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# The Complexities of Identifying the Modern Typewriter

The last fifteen or twenty years have seen the problems of typewriting identification become more and more complex. Formerly, the vast majority of problems involved the identification of either pica or elite typewriting prepared on a manual typewriter. Although even as early as 1900 these machines had been well built there were many elements of typewriter construction which brought about rapid individualization of a machine. In this country domestic typewriters produced by less than ten major companies were virtually the only ones encountered so that a qualified document examiner carried in his mind significant type design characteristics. With type design highly individualized he could recognize quickly the make and age model of a particular machine.

The last twenty years, however, have seen a number of changes in typewriter manufacturing. Today the electric typewriter is the almot universal office machine, and its construction is held to close tolerances. Furthermore, maintenance and service programs are the rule for most office machines. Undoubtedly this accounts for better operating conditions than had been true in former years. It does not provide for readjustment or elimination of identifying defects, but in combination with improved manufacturing techniques it has led to a much subtler form of individualization than in earlier years. Typewriters are still individual, but proof of this individuality requires precise examination methods.

Typewriting identification is further complicated by the vast number of type fonts marketed today. In identifying the work of an individual machine it may not be necessary to determine the particular font and manufacturer, but this information helps the examiner to establish the general characteristics of the basic design. For example, balanced serifs which were commonplace in fine line pica fonts are not necessarily a part of many current special fonts. Thus damage to a very exposed portion of the type face cannot always be readily recognized until one knows the design features of the particular font and has had an opportunity to examine in detail the type faces on the known machine.

The introduction of a number of foreign typewriters such as Olivetti, Olympia, Adler, Hermes, and Brothers under a variety of special labels means that the examiner is confronted with problems which involve additional escapement test plates and much more extensive reference material.

Significant complications have been created by the IBM Corporation. First they produced a proportional spacing typewriter[2] changing from the established unit pitch of 1/10

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[2] Hilton, Ordway, "Problems in the Identification of Proportional Spacing Typewriters," *Journal of Forensic Sciences*, JFSCA, Vol. 3, No. 3, July 1958, pp. 263–287.

or 1/12 in. for each letter in the font to a variable width ranging from 1/16 in. for the *i* and *t* to 5/32 in. for the *m*. These machines grew in popularity during the 1950's and early 1960's and are still widely used. IBM's second contribution to the complexities of document examination came about in 1962 with the introduction of the Selectric typewriter.[3] The Selectric is a high speed, interchangeable type ball machine whose mechanism eliminates many of the traditional identifying defects. It has proved to be a machine which produces typewriting of far greater uniformity than most type bar machines. Finally, in the fall of 1971 IBM introduced their Selectric II typewriter which is capable of typing with both pica and elite (10 and 12 pitch) escapement. It incorporates all the features of the original Selectric including the ease of changing type fonts without removing the document from the machine plus a change of escapement within a single page of typewriting. With a simplified cartridge ribbon system different color ribbons can be inserted while preparing a single document by simply removing one cartridge and inserting another. As a result demonstration that typewriting has been fraudulently inserted in a blank area of a printed form becomes more difficult.

One current trend with modern typewriters is the increased use of plastic ribbons. This is a definite assistance in identification problems. Ribbons of this class record clear impressions of the type faces and disclose type face damage and subtle breaks in metal (Fig. 1). There has also been improvement in cloth ribbons with many machines being equipped with high grade ribbons of fine threads and good quality ink. Unfortunately, the best quality ribbons are not always used even on the best machines. It also should be recognized that some typewriters are built to accommodate both cloth and plastic ribbons. Others are not and, consequently, inspection of the machine itself may be important in eliminating some machines on the basis of the ribbon alone.

It is fortunate that today we still have the portable typewriter, many of which are manually operated and are of very light construction. At least occasionally we can encounter a routine identification problem with badly aligned type and broken type faces.

Following are several suggestions on how to handle some of the more complex problems which are produced by today's high quality typewriters. These will not concern the more fundamental identification problems involving older manual and portable typewriters. Instead attention will be directed toward the subtle defects upon which many identifications depend today in terms of how to recognize and interpret them.

