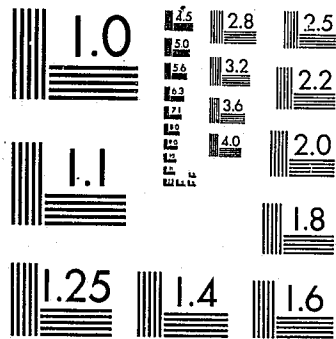


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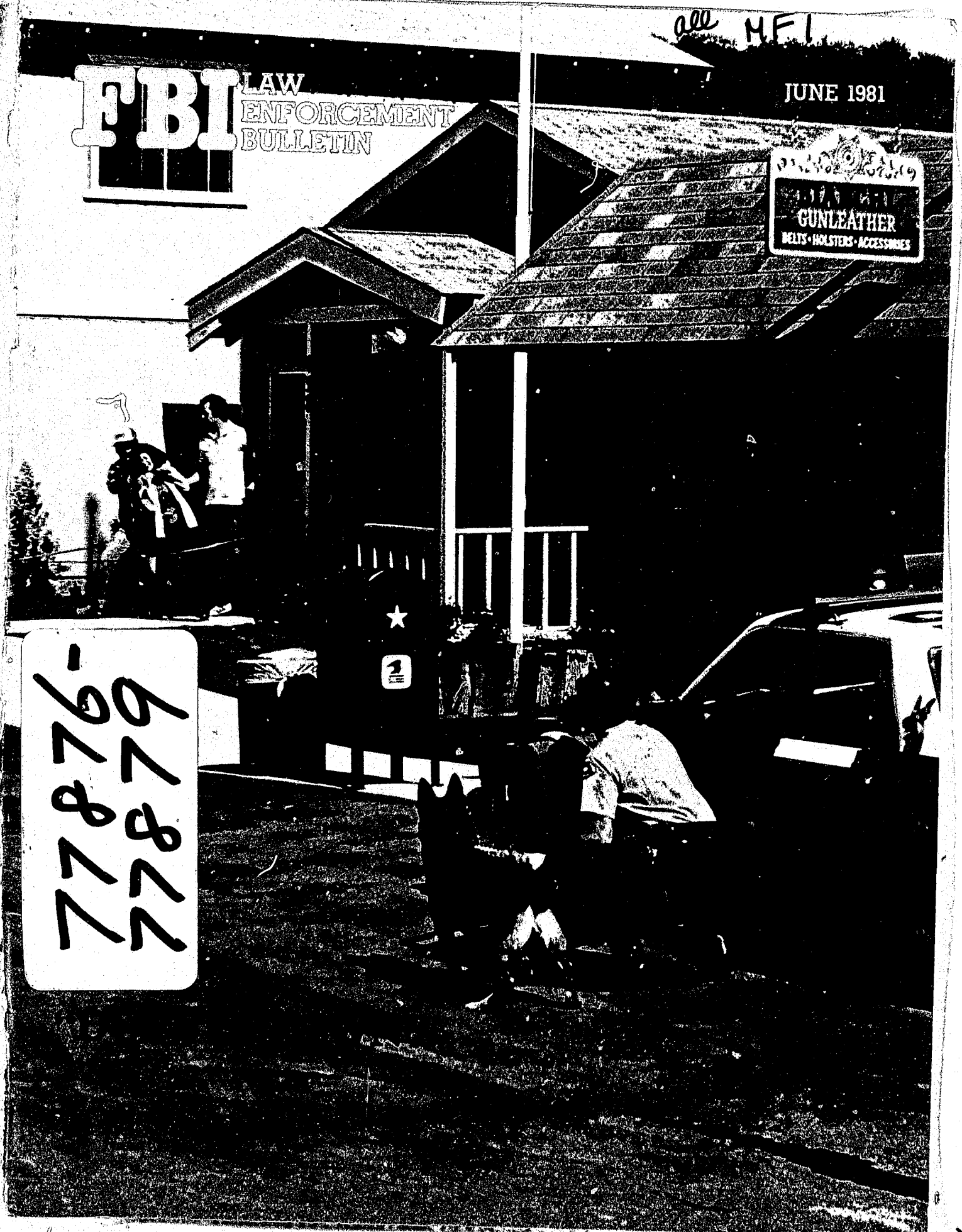
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Contents

- Crime Problems** 2 **A Practical Overview of Hostage Negotiations (Part I)**
By G. Wayne Fuselier 77876
- Management** 8 **Results Management (Part I)**
By John N. Dempsey and Pamela A. Hamm 77877
- Biographical Sketch** 13 **The Attorney General of the United States**
- Gambling** 14 **The Basket Game**
- Training** 16 **"Duffystown"—A One-of-a-Kind Tactical Training Facility**
By Jack Drown
- Forensic Science** 22 **Examination of a Typewritten Document**
By David W. Attenberger and W. Gary Kanaskie 77878
- The Legal Digest** 26 **In the Katz Eye: Use of Binoculars and Telescopes (Part I)**
By Robert L. McGuiness 77879
- 32 **Wanted by the FBI**



The Cover: "Duffystown" provides realistic exercises in tactical training. See story p. 16.

