SIGNIFICANT DATES
OF
MODERN TYPING METHODS

Authored by
Jan Seaman Kelly

THE AMERICAN BOARD OF
FORENSIC DOCUMENT EXAMINERS, INC.
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PREFACE

This monograph is intended to be a resource for verified dates of typewriters, printers, ribbons, and correction fluids, as well as a brief history of the computer and the facsimile machine.

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THE AUTHOR

Jan Seaman Kelly is a questioned document examiner with the Las Vegas Metropolitan Police Department. Ms. Kelly received her document training from George Lewis and Susan Morton, who are with the U.S. Postal Service Forensic Laboratory in San Bruno, California. Her professional affiliations include the American Academy of Forensic Sciences, and she is a Diplomate of the American Board of Forensic Document Examiners, Inc.

TABLE OF CONTENTS

SIGNIFICANT DATES OF MODERN TYPING METHODS

The short 200-year history of the typewriter is filled with technological advances. The first typewriter known to exist was invented in 1808 by Pellegrino Turri.[1] The typewriter is the predecessor of the printers and computers in existence today.

This paper is the result of researching the introductory dates of the technological advances of typing methods, including typewriters, printers, ribbons, computers, and facsimile machines. The scope of this research deals mainly with the post-1940 era and only the United States market. However, due to the various print technologies used by earlier inventors in the 1800s, a brief listing of dates of earlier typewriter inventions is included. This research is intended to serve the examiner as a resource for verified dates and a starting point for case research. It seeks only to familiarize the examiner with the beginning of some print technologies and is not a complete history of the typewriter.

Knowing a verified date of product availability is important to enable an examiner to know whether a particular technology was available at the time the disputed document was created. Dates in this paper are described as announcement dates, introduction dates, shipping dates, test marketing dates, and production dates; and the examiner should note carefully the differences among these dates. It should also be noted that U.S. and European markets may have different introductory dates.

All of the dates listed in this paper were obtained either from earlier research papers by other examiners or from the manufacturers themselves. Some of the dates were verified through both sources. Numerous companies were contacted in an attempt to make this listing as complete as possible. Some companies, such as Canon, Pelikan, and Bic (Wite-Out) do not maintain archives concerning dates of availability of their products. The Gillette Corporation bought the Liquid Paper Company, and the only history of Liquid Paper is contained in one newsletter. Gillette did not maintain any dates other than those listed in this paper.

This paper is divided into six sections. Section I covers the dates of the technological advances in typewriters, ribbons, and printers by each company contacted as well as key features of the product. Section II is a brief history of today's printers. Section III lists the history of correction fluids, Post-it Notes, and carbon and carbonless paper. Section IV contains a chronology of typewriters and ribbons. Section V contains the history of facsimile machines as well as a brief history of the computer, focusing on the contributions of Apple, Inc. and IBM. Section VI is the glossary of terms used in this paper.

Section I

TECHNOLOGICAL ADVANCES BY COMPANY

TYPEWRITERS

Typewriter identification became more difficult in the late 1950's for the following reasons:

1. Imports of European typewriters increased greatly;
2. U.S. production of typewriters, particularly portables, declined in volume;
3. American typewriter companies began to manufacture typewriters in European factories and to market those typewriters in the U.S. under their own brand names;
4. Certain American typewriter companies started buying European typefaces for use on American-made typewriters, also marketed under their own brand names;
5. A consequential number of European typewriter manufacturers initiated models with pitches of 2.54 mm and 2.12 mm for export to the U.S., a departure from their historic adherence to the metric system.[2]

IBM

1933 Purchased tools and patents for Electromatic Typewriters, Inc. of Rochester, New York.[3]

1935 IBM Electric Typewriter, Model 01, was introduced. First commercially successful electric typewriter in the U.S.[4]

1938 Field tested ten proportional typewriters which were subsequently sold.[5]

1941 IBM Executive, a proportional spacing typewriter, was announced. World War II delayed its introduction.[6]

1944 Introduced its proportional spaced typewriter, the IBM Executive.[7]

1956 Model B Standard Typewriter introduced. Key features: Typebar typewriter; 10 or 12 pitch; fabric ribbon mechanism (ratchet spool).[8]

