Writing instrument usually used
15. Writing instrument persons write best with
16. Writing instrument used on the survey form
17. Profession or job type—five columns, Housewife, Unskilled, Skilled, Clerical, Professional; a sixth column for students was added for persons born in the 1950s
18. Educational attainment—four columns, to 8th, 9–12, college, and graduate work
19. Is signature considered unusual?—two columns, Yes, No.

All of the information was taken from the survey forms by a document examiner with over 16 years of experience. In order to get a balanced interpretation of all factors leading to a set of valid conclusions, it was considered important that all determinations be made by one person. For the most part, where judgment was needed in the interpretation of the data being recorded, the experience of the examiner was relied upon. He made his decisions using the following guidelines:

1. Style was graded on the overall impression with special attention to the lower case letters m, n, e, h, r, s, u and the connecting strokes.
2. The overall slant of the writing.
3. A judgment of skill was made based on the examiner's experience.
4. A judgment of speed was made based on the examiner's experience.
5. A count of the breaks in flow was made *only* when it appeared between lower case letters in the answers on the survey sheet. The writing was scored as follows:
None: No breaks found or a single break that appeared accidental or a single break that was not repeated in a similar letter combination.
Some: At least two breaks but not more than five breaks, and not where breaks appeared after three different letters.
Many: More than five or where breaks appeared after three or more different letters.
6. No actual measurements of extensions were made. To be considered long or short, the letters had to be exaggerated in either direction.

For determination of the:

7. Departure from classic letter design, each of the 26 upper case letters on each survey form was individually compared with a model of the same letter as advocated in the copybook system the writer had been taught originally. In deciding whether the letters on the survey sheets were the same or different from the copybook models, a great deal of leeway was allowed. Some variations in slant, size, proportions, shape, sizes of loop, or length of approach or ending strokes were expected and considered normal in all letters. The final decision of similarity or difference was based on the opinion of the researcher when he applied his knowledge and skills to the question Is the letter similar enough to the copybook style to be recognizable as a reasonable facsimile when viewed next to the copybook model letter form?

8. Because of the great similarity of form between the lower case letters as shown in the different systems, it was not felt that it would be profitable in this study to attempt to record variations or special forms. As a matter of curiosity and in an attempt to get some measure of the frequency with which some selected letter forms appear, it was decided to record the use of certain letter forms. The letters selected were *e*, *p*, (tall upstroke), *r*, *s*, and *t* and any other unusual forms such as triangular lower zone loops.

9-19. The various elements described above as 9 through 19 were coded directly from the answers supplied on the charts and did not require any interpretation on the part of the examiner.

Results

Both the Palmer and Zaner-Bloser systems taught the subjects to have rounded tops to letters such as *m* and *n*. These are usually associated with the arcade style found in writings by persons who make ovals in a clockwise direction. Table 1 shows how many writers retained the rounded or arcade tops, how many changed to sharp tops normally found in garland style writing, and how many changed to a triangular or sawtooth style.

TABLE 1—Frequencies of styles: Arcade (Ar), Garland (G), Angular (An).

Persons Born	Specimens Used		Male			Female			Combined		
	Male	Female	Ar	G	An	Ar	G	An	Ar	G	An
Before 1910	2	8			2			8			10
1910-1919	0	6				1	3	2	1	3	2
1920-1929	17	17	8	1	8	9	1	7	17	2	15
1930-1939	14	25	2		12	19	1	5	21	1	17
1940-1949	4	5	1	1	2	2		3	3	1	5
1950-1959	12	18	5		7	17		1	22		8
Total	49	79	16	2	31	48	5	26	64	7	57
Percentage			33%	4%	63%	61%	6%	31%	50%	6%	44%

Most examiners recognize that the handwriting of females, as a group, is superior in style or ability to that of males. They are usually more mature as students and take more interest and pride in their school work. Table 1 showed males had retained the taught rounded tops in their writing in 33 percent of the forms while females retained them in 61 percent of the forms. The proportions of sawtooth tops were almost exactly the opposite: 63 percent for the males and 31 percent for the females. The percentages of garland writers, 4 percent of males and 6 percent females, show similar use of that style by both

sexes. Two thirds of the male writers had changed from the rounded tops of the system models, while only one third of the females had changed in this manner.