Special type designs present a challenge. The collection of basic information on all type face designs in use today is an extensive and complex problem. Many of the newer fonts incorporate shaded characters. Some of these have very slight shading. There are also newer fonts which appear to be monotone or without shading, but upon close examination are found to contain some strokes that are cut thinner than others. Built in shading in the type makes it particularly difficult to recognize a letter printing off-its-feet. Instead of recognizing by routine inspection that some letters are heavier on one side than another, one needs basic knowledge of how these type faces are designed to differentiate between those areas which normally are shaded and those which print heavier. Examination with a binocular stereoscopic microscope often is necessary to accurately establish through varying depths of embossing that a letter is off-its-feet. However, there is tremendous advantage in having good reference specimens typed on machines which were carefully aligned to assist with an examination of a questioned document. There is also advantage in examining the typewriter itself, inspecting each type face under magnification in order

[3] Hilton, Ordway, "Identification of the Work from an IBM Selectric Typewriter," *Journal of Forensic Sciences*, JFSCA, Vol. 7, No. 3, July 1962, pp. 286–302.

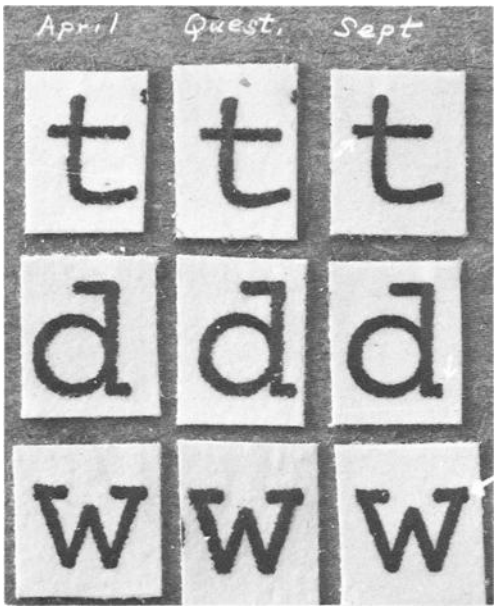


FIG. 1—*The arrows indicate three slight points of damage to the type face which occurred some time between April and September. The machine was equipped with a plastic carbon ribbon which discloses fine detail such as the break in the* t. *The problem was to determine whether the questioned typing dated in January had in fact been prepared that early or as late as September.*

to locate the exact shaded area. In other words, the common defect of a letter off-its-feet may require painstaking examination.

Today damaged or broken type faces are less frequently encountered in typewriting examinations. Even with a good deal of use serifs are not necessarily worn away or chipped. In part modern typewriter design has reduced the change of a type face clashing against another type face or against other metallic parts of the machine. Manufacturers of electric typewriters through mechanical devices have minimized the frequency of type stacking. When this is coupled with the fact that the type design may incorporate unbalanced serifs which suggest type face damage where none exists, or on the other hand makes slight wear extremely difficult to detect because of the basically short serifs, one must proceed with caution. Here, again, examination of the type face itself is extremely helpful.

Alignment is adjusted to very close tolerances on modern machines. Although letters do get out of alignment to the right or left or above or below the line, the divergence from normal is often slight. Again, in certain fonts a few letters are unusually narrow or unusually wide which can complicate alignment studies unless the type is examined under ruled test plates or grids (Fig. 2). I have found that a plate ruled with double lines spaced one-hundredth of an inch apart between each letter is more useful in revealing slight alignment defects than the more common single rule plate which manufacturers consider standard. Unfortunately double ruled plates were developed after the revision of Osborn's "Questioned Documents" in 1929 and, consequently, are not illustrated in this standard work. Their introduction apparently can be attributed to Elbridge W. Stein of New York City, as his test plates, made photographically from original drawings, incorporate this improvement. These double rulings emphasize slight horizontal malalignment which