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William H. Webster, Director

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Forensic Science

Examination of a Typewritten Document

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Generally, typewriters and the printing sources in a word processing system currently can be equipped with conventional typebars, a single element ball, or a printwheel. A typewriter is a machine which has very limited or no memory capabilities. However, a final typewritten document cannot be determined to have been the result of a typewriter or a word processing system.

Developments and changes in the typewriting industry require that the investigating officer be fully updated regarding these advancements. For a typewriter examination by the FBI Laboratory to be of value to the investigation and prosecution of cases, investigators will have to be more knowledgeable regarding typewriters.

Basic Terms

- 1) Conventional typewriter using typebars—This popular typewriter has approximately 44 typebars connected to the keyboard. (See fig. 1.)
- 2) Typewriter using a single element or ball—This is a typewriter equipped with one element containing all the characters represented by the typewriter keyboard. (See fig. 2.)
- 3) Typewriter using a printwheel (electronic typewriter)—This is a typewriter equipped with a disc-type device called a printwheel. The printwheel contains all of the characters represented on the typewriter keyboard. (See fig. 3.)
- 4) Horizontal spacing—This is a measurement of the space a typewritten character occupies horizontally. The two most common spacings in the United States are 10 characters per inch (pica style of type) and 12 characters per inch (elite style of type). (See fig. 4.)

5) Proportional spacing—This type of horizontal spacing is not constant. Each typewritten character can occupy a different amount of horizontal space. The capital "M" occupies five units while the lower case "i" occupies two units of horizontal space. Each unit is equivalent to 1/32, 1/36, or 1/45 of an inch on the conventional typewriter. (See fig. 4.)

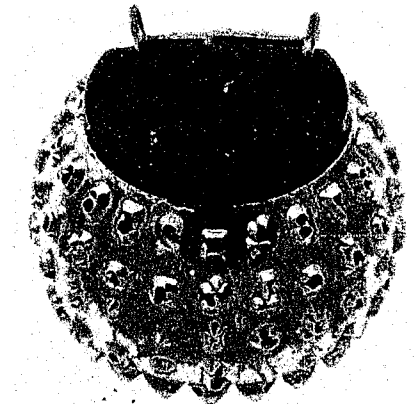
6) Dual-spaced machine—This is a typewriter that is capable of typing horizontally 10 characters or 12 characters per inch. The change of horizontal spacing is done easily by the flip of a switch. This is commonly found on single element (ball) typewriters.

7) Electronic typewriter—This machine usually has the capability of typing 10, 12, and 15 letters to an inch, as well as proportional spacing.

History and Development of Typewriters

Starting with the first commercially successful typewriter in 1873 (Remington), the machines used to prepare typewritten documents have progressed and changed dramatically. Beginning with a typewriter using the hammer (typebars) which used only capital (uppercase) letters, intense competition between various companies brought about continual improvements. In 1888, the "touch typing" system was introduced. In 1920, the first portable typewriter was marketed; in 1940, IBM introduced a proportional

Figure 2



spaced typewriter; in 1961 and 1962, single element (ball) typewriters were available; and in 1970 and 1971, dual-pitched (spacing) machines were introduced. The mid-1970's produced electronic typewriters and the use of "printwheels," "daisywheels," and disk-type wheels containing the type styles. The printed text on a document can now be the result of a typewriter, a word processing system, or a high-speed printer.

The two most frequently made typewriting examinations are determining the make and model typewriter used to prepare the questioned document and determining whether a specific known typewriter prepared the questioned document.

Classification of Make and Model

Original typewriting is preferred for examination. In examining the typewriting, the document examiner first determines the horizontal spacing of the questioned typewriting. The typewritten text is then examined for any characteristics unique to a particular typewriter, typewriter manufacturer, or type manufacturer. If no unique character(s) are found, the questioned typewriting is searched through the typewriter standards file. This file consists of American and foreign type styles collected by the FBI Laboratory over the past 50 years.