Sharp tops, or a garland style, would seem to have considerable value in any handwriting comparison. One writer in twenty in both sexes changed to that style. Rounded tops, or an arcade style, would appear to be of little value in examinations of a female's writing as six in ten retained this style. It would be of greater value in an examination of a male's writing as one in three retained the style. Sawtooth, or angular, tops would have a one in three value in females and be the norm for males.

It is interesting to note that none of the writers over 60 years of age retained the rounded letter tops while the number of young writers, between 13 and 20 years of age, who retained the rounded tops outnumbered those who had changed to angular tops by a ratio of 22 to 8. Perhaps these rounded tops could be considered an indication of youth or immaturity in the writer, while sawtooth tops would be the norm for writers starting their physical decline.

The slant advocated by the two copybook systems was in a right direction. Table 2 shows that 96 percent of the writers retained the right slant. Note that the females appeared more prone to a slant change than did the males.

TABLE 2—*Slant of all writers.*

Persons Born	Male			Females			Both		
	Rt	Lt	Vert	Rt	Lt	Vert	Rt	Lt	Vert
Before 1910	2			8			10		
1910-1919				6			6		
1920-1929	17			16		1	33		1
1930-1939	14			24		1	38		1
1940-1949	3		1	5			8		1
1950-1959	12			16	1	1	28	1	1
Total	48	0	1	75	1	3	123	1	4

As was expected, the males as a group scored lower in skill than the females. Note that the bulk of the males earned a poor to medium rating. Only one scored as excellent. The females were rated heavily in the medium to excellent ratings. It was interesting to note that housewives tended to score higher than average (Tables 3 and 4). These findings are similar to those of Templin who reported⁶ that females scored higher than males in all occupational groups. She also found that, the more a male wrote, the better he wrote, while the exact opposite was true for females: the *less* they wrote, the better the writing skill. Note the higher skill of housewives found in this study. Templin also found a great increase in skill in female handwriting in grades 6 through 10, while boys showed slight improvement during the same period. This also appears to be verified by the results of this survey.

Omwake⁷ and E. L. Thorndike⁸ both reported little relationship between scores of handwriting ability and the adult intelligence of the writer. The scattered pattern of ability grades assigned to the various occupational skills in this survey indicate that these findings are true.

⁶ "Study—Legibility of Adult Manuscript."

⁷ *Public Personnel Studies*, III, pp. 2-15.

⁸ *Teachers College Record*, XI, 2, 1910.

TABLE 3—Relation of occupation to skill by age group and sex.

	Male					Female				
	P	2	M	4	E	P	2	M	4	E
Prior to 1909										
Housewife								3		
Unskilled										
Skilled		1								
Clerical							2	2	1	
Professional			1							
1910-1919										
Housewife							1		1	1
Unskilled										
Skilled										
Clerical										2
Professional										1
1920-1929										
Housewife							1	2	4	2
Unskilled										
Skilled		6	2	1						
Clerical	1	1	1				1	1	2	1
Professional	1	2	1		1			1	1	1
1930-1939										
Housewife						2	1	2	8	1
Unskilled									1	
Skilled			3	2						
Clerical			3	2		1	1	4	1	1
Professional	1	1	1	1				1		1
1940-1949										
Housewife									1	
Unskilled										
Skilled		1								
Clerical			1				1		3	
Professional		1								
Student	1									
1950-1959										
Housewife										
Unskilled										
Skilled										
Clerical		2	1					1		1
Professional										
Student	2	5	2				3	6	5	2
Total	6	20	16	6	1	3	11	23	28	14

TABLE 4—Relation of occupation to skill by sex only.

	Female					Male				
	Poor	2	Medium	4	Excellent	Poor	2	Medium	4	Excellent
Housewives	2	3	7	14	4					
Unskilled				1						
Skilled							8	6	3	
Clerical	1	5	8	7	5	1	3	5	2	
Professional			2	1	3	2	4	2	1	1
Student		3	6	5	2	3	5	3		
Total	3	11	23	28	14	6	20	16	6	1

There seemed to be little difference in the speed of the writing of males and females (Table 5); on the whole, females wrote slightly faster. The slower speed that was expected in the writing of the younger persons was verified, being more pronounced among males than females. Professional persons, as expected, wrote faster than others in the survey. Most persons have noted an accompanying deterioration on the part of professionals, especially doctors. Templin found professors to be the poorest writers and bookkeepers to be the best.