1956 Model B Executive Typewriter introduced. Key features: Typebar typewriter; proportional spacing; film ribbon mechanism; split space bar.[9]

1961 **July 31.** Introduced the Selectric I with "golf ball" typehead. Key features: 10 or 12 pitch; cartridge fabric ribbon. After 1963 could use carbon ribbon.[10]

1964 **July 1.** Magnetic Tape Selectric Typewriter (MT/ST) introduced. Key features: Record; reverse playout capability; 88-character interchangeable typing elements; 10 and 12 pitch.[11]

1966 Introduced Magnetic Tape Selectric Composer (MTSC).[12]

1967 **April 17.** Introduced the IBM "Executive" Model D. This is IBM's last typebar typewriter.[13]

1969 Introduced the IBM MagCard "Selectric." First typewriter that recorded on magnetic cards.[14]

1971 **September 1.** Introduced the Selectric II Typewriter. Key features: Dual escapement; half backspace; Tech III ribbon cartridge.[15]

1972 Introduced MagCard Executive Typewriter. Key features: 88-character interchangeable elements; proportional spacing; selective ribbon mechanisms.[16]

1973 **March 1.** Introduced the IBM Correcting Selectric II. First IBM Selectric with lift-off/cover-up correction key. This feature lifts typing errors off the paper.[17]

1973 IBM MagCard II introduced. First magnetic media machine with electronic technology. Memory holds up to 8,000 characters which can be revised and recorded on cards.[18]

1974 Introduced the IBM Memory Typewriter, Models 50 and 100. Key features: 50- or 100-page storage; 10 and 12 pitch; 88-character interchangeable typing elements.[19]

1977 6240 MagCard Typewriter introduced. Key features: 8,000 character memory; 96-character interchangeable non-cartridge printwheels; 10 and 12 pitch.[20]

1978 **May 23.** Introduced its electronic models, Model 50 and Model 60. Key features of Model 50: Golf ball element; can have 10 or 12 pitch and proportional-spaced characters; 96-character interchangeable typing element. Key features of Model 60: 96-character interchangeable element; no proportional spacing; automatic correction enabled the typist to reverse the type element, and when the automatic erase key is depressed the typewriter will select the error character from memory and automatically erase it.[21]

1979 **July.** MTST discontinued.[22]

1979 **October 1.** Introduced the IBM Electronic Typewriter Model 75. Key features: 7,500- or 15,500-character storage; electronic error corrections; 96-character interchangeable typing element.[23]

1979 Introduced the IBM Audio Typing Unit. Produced synthetic speech. Attachment for magnetic card typewriters enabled blind typists to proof and revise their documents.[24]

1979 Model D typewriter discontinued.[25]

1980 **May 7.** Introduced two models of the IBM Selectric III, Model 6703 and Model 6700, which are single pitch (elite) only. Key features: Expanded 90-, 94- or 96-character keyboard; uses 96-character interchangeable typing elements; 10 and 12 pitch; machines manufactured after 2/82 and through 10/84 have ribbon cassette systems. From 2/82 through 10/84, no ribbon guides on typewriter, semi-automatic loading. After 10/84, ribbon guides on typewriter.[26]

1982 **March 1.** Discontinued IBM Memory 50 Typewriter.[27]

1982 **November 18.** Introduced the IBM Electronic Typewriters 65 and 85. Key features: Triple pitch; automatic right margin justification; and an electronic keyboard.[28]

1982 **November 22.** Test marketed the IBM Personal Typewriter.[29]

1982 **December 15.** Discontinued the IBM Electronic 50, 60, and 75.[30]

1983 **January.** Introduced the IBM Personal Typewriter. This typewriter is a compact electric model for student and home use.[31]

1983 Introduced the IBM Electronic Typewriter 95 which offered 31,500 characters of internal memory.[32]

1983 Introduced Typewriter Communications Module which enabled the Electronic 85 to communicate with a variety of terminals, word processors, computers, and other Electronic 85's. A personal computer attachment permitted the Electronic 65 and 85 to be used as letter-quality printers for IBM PC.[33]