Figure 1

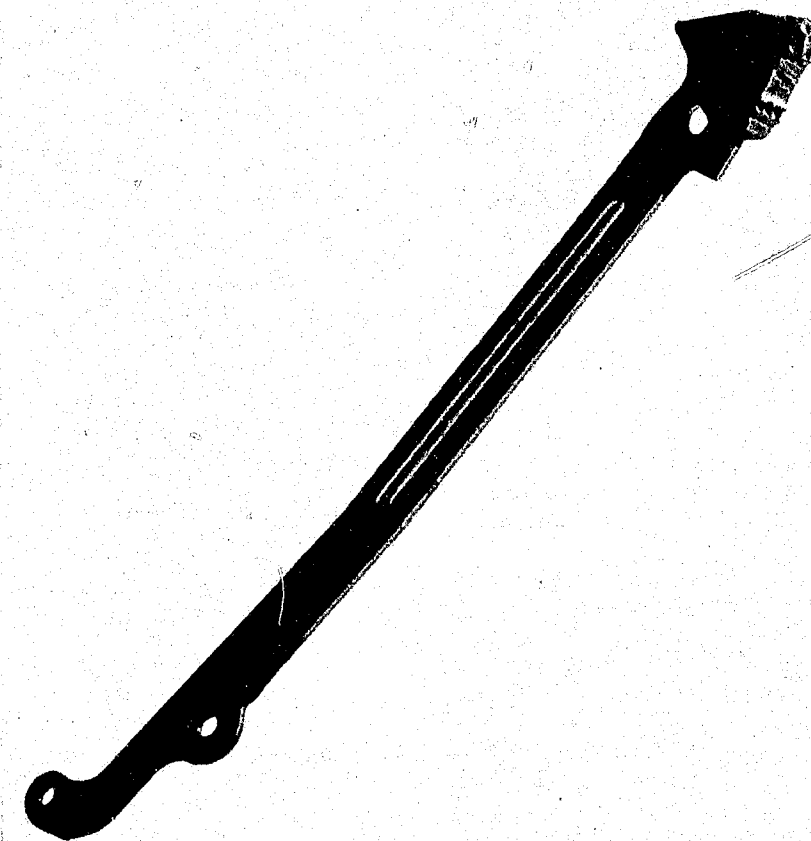
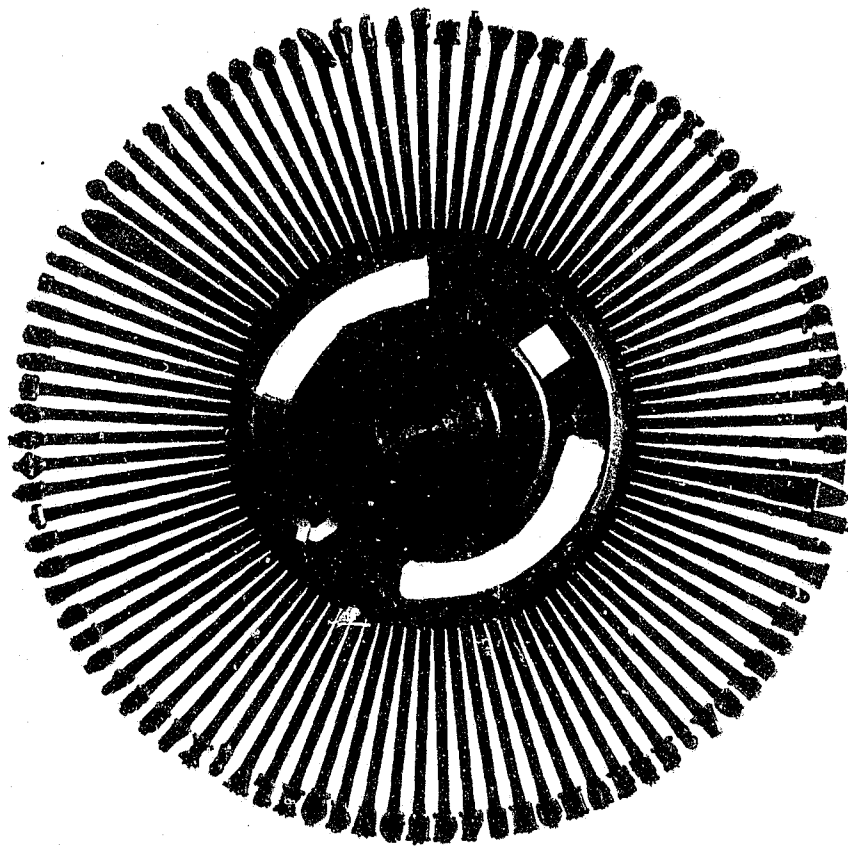


Figure 3



Once a known standard similar to the questioned typewriting is located, the questioned typewriting is compared with the known standard to insure that each character corresponds with the respective character on the known standard. The known standard is also used to verify that all suspected defects in the questioned typewriting are, in fact, defects.