TABLE 5—*Relation of occupational type to speed by age groups.*

	Male				Female			
	S	2	3	F	S	2	3	F
Prior to 1909								
Housewife					1		2	
Unskilled								
Skilled		1						
Clerical					2		3	
Professional				1				
1910-1919								
Housewife					1		2	
Unskilled								
Skilled								
Clerical							2	
Professional							1	
1920-1929								
Housewife					2		7	
Unskilled								
Skilled		3	6					
Clerical	1		1	1			4	1
Professional		1	3	1	1		2	
1930-1939								
Housewife					5		9	
Unskilled							1	
Skilled		1	4					
Clerical		1	3	1	1	4	3	
Professional		2	2				2	
1940-1949								
Housewife							1	
Unskilled								
Skilled			1					
Clerical			1		1	3		
Professional				1				
Student		1						
1950-1959								
Housewife								
Unskilled								
Skilled								
Clerical		2	1				2	
Professional								
Student		8	1		3	9	3	1
Total	1	20	23	5	5	28	44	2

The tabulation of breaks in the writing flow was interesting (Table 6). It showed that 78 percent of the males and 85 percent of the females had retained the letter connections of the taught systems. Some breaks were found in the writings of 20 percent of the males and 15 percent of the females. From an identification standpoint, it would seem that the presence of even a few breaks would have some value. The presence of numerous breaks

would be highly unusual. Only one male and none of the females had adopted the habit of numerous breaks. In this regard care should be exercised in the assigning of value to breaks. Most common places where breaks occurred were after the letter *t* and before the letters *g*, *a*, *d*, and *c*, in that order. Breaks in other places would be highly significant.

It is interesting to note that 29 housewives were scored with no breaks and only 1 with a few breaks. This suggests that women who do not continue their education or do not go out into the working world are more likely to retain the model characteristics. This tendency of housewives to adhere closely to the system they were taught appears in several other parts of this survey.

Of the males 14 percent exhibited an unusual signature, while only 9 percent of the females had unusual signatures (Table 7). This is not a really satisfactory summary of the combined male-female ratio, because 4 of the 16 female students born in the 1950 to

TABLE 6—Relation of occupational type to breaks in the writing line.

	Male			Female		
	N	S	M	N	S	M
Prior to 1909						
Housewife				3		
Unskilled						
Skilled		1				
Clerical				3	2	
Professional	1					
1910-1919						
Housewife				3		
Unskilled						
Skilled						
Clerical				2		
Professional				1		
1920-1929						
Housewife				8	1	
Unskilled						
Skilled	7	2				
Clerical	2		1	3	2	
Professional	4	1		2	1	
1930-1939						
Housewife				14		
Unskilled				1		
Skilled	5					
Clerical	4	1		7	1	
Professional	3	1		2		
1940-1949						
Housewife				1		
Unskilled						
Skilled		1				
Clerical	1			4		
Professional		1				
Student	1					
1950-1959						
Housewife						
Unskilled						
Skilled						
Clerical	3			2		
Professional						
Student	7	2		11	5	
Total	38	10	1	67	12	0
Percentage	78%	20%	2%	85%	15%	

1959 period accounted for 4 of the 7 unusual signatures by females. Experimentation with unusual styles seems to be a passing fancy with the young. In examining handwriting over the years, I have noted similar experimentation on the part of the young. Many of these writers reverted to a more normal style as they matured. Among adults, males affecting an unusual style appear to outnumber females by a ratio of 3 to 1.

Care should be exercised in applying these findings to the handwriting of persons educated outside of the United States. In many countries, especially those of Latin origin, the popularity of illegible or contrived signatures, abbreviated or slurred style, and the use of Rubrics or Paraph is very common.