1984 **October 16.** Introduced the IBM Quietwriter 7. Key features: Non-impact print operation using resistive ribbon thermal printing and the printhead; single supply ribbon cartridge (no lift-off tape required); virtually undetectable corrections.[34]

1984 Introduced IBM Wheelwriter® 3 and Wheelwriter® 5. Key features: Advanced electronic functions; cartridge printwheels; automatic correction up to 72 characters (one line); semi-automatic paper feed; no platen knobs; optional personal computer attachment.[35]

1984 Introduced Actionwriter I, a compact typewriter incorporating printwheel technology.[36]

1987 Introduced the IBM Personal Typing System. It integrated the functions of a word processor and a typewriter in a single application-specific work station. Can also be used as a computer. An impact or non-impact printer can be used.[37]

1988 Introduced the IBM Personal Wheelwriter® Typewriter. It uses an IBM Cartridge Printwheel II.[38]

Underwood

1919 **November.** Released a portable typewriter.[39]

1947 **March.** Started manufacturing the Underwood Standard Electric Typewriter.[40]

1959 **September.** Olivetti merged with Underwood and bought Underwood stock.[41]

1960 **March.** Released "The Raphael", their first proportional-spaced typewriter.[42]

1960 **October.** Introduced the FORM, an electric standard model with duplex carbon and fabric ribbons.[43]

1961 **July 1.** Underwood acquired Olivetti Corporation of America.[44]

Olivetti

1952 Introduced electric typewriter, the Lexikon.[45]

1975 **Fall.** Introduced the Lexikon 82, a single pitch, heavyweight portable manufactured in Great Britain, and the Lexikon 90, a full-size typewriter manufactured in Italy and Harrisburg, Pennsylvania. The elements are not interchangeable between the Lexikon 82 and the Lexikon 90 due to their different mounting positions.[46]

1976 **Summer.** Marketed their Model 92C in the U.S. which can type proportional or elite spacing.[47]

1978 Introduced the Electronic Daisywheel in two models, ET 201 and ET 221.[48]

Smith Corona

1946 The name "Smith Corona" was used on all office and portable typewriters and adding machines from 1946 through 1962. Since 1962, the initials "SCM" have been used.[49]

1955 **February.** Introduced electric office machine, Model 2E.[50]

1957 **February.** Introduced their first electric portable machine, the "Smith Corona Electric."[51]

1983 **February 28.** Announced it will end production of manual typewriters.[52]

1983 **May 12.** Last manual typewriter made by Smith Corona came off the line.[53]

1983 **May 26.** Introduced three electronic typewriters that double as text printers for personal computers.[54]

Remington

1923 First Remington portable manufactured.[55]

1924 First Remington Noiseless typewriter manufactured.[56]

1925 Remington Electric, Model 112 was manufactured. Key features: Electric typebars, shift, backspacer, tabulator, and carriage return. America's first fully electric typewriter.[57]

1949 Introduced the Remington Electric.[58]

1956 Manufactured the Statesman, the company's first proportional typewriter.[59]

1960 Discontinued the manufacture of the Statesman.[60]

1967 **December.** Brother making typewriters for Remington.[61]

1974 Introduced the Sperry-Remington single-element typewriter, known as the SE-100. After 3,000 or 4,000 typewriters were manufactured under this designation, the typewriter was renamed the SR-101. The Remington SR-101 single-ball element is interchangeable with IBM's "Correspondence."[62]

Royal

1962 **January.** Office model, the "Empress", introduced.[63]

1962 **December.** Electric machine, the "Electress", introduced.[64]

1974 Introduced the single pitch, Royal 500 (also known as the Imperial 500), to the trade.[65]

1975 **May.** Royal/Imperial 500 first sold to the public.[66]

Brother

1961 **March.** Brother began producing their portable typewriter, the "Valiant". This machine put Japan among the world's typewriter producing nations.[67]