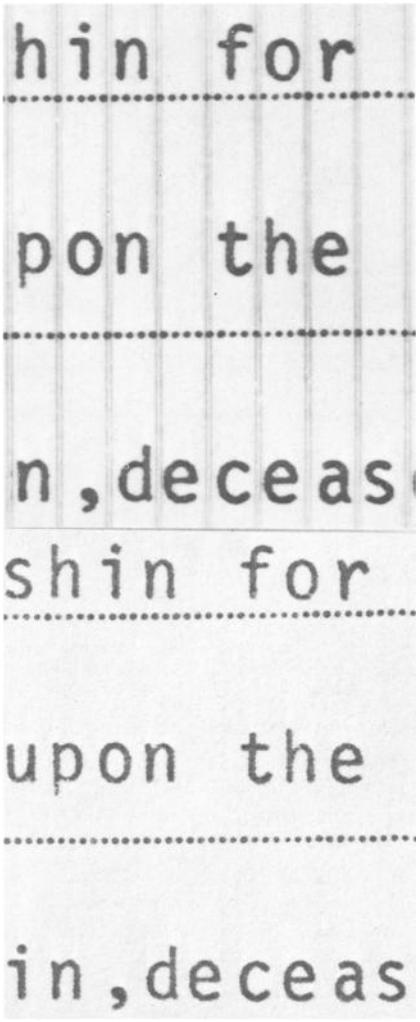


FIG. 2—*The lower portion of the illustration shows typing from a machine equipped with a sans-serif type face. Note the difficulty in determining lateral alignment compared to the same material photographed under a typewriter grid. The small* n *was used for aligning the grid and this shows clearly the* r *and* d *printing too far to the right.*

otherwise is more difficult to detect and illustrate. In fact, photographs of typewriting under a test plate become more essential for court room demonstration charts than in former years since alignment has become a more delicate test than it was in the early days of typewriting identification.

Among the newer type faces which are encountered in identification problems with some regularity are a series of fonts which can be described as sans-serif or modern Gothic. In reality many of these fonts are not completely without serifs, but the vast number of characters and letters have none. Rather than following the old pattern of attempting to fill the unit space as completely as possible with a type design, especially with broad serifs

on a narrow letter, not all of the characters occupy the full space. With type such as this horizontal alignment has to be checked very carefully and the lack of serifs, particularly on wider letters, eliminates a more common area of type damage. When this is coupled with the improvement in basic alignment and more carefully adjusted typewriters, identification of these fonts may require extremely careful study.

Script type in which the letters are designed to resemble handwriting have also increased in popularity. Here again alignment studies become more difficult and type face damage is less pronounced. Possibly it is the lack of familiarity with some of these problems which brings about added concern in identifications, but basically the type design is such that malalignment may not be as readily recognized as with standard pica and elite types.

Proportional spacing typewriting provides special problems which with special test plates do not become insurmountable. As far as the IBM machine is concerned (and it is by far the most common variety) wide letters such as *m*'s and *w*'s of both lower and upper case, reveal frequent common type face breaks especially to the outside serifs. Other letters also show comparable damage much more frequently than with standard typewriters. The special problem is left and right malalignment. New tools must be used in the form of specially ruled test plates based on the unit value of escapement (IBM 1/32 or 1/36 in.).[4] Unassisted visual recognition generally is not possible. Remington made a proportional spacing machine using the same unit escapement as IBM but apparently limited sales have led to infrequent problems and the machine no longer is being marketed.[5] Olympia and Olivetti have within the last year or so entered the field with metric escapement units. Thus, proportional spacing problems continue to multiply with additional data to collect.

The IBM Selectric typewriter has no type bars and the movable carriage has been eliminated. The type faces are distributed around two hemispheres of a type ball in four rows of eleven characters each. Capital letters and other characters which require the use of the shift key appear on the opposite hemisphere from the lower case letters. When a key is depressed the proper character is positioned by a rotation and tilting action of the type ball which occurs almost simultaneously with the printing action of the ball moving forward against the ribbon and paper. The type ball moves from left to right across the paper which is rolled around a fixed platen. While a number of concepts of the Selectric typewriter are adaptations from earlier non-type bar machines, there are highly sophisticated distinctions which make the Selectric uniquely different from any predecessor. It is a high speed, precision writing machine.

To complicate the problem more, the Selectric type ball can be easily removed and replaced by any other. The document need not be removed from the machine or disturbed in any way. Thus it is entirely possible to use several different fonts in a single document without interrupting alignment. The Selectric type design is distinctive and different from other comparable fonts even those of IBM. The machine is so built as to minimize variations and defects are at best very slight. In fact there is actually an interdependence between alignment defects of certain letters since they can be a function in part of the machine or in part of the type ball. Identification actually is not that of an individual machine but of a machine-type ball unit. Broken or worn type faces are extremely rare and alignment defects are found to be very slight. Thus identification problems are ex-

[4] Hilton, Ordway, "A Test Plate for Proportional Spacing Typewriter Examination," *Journal of Criminal Law, Criminology and Police Science*, Vol. 47, No. 2, July–Aug. 1956, pp. 257–259. Test plate, for use with proportional spacing typewriting can be obtained from Lyman Nichols, Fort Collins, Colorado.

[5] Godown, Linton, "Proportional Spacing Typewriter Identification," RCMP Crime Detection Laboratories, Seminar 5, The Queens Printer, Ottawa, Canada, 1958, pp. 46–55.