As mentioned earlier, measurements were not made regarding extensions: all classifications depended on the visual appearance as interpreted by the examiner. Table 8 shows that males and females both tended to make long upper and lower extensions approxi-

TABLE 7—*Relation of occupational type to unusual signatures.*

Persons Born	Male		Female	
	No	Yes	No	Yes
Prior to 1909				
Housewife			2	
Unskilled				
Skilled	1			
Clerical			5	1
Professional	1			
1910–1919				
Housewife			3	
Unskilled				
Skilled				
Clerical			2	
Professional				1
1920–1929				
Housewife			8	1
Unskilled				
Skilled	7	2		
Clerical	3		5	
Professional	5		3	
1930–1939				
Housewife			14	
Unskilled			1	
Skilled	5			
Clerical	4	1	8	
Professional	3	1	2	
1940–1949				
Housewife			1	
Unskilled				
Skilled	1			
Clerical		1	4	
Professional	1			
Student	1			
1950–1959				
Housewife				
Unskilled				
Skilled				
Clerical	2	1	2	
Professional				
Student	8	1	12	4
Total	42	7	72	7
Percentage	86%	14%	91%	9%

mately three times as often as they made short extensions. It is important to note that the young student group made 11 of the 21 short lower extensions. This is greatly out of proportion to their actual numbers in the sample. It would seem that this is probably due to the slower, less skillful ability commented on earlier in this paper. These extensions will, in all probability, lengthen as these writers mature and develop in writing skill, speed, and personality.

Table 9 indicates the preference of the subjects with respect to writing instrument. One male and one female born in the period 1920 to 1929 did not indicate with which instrument they felt they wrote best. There were 134 choices of instruments usually used, which indicates multiple choices by 13 different persons. One person indicated a pen and a typewriter; twelve persons indicated pen and pencil.

All persons completing forms in the survey were first taught to use pencils. After a while they were required to learn to write with and use fluid ink pens. After the period of formal penmanship training, all or most of the persons discovered and used ballpoint pens. It is interesting to note that none of the persons returning a specimen of his or her handwriting used the pencil or fluid ink medium of student days.

Unfortunately when the request form was prepared, persons were not asked to distinguish between fluid ink and ballpoint pens. Because of this oversight the results regarding fountain pens are uncertain. In the writing instrument "usually used" and writing instrument "best with" columns, fluid ink or fountain pen was recorded only if the person specified it on his form. If the writer merely said pen (as most writers did), it was considered to be a ballpoint pen, as this was the instrument used to fill in 127 out of the 128 forms.

Table 10 shows the occurrence of certain lower case letters. Under the heading "System Forms Retained" entries are made to record the number of persons who wrote the letter *p* with the tall upthrust found in the Palmer and Zaner Bloser systems and the number of

TABLE 8—Length of extensions.

Persons Born	Upper		Lower		Total Specimens in Each Group
	Short	Long	Short	Long	
Before 1910					
Male		2		2	2
Female		1	1	3	8
1910-1919					
Male					0
Female		3		5	6
1920-1929					
Male	2	9	1	9	17
Female	2	8	1	9	17
1930-1939					
Male	1	10	1	6	14
Female	2	8	2	13	25
1940-1949					
Male		3	1	3	4
Female	2	1	1	2	5
1950-1959					
Male	1	7	2	4	12
Female	11		10	2	18
Total	21	52	20	58	128
Percentage	16%	41%	19%	45%	

TABLE 9—Use of writing instruments.

Persons Born	Usually Uses				Best with				Used	
	Ball	Felt	Pencil	Type	Fount	Ball	Felt	Pencil	Ball	Felt
Prior to 1910										
Male	2					2			2	
Female	8		1			8			8	
1910–1919										
Male										
Female	6					6			6	
1920–1929										
Male	15		5	1		13		3	17	
Female	16	1	5		2	11		3	17	
1930–1939										
Male	11	1	2		1	9	1	3	13	1
Female	24		4		6	17		1	25	
1940–1949										
Male	3		2			3		1	4	
Female	4		3			3		2	5	
1950–1959										
Male	10		2	1	1	9		2	12	
Female	17		1		2	14		2	18	
Total Male	41	1	17	2	2	36	1	9	45	1
Total Female	75	1	14		10	59		8	75	
Total Combined	116	2	25	2	12	95	1	17	127	1

times the letter *r* was written in the copybook style by persons taught the Palmer system. Note that 24 percent of the males and 36 percent of the females continued writing the letter *p* with the tall upthrust and that only 21 percent of the males and 16 percent of the female writers taught the Palmer style *r* continued to write the letter in that style. Under the heading "Non System Forms Found" entries record the number of persons who made various letter shapes. Usually less than 8 percent of the persons adopted the various letter forms, with two interesting exceptions: only 1 percent of the males wrote a *t* with no cross bar, while 23 percent of the females used this letter form; 8 percent of the females used a form of the letter *t* with a cross bar continuing from the bottom of the vertical stroke and doubling over (right to left then left to right) the stroke, while 24 percent of the males used this form.