1961 Brother began selling typewriters in the U.S. under numerous brand names.[68]

1964 **March.** The full-size model of the "Valiant" was produced.[69]

1965 **February.** The Deluxe model of the "Valiant" was produced.[70]

1965 **August.** The electric portable model of the "Valiant" was produced.[71]

1967 **December.** Brother making typewriters for Remington.[61]

1968 **July.** Brother introduced Dial-A-Type which is a special attachment for the +/= key. Four different styles of Dial-A-Type: engineering, mathematical, international, and medicine-pharmacy. Each contains 6 different sets of characters including that depicted on the original typeface.[72]

1982 Brother entered the personal printer market with the production of the EP-20, a 7-pin thermal typewriter/ printer.[73]

RIBBONS

Underwood

1909 Introduced the bicolor red and black ribbon.[74]

Hammond-Varityper

1927 First typewriter to use a carbon ribbon and to introduce a carriage moving right-to-left or left-to-right at a turn of a switch.[75]

Olivetti[76]

Olivetti manufactures their own ribbons. Their ribbons are made of nylon, fabric, and mylar.

1977 Polyurethane ribbons by Olivetti. They were discontinued as a result of being too bulky when manufacturers started using cartridges.

Canon[77]

Canon does not maintain archive dates on their ribbons. All of their products were proprietary until 1982-1983. Prior to that date, Canon supplies could be obtained only through an authorized Canon dealer.

IBM

1957 Started production of Black Cotton Fabric Ribbons and Carbon Paper Ribbons.[78]

1958 Started production of Color Cotton Fabric Ribbons, Black/Red Bicolor Ribbons, and Polyester Carbon Ribbons.[79]

1960 5121 Ribbon: Single-strike impact ribbon made of polymer film coated with pigments, dyes, waxes, and oils. The ink soaks into the paper.[80]

1961 Cartridge Fabric Ribbons for the Selectric introduced.[81]

1962 Polyester Carbon Ribbon introduced.[82]

1963 5121 Polyethylene Film Ribbon for the Selectric was introduced.[83]

1965 Cartridge for the 5121 Carbon Film Ribbon introduced.[84]

1966 Introduced 2122 Solvent Film Ribbon; 5121 and 3121 Color Ribbon; 1202/1203 MICR Ribbon.[85]

1967 5122 Carbon Film Ribbon introduced.[86]

1971 Tech III Ribbon introduced. It is the only ribbon totally cast from solution and is a cartridge film ribbon.[87]

1972-73 IBM manufactured "Scotch" Brand #555 Lift-Off tape and sold bulk rolls to IBM. IBM then slit the bulk rolls to size and packaged the lift-off tape on spools for sale as correction tape for IBM Selectric typewriters.[88]

1973 **March 1.** IBM Correctable Film Ribbon and Lift Off Tape.[89]

1975 Thermal Transfer Ribbon developed. Non-impact technology consisting of heat resistant polyester substrate which is coated with solid ink composed of colorant such as carbon black and waxy resinous material which melts at high temperatures. The printhead consists of multiple heat sources arranged in a dot matrix pattern.[90]

1977 IBM High-Yield Film Correctable Ribbon introduced. Reduction in film thickness from 18 microns to 14 microns resulted in 25% increase in character yield.[91]

1983 IBM discontinues manufacture of "Scotch" Brand #555 Lift-Off tape.[92]

1984 IBM Easystrike Ribbon Cassette introduced featuring ratchet and pawl tensioning and an internal spike driver designed for the IBM Wheelwriter typewriter.[93]

1984 Introduced the Easystrike Lift-Off Tape manufactured by an ultraviolet curing process producing low tack, sheer sensitive tape.[94]

1984 Introduced Quietwriter Ribbon and 3890 Fluorescent Jet Ink.[95]

1985 **August 20.** IBM replaced "Quiet" non-correcting ribbon with non-eradicable, non-correcting ribbon to be recommended for use on negotiable instruments. Prior to this date, IBM had to print a warning stating the original ribbon should not be used for negotiable instruments.[96]

1985 **September.** "Quiet" high-density correcting ribbon was introduced providing more ink coverage and better stability of typed characters on rougher surfaced papers.[97]