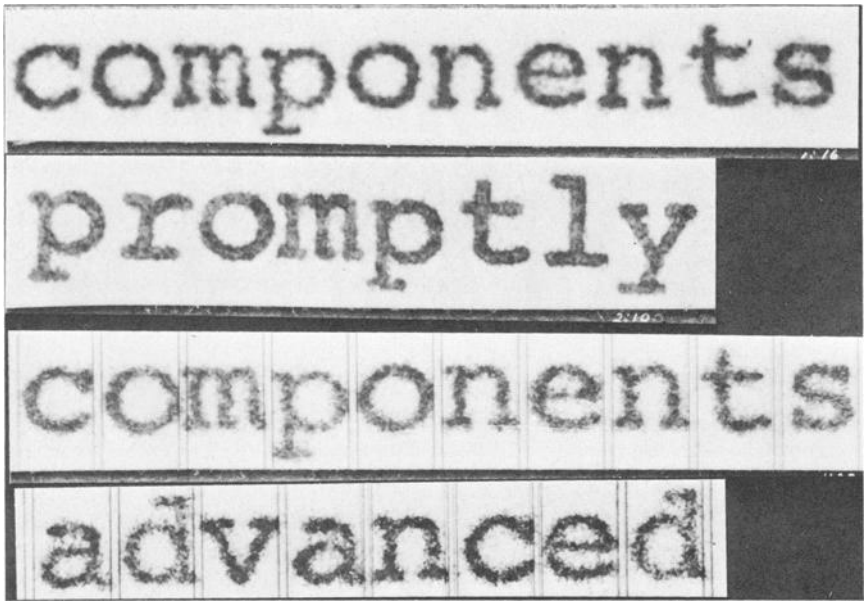


FIG. 3—*Two slight alignment defects which occur in a Selectric typewriter are illustrated. Note the relative position of the tops of the* m *and* p. *Note also in the typewriting illustrated under the grid that the small* c *types slightly to the right. Both documents were carbon copies.*

tremely difficult and require precise examinations (Fig. 3). It has been found almost imperative to make alignment checks under ruled test plates rather than by simple visual inspection without such plates.

The later Selectric II, introduced in the fall of 1971, complicates identification problems further. This typewriter has a dual escapement, 10 and 12 pitch. The two different racks can be interchanged by a simple lever operation. Thus a portion of a page of typewriting can be prepared with 12 pitch type and the balance with 10 pitch. Type fonts can be changed exactly as they are with the Selectric I, for this element of the machine has not been changed. IBM has adjusted the tolerances so that the zero positioning of pica and elite escapements will not vary by more than 0.004 in. To be certain that elite and pica typewriting on a single sheet was prepared continuously requires the use of a specially designed test plate. The problem is certain to arise in the future, and the document examiner needs to be prepared for it. Meanwhile the identification problem with the Selectric II parallels that of the Selectric I. The machine is built with equal precision and with some mechanical improvements. According to IBM sales personnel, certain nylon and plastic parts in the earlier model have been replaced with metal units to provide for a sturdier and better typewriter. These changes could minimize identification defects further.

The new Selectric II plastic carbon coated ribbon cartridge incorporates a special ribbon action. The ink and the plastic material provide a recovery rate to allow five typings in a single area of the ribbon. Thus the ribbon gives much longer service with uniform impressions typical of the regular single-use plastic ribbons. The cartridge is designed so that it can be easily removed without disturbing the document which is being prepared. Since the Selectric II also can utilize standard ribbon cartridges without any mechanical

readjustment, for special types of work an operator can use several ribbon colors on a single page without removing the paper from the machine. In other words when dealing with a Selectric II there may be times when both 10 and 12 pitch, with a variety of type faces and ribbon colors on a single page, will be encountered; and it can be established that all of the typing was done on the sheet without removing it from the machine during preparation. When the document is challenged we must be in a position to establish and demonstrate this fact or prove that it is not so.

It can be seen from this analysis that the typewriting identification problem is growing in complexity. Some factors which only a few years ago suggested obvious conclusions now must be carefully investigated to be sure that what appears obvious is actually fact. Techniques must be honed to greater sharpness. Many identifications may rest on slight and subtle defects or even upon full consideration of slight variation in variable characters. No longer is typewriting identification a routine task.

**Summary**

Complexities in typewriting identification where machines of recent design have been used were discussed. Special considerations of the problems arising from the use of the IBM Selectric I and II were also examined.

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