There was only one person in the entire group of 128 writers who had a great number of unusual lower case letter forms, a male with two years of college education who was employed as a business manager. He used a form that was practically a handprinted style.

The principal aim of this inquiry was to determine how often writers vary from the letter styles they were taught in school. In examining Table 11 the number appearing horizontally across the top of the chart on the "Specimens Used" line is the total number of specimens checked in that age group; for example, in the 1930 to 1939 age group there were a total of 14 forms written by males. Following the column down 6 males varied from the style of the letter *A* taught, 12 males varied from that taught for the *B*, 8 from the *C*, etc. Bear in mind that each number appearing on the horizontal line, after the letter in the extreme left column, represents the number of times that that letter was *not* made in the copybook style.

On the right side of the chart the total for each letter is given in two different ways. (1) Under the word "Combined" the total number of times the 49 males and 79 females

varied as to each letter and the total for the number of times all (128 male and female) writers varied is given; for example, 41 of the 49 males and 51 of the 79 females, or a total of 92 of the 128 male and female writers, changed the way they wrote the upper case cursive letter *D*. (2) Under the words "Combined Percent Changed" the chart shows that 41 of the 49 males, or 84 percent of the male writers, and 51 of the 79 females, or 64 percent of the female writers, or of the total of 92 of the 128 writers 72 percent changed writing style.

Near the bottom of the chart, the line "Total different" is the total number of times the writers changed all of the 26 letters. The line "Possible total" gives the maximum number of changes possible, for example, females born prior to 1909 wrote 208 different upper case letters [$26 \times 8 = 208$]. In this survey they actually changed the letter style a total of 131 times, or 64 percent of the time.

It seems unnecessary to go into a lengthy discussion of each facet of the chart; however, it is interesting to note some of the following points: (1) the letter *F* showed the greatest change, 86 percent of the times written; (2) the letter *A* showed the least change, 29 percent; (3) the letters *E* and *O* were the only letters for which females showed more changes than males; (4) males were more prone to change a letter than females (69 percent of the time as opposed to 52 percent of the time); (5) as expected, least change took place, as a group, in the youngest writers, those born in the years 1950 to 1959.

Epstein, Hartford, and Tumarkin⁹ reported in 1961 the results of a well conducted experiment with 150 women. They found that female adults who continue to write in the copybook style are likely to have less education and a lower I.Q. than those with more variation from copybook form. Epstein and Hartford¹⁰ had earlier reported similar findings in a group of medical students. They found that the students who retained the superfluous initial upstrokes on the letters *U*, *V*, *W*, and *Y* tended to be emotionally immature.

A comparison with style changes by occupation was made and the results of these two findings were confirmed. It would seem that the person who faithfully retains the shapes of his taught system could be termed unimaginative and limited in outlook or initiative.

Summary

Consideration of the system of handwriting as person was taught is a part of a handwriting examination or comparison. However, owing to the great similarity among the various systems being taught in the United States, and because there is such a divergence from taught system by various writers, it will most often be difficult or impossible to determine what system was originally taught a given writer. A complicating factor (not touched upon in this survey) is the effect of the great mobility of our society. The numbers of persons moving interstate or intrastate or intracity is staggering. A great percentage of our young people are being exposed to a number of different handwriting systems in their formative years. Certainly the style of these persons would be cosmopolitan in nature, probably so much so that a single copybook style could never be ascertained.

Probabilities can be established to show the incidence of such things as arcade writing style, direction of slant, speed of the writing, and breaks of writing line. It would seem from this survey, as in most others, that some questions can be answered; however, many

⁹ Epstein, L., Hartford, H., and Tumarkin, I., *Journal of Experimental Education*, Vol. 29, No. 4, 1961.

¹⁰ Epstein, L. and Hartford, H., *Perceptual Motor Skills*, IX, 1959, pp. 55-62.

more require further inquiry. Taking into consideration the fact that handwriting identification is not an exact mathematical or statistical science, it would still be of great value to know, on a statistical basis, just how much value could be placed on certain features—leftward slant, vertical writing, short, upper or lower extensions, or the presence of any particular letter design.

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