1985 Announced the 4201 Proprinter Ribbon.[98]

1986 Introduced the 4224 Matrix Printer Ribbon, the 4234 Dot-Brand Printer Ribbon and the 4202 Proprinter XL Ribbon.[99]

1986 Announced a thermal transfer ribbon for the PC Convertible Printer.[100]

1986 Announced two 4-color and five black fabric ribbon cartridges for IBM printers.[101]

1988 Introduced the "Easystrike" High Yield Ribbon and the "Easystrike" SuperiorWrite Ribbon.[102]

Liquid Paper

1977 Made typewriter ribbons in Dallas, Texas.[103]

1983 Gillette closed the Greenville, Texas plant due to poor sales of correctable ribbons.[104]

Pelikan, Inc.

Pelikan, Inc. is a co-manufacturer of ribbons, and their product would be released after the Original Equipment Manufacturer (OEM). The Product Manager said she is unable to provide introductory dates of their products.[105]

The ribbon cassettes supplied with Brother typewriters are manufactured by Pelikan, Inc.[106]

PRINTERS

According to PC Magazine, the dot matrix printer market was on the decline in 1992 as a result of lower prices of laser printers. In 1992, 4.9 million dot matrix printers, 2.6 million laser printers, 1.8 million ink jet printers, and 100,000 thermal printers were sold in the U.S.[107]

According to BIS Strategic Decisions, buyers of dot matrix printers in 1991 and 1992 purchased the 24-pin printers over the 9-pin. Ink jet and laser printers are showing the most growth in sales.[108]

The five leading manufacturers of printers in 1992 are:

9-pin dot matrix:	Epson, Okidata, Panasonic, Star, and Citizen
24-pin dot matrix:	Panasonic, Epson, Citizen, Star, and Okidata
Inkjet:	Hewlett-Packard, Canon, Eastman Kodak, DEC, and Star
Laser:	Hewlett-Packard, IBM, Okidata, Panasonic, and Epson.[109]

Diablo Systems, Inc.

1972 Introduced the first daisywheel.[110]

1972 Xerox acquired Diablo.[111]

1982 **December 8.** Diablo introduced the EPM 1, first thermal ribbon transfer printer.[112]

Qume

QUME is concentrating its efforts on terminals and VGA monitors. The printer market is a small part of their business due to the expense of remaining competitive.[113]

1973 First established by David Lee.[114]

1974 First 45 cps daisywheel printers.[115]

1975 First 55 cps daisywheel printers.[116]

1975 Twin-track serial printers with 2 daisy wheels in tandem giving access to 192 different characters.[117]

1990 **June.** CRYSTALPRINT Express laser printer. Key features: 600 x 300 dpi and 12 ppm.[118]

QMS

1977 **August.** Shipped its first product. MAGNUM controller board that provides dot matrix printers the capability to produce sophisticated graphics, different sizes, and varieties of type, forms, bar codes, and coding of forms for repetitive use.[119]

1983 **January.** Introduced its first intelligent laser print system, the Lasergrafix 1200.[120]

1985 **November.** Broke the $2,000 price barrier for laser printers with the QMS KISS system.[121]

Epson

1964 Epson-Seiko introduced the EP-101, an electronic printer with printing mechanism connected to a clock for printing out racing speeds. First used at 1964 Tokyo Olympics.[122]

1968 Seiko released commercial version of EP-101, a miniature printer sold as a component for calculators and printers.[123]

1978 Introduced the first dot matrix printer for personal computers, the TX-80.[124]

1982 Only way to print from a computer is a 9-pin dot matrix printer.[125]

1983 Introduced their ink jet printer.[126]

1992 9-pin printers expected to comprise 35-40% of all dot matrix printers.[127]

Olivetti[128]

1975 Olivetti's first dot matrix printer, the PR 1470.

1977 TES 401 is Olivetti's first daisywheel word processor on the market.

Apple[129]

1979 Apple's first printer, SILENTYPE, is introduced. It is a thermal printer that will only use heat sensitive paper.

1982 **July.** Apple Dot-Matrix printer introduced.