Currently, numerous typewriter manufacturers obtain type fonts from the same type font manufacturer(s). Thus, many different brand name typewriters are equipped with a similar, if not identical, style of type. Without having a complete keyboard of the questioned text, it is often difficult to determine on which specific brand typewriter(s) the questioned typewriting was produced.

Comparison of the Questioned Typewritten Text With Known Typewritten Exemplars

When questioned typewriting is compared with known typewritten exemplars, three general areas of examinations are made:

- 1) Size and spacing (vertical and horizontal);
- 2) Type style; and
- 3) Unique identifying characteristics—character and alignment defects.

Using these three general areas, the FBI document examiner ultimately tries to determine if a particular typewriter prepared the questioned document to the exclusion of all other typewriters.

Referring to the machines previously described as having dual spacing, single elements, or printwheels, the investigating officer must not be

misled by horizontal spacing and/or different alignment characteristics. Remember, the same typewriter can type 10 letters and 12 letters per inch. Also, single elements and printwheels can be interchanged from one typewriter to another. This means that if a ball-type element or printwheel was used to prepare the questioned document, it is necessary not only to identify the single element or printwheel but also the specific typewriter. These compound considerations make the typewriter identification more complex.

Unique identifying characteristics commonly found on typebar machines, such as broken or bent serifs on a particular character, are not found as frequently on single elements or printwheels. This further complicates determining whether the questioned document can be positively associated with a particular typewriter or typewriting source.

In general, due to typewriter companies obtaining their type styles from the same manufacturer and due to the lack of unique identifying characteristics in the typewriting produced by single element and printwheel typewriters, the investigating officer should not expect too many positive identifications involving typewriters equipped with single elements and printwheels. However, many associations and identifications can be made when the conventional typebar machines are involved in the preparation of a typewritten text. Finally, although the particular typewriter may not be positively identified, it may be possible to determine that a particular typewriter or typewriting source did not prepare the questioned document.

Figure 4

This is Pica Spacing...Ten letters per horizontal inch

This is Elite Spacing...Twelve letters per horizontal inch

This is proportional spacing... M M i i M l M s 5 u N i

Obtaining Known Typewritten Exemplars

The following guidelines are suggested for obtaining known exemplars from a suspect typewriter:

- 1) If the typewriter ribbon is obviously new, remove it from the typewriter and send it to the laboratory with the typewriting exemplars prepared from another ribbon. (The text of the material in question may still be discernible on the ribbon.)
- 2) Unless the questioned document is excessively long, obtain its complete text, including typographical errors.
- 3) After placing the typewriter in a stencil position or removing the cloth ribbon, obtain samples of each character on the keyboard by typing through carbon paper which has been inserted carbon side down over a piece of white bond paper.
- 4) Make certain that each specimen contains the make, model, and serial number of the typewriter from which it was procured, as well as the date and the initials of the officer.
- 5) Typewriter specimens should be taken from suspect typewriter(s). It is usually not necessary to forward the typewriter to the FBI Laboratory if complete known exemplars are obtained. This will insure against loss or damage to the typewriter during shipment.

Also, examination of the typewritten exemplar may produce the requested result, thus eliminating cost and time involved in shipping the typewriter to the Laboratory. However, when certain alignment or nonprinting areas are present in a questioned and known typewriting, the document examiner may require that the known typewriter be submitted to the Laboratory for a more definite opinion to be reached.

- 6) If possible, after a typewritten exemplar is obtained from a suspect typewriter, the investigator should insure that the typewriter is kept in its current condition. For example, dirty type face could be identified with a questioned text typed on that typewriter. However, if maintenance and cleaning of the type has been conducted on that typewriter, the absence of the dirt particles on the type would change the appearance of the typewriting.

Typewriter Ribbons and Inks

Many typewriter ribbons, such as cloth, carbon with wax base ink, polyethylene and solvent coatings, mylar based, etc., are commercially available. When both the questioned document and the typewriter ribbon are submitted, it is possible to determine whether the questioned typewritten text was prepared by the ribbon submitted or by another ribbon of the same general style.

The FBI Laboratory does examine ribbons for suspected typewriting. Before submitting the ribbon for determining the text appearing on a particular ribbon, the investigating officer should determine whether the text is readable, since not all ribbons removed from typewriters can be read.

It is hoped that this article will better prepare the investigating officer to conduct a preliminary field examination of the evidence and better understand the opinions of the document examiner. The Document Section of the FBI Laboratory is always available to answer any questions regarding questioned documents. **FBI**

END