1984 **April.** Apple Scribe printer introduced. This is a 24-pin in-line vertical thermal transfer dot matrix.

1985 **January.** LaserWriter introduced.

1988 **January.** Apple introduced desktop laser printers: family of LaserWriter II including LaserWriter IINTX, LaserWriter IINT and LaserWriter IISC.

1990 **July.** Introduced Personal LaserWriter SC and Personal LaserWriter NT.

1991 **March.** Low cost laser printers introduced including the StyleWriter and Personal LaserWriter LS.

Hewlett-Packard[130]

1984 **May.** Introduced HP LaserJet with 2 fonts.

1984 2.8 million ink jet printers sold.

1984 HP Thinkjet introduced. The first HP printer based on thermal drop-on-demand ink jet technology.

1985 **September.** HP LaserJet printer introduced with 3 fonts.

1987 **March.** The HP LaserJet 2000 printer with 2 font cartridges.

1990 **February.** HP LaserJet III printer introduced with resolution enhancement technology.

1991 **March.** HP LaserJet IIISi printer introduced. Key features: Microfine toner; optional network printer interface; optional duplex printing; optional Adobe Postscript integrated into design.

1991 **August.** HP LaserJet IIISi for the Macintosh introduced.

1992 **January.** HP LaserJet IIISi printer for Macintosh with EitherTalk.

1992 **October.** Introduced the Laser 4 and the HP LaserJet 4M. Both printers have a 600 dpi resolution.

1992 **October 5.** Announced the November release of two new color printers. DeskJet 550C works with DOS and Windows computers. HP DeskWriter 550C for Apple MacIntosh.

1992 **November.** DeskJet 550C and DeskWriter 550C introduced.

IBM

1975 Introduced the IBM 3800 Printing Subsystem using a high speed, non-impact laser technology. Average speed is 20,040 lines per minute or 215 pages a minute. Used the Xerox 9700 laser printer.[131]

1976 IBM 6640 DocumentWriter Inkjet Printer. Key features: Non-impact inkjet printing; electronic type style changing; 10 and 12 pitch; proportional spacing.[132]

1980 IBM DisplayPrinter 5218 and 5228. These two printers deliver high-quality printed impressions in 10-pitch rated burst speeds of either 40 or 60 cps. Model 5228 is a wide-carriage version in 60 cps. The printwheels and ribbons are enclosed in separate cartridges. These printers print bi-directionally. They can print proportionally spaced, or 10, 12, or 15 characters to the inch.[133]

1980 IBM Displaywriter printer uses 88-character interchangeable typing elements, 10 and 12 pitch.[134]

1982 PC Graphics Printer. Key features: All-purpose printer with 4 modes of APA graphics; up to 120 dpi horizontally, 216 vertically; 3 character sets; prints up to 80 cps in both directions.[135]

1983 IBM PC Color Printer. Key features: 35 to 200 cps bi-directional dot matrix printer; point modes draft, 200 cps; text, 110 cps; near-letter-quality, 35 cps, using a black ribbon; high resolution: 82.5 dpi. Choice of 3 ribbons: black, primary 4-color, and process 8-color ribbon; uses fanfold, cut sheet, single-ply paper, and up to 4-part forms.[136]

1983 IBM PC Compact Printer. Key features: Compact; uses 5 x 8 dot matrix; offers APA graphics; prints up to 50 cps; 4 print modes available; uses thermal paper in sheets, fanfold or continuous rolls.[137]

1984 Quietwriter Printer. Key features: Non-impact printing technology; letter-quality printing; support for PC graphics.[138]

1984 Wheelprinter. Key features: Letter-quality, serial, impact printer; prints 25 cps; 10, 12, or 15 pitch and proportional spacing; for word processing applications.[139]

1985 IBM 3812 Page Printer. Key features: LED printhead technology; provides letter-quality text and APA graphics; print resolution of 240 x 240 dpi; prints up to 12 pages per minute; tabletop model; electrophotographic (laser) technology.[140]

1985 IBM Wheelprinter E. Key features: Letter-quality printing; multipart forms printing; full 13.5 inch print line.[141]

1985 IBM Color Jetprinter. Key features: Drop-on-demand ink jet technology; 7-color text and graphics; APA at 100 x 96 pels-per-inch resolutions in text and graphic modes.[142]

1985 IBM Proprinter. Key features: All-purpose PC printer with APA full-function graphics; operates in 3 print modes: normal, 200 cps; emphasized, 100 cps; and NLQ, 40 cps; Pitches: 5, 6, 8.55, 10, 12, and 17.1 cpi.[143]

1986 IBM PC Convertible Printer. Key features: Portable; thermal-transfer printer designed to attach to the back of IBM PC; uses thermal, thermal-transfer or smooth paper.[144]

1987 IBM Proprinter II. Key features: High-speed, NLQ impact printer; APA-graphics capability; prints double-high characters.[145]

1987 IBM Correcting Wheelwriter Printer.[146]

1987 IBM Correcting "Quietwriter" printer.[147]

1988 IBM Proprinter III. Key features: High-speed, 9-wire, dot matrix with APA graphics capability.[148]

1988 IBM Quietwriter Printer. Key features: High-speed, executive letter-quality output; 8 resident fonts; multipart forms capability (original plus 4 carbon or carbonless copies). [149]

1990 IBM ExecJet Printer. Key features: Wide carriage; 64-nozzle; letter-quality ink jet printer.[150]

1990 IBM PS/1 Printer. Key features: Narrow carriage; 24-wire serial; dot matrix impact printer designed to be a companion for the IBM PS/1 Computer.[151]

1990 IBM LaserPrinter. high resolution, 300 dpi printing.[152]

1991 IBM LaserPrinter 10. Key features: Standard office laser printer; 300 x 300 dpi with PQET for character and line smoothing; 600 x 600 dpi with PostScript and 4MB memory options.[153]

1991 IBM LaserPrinter 10P. Key features: 600 x 600 dpi; PostScript software from Adobe built in; 39 Adobe Type 1 scalable fonts.[154]

1991 IBM Personal Printer Series II. 9-wire dot matrix printer marketed with a narrow or wide carriage printer.[155]

1992 IBM Portable Printer. Portable, thermal transfer printer that produces 360 dpi output.[156]

1992 IBM 4070 IJ Printer. This ink jet printer is a 64-nozzle bubble-jet laser-sharp 360 dpi printer.[157]

1992 IBM Color Jetprinter PS. Key features: Thermal ink jet print technology for laser-quality text and color printing; 360 dpi text and graphics resolution; 39 scalable fonts.[158]

Okidata

1980 Okidata's dot matrix printer, the ML 80.[159]

1992 **September 28.** DOC-IT introduced. Uses digital technology to combine functions of laser printer, scanner, copier, and facsimile machine. The first desktop machine to combine all four into one.[160]

Citizen[161]

1985 **December.** Introduced their 9-pin dot matrix printer, the Model D.

1987 **May.** Introduced their laser printer, the Overture 110. This printer was discontinued after a couple of years due to the cost of staying competitive, and Citizen preferred to apply their technology to other printers.

1991 **August.** Introduced their notebook printers, the PN48 Standard and the PN48 Professional. Both printers use the printing process of thermal fusion, which is currently proprietary to Citizen. This printing process gives laser-quality printing. Citizen is the OEM of this process, and one of their customers is Lexmark.

Tektronix[162]

1969 Monochrome printer. The monochrome machines involved a dry silver process.

1982 4691 150 dpi color ink jet raster printer (B-size).

1982 The company started to focus their production on color printing and began ceasing production on all their other printers.

1983 4695 120 dpi color ink jet screen copy printer.

1984 4692 150 dpi color ink jet printer (A-size).

1986 4696 150 dpi color ink jet screen copy printer. (Replacement for 4695).

1987 4693 D 300 dpi color thermal wax raster printer (for Macintosh).

1988 4693 CP 300 dpi color thermal wax PostScript printer.

1988 4693 DX 300 dpi color thermal wax raster printer.

1989 ColorQuick 216 dpi color ink jet printer.

1989 4693 PS 300 dpi color thermal wax PostScript printer.

1990 4693 PX 300 dpi color thermal wax PostScript printer.

1991 4694 PX 300 dpi color thermal wax PostScript printer.

1991 4698 PXi 300 dpi color phase-change ink jet PostScript Level 2 printer.

1993 200e 300 dpi color thermal wax PostScript Level 2 printer.

1993 200i 300 dpi color thermal wax PostScript Level 2 printer.

Section II

BRIEF HISTORY OF TODAY'S PRINTERS

Typewriter sales have been in the decline since 1986. This trend is due, in part, to the market growth of impact and non-impact printers available for business and home use.[163]

Listed below is a brief history of today's printers.

DAISYWHEEL

1970 Diablo developed the HyType printwheel.[164]

1972 Diablo introduced the HyType printwheel.[110]

1973 QUME first established.[114]

1974 QUME introduced first 45cps daisywheel printer.[115]

1977 Olivetti introduced the TES 401, first daisywheel processor on the market.[128]

1983 By the end of 1983, every daisywheel manufacturer included a sub-$1,000 unit in their product line. Low-end products could no longer be dismissed as toys.[165]

1985 Since 1985, daisywheel shipments have declined.[166]

DOT MATRIX

1937 Patent for dot matrix printhead using 30 wires.[167]

1948 Burroughs used impact dot matrix technology in printing devices for punch cards, addressing, and general computer output.[168]

1960 **Mid-1960's.** Philips Mosaic printer was the first truly inexpensive and compact dot matrix printer. Developed in Germany for that company's printing calculator.[169]

1970 IBM introduced its 66 cps Model 2213 several months before Centronics Model 101.[170]

1970 Centronics announced their Model 101. Centronics is given credit for popularizing and "inventing" the serial dot matrix printer. The printer's output was 165 cps.[171]

1972 Mannesmann Tally's dot matrix line printer used a "comb" printhead for data processing.[172]

1975 Olivetti dot matrix printer PR 1470.[173]

1978 Epson introduces the first dot matrix printer for the personal computer, the TX 80.[124]

1980 By the end of 1980, 120 printer manufacturers were selling products in the U.S. Almost all offered at least one dot matrix printer.[174]

1982 Since this date, 24-wire printers have been the leading seller in the serial dot matrix market.[175]

INK JET

The developmental history of ink jet technology dates from 1873 when Lord Kelvin used ink jet pattern generation. Patents can be found from 1940's and 1950's. During the 1960's, technology development addressed typewriter, calculator, mailing system, and general computer output.[176]

1965 Paillard, a Swedish company, patented the ink jet printer.[177]

1969 A.B. Dick released their ink jet printer, the VIDEOJET.[178]

1974 Casio (Japanese firm) introduced an all electronic typewriter using ink jet printing called the "Typuter".[179]

1976 IBM introduces inkjet printer, the IBM 6640 DocumentWriter.[132]

1982 Tektronix introduces color inkjet.[162]

1984 2.8 million ink jet printers sold.[130]

LASER

1973 Xerox introduced its model 1200, a 60 ppm device.[180]

1979 Canon introduced the LBP-10, a 10 ppm desktop printer engine that used low power semiconductor laser. OEM price $6,000.[181]

1983 **Late.** Canon introduced the Canon LBP-CX printer engine. It began the "low-end" page printer market, since its sub-$1,000 engine price permitted OEM's to sell their products under $3,000. OEM's include Hewlett-Packard and Apple.[182]

1983 QMS introduced their laser printer, the Lasergrafix 1200.[120]

1984 **May.** Hewlett-Packard introduced its laser printer, the LaserJet.[130]

IMPACT AND NON-IMPACT PRINTERS

1964 Epson-Seiko: EP-101.

1968 Seiko released commercial version of the EP-101.

1970 IBM introduced its 66 cps Model 2213 dot matrix printer.

1970 Centronics announced its 165 cps dot matrix printer, the Model 101.

1972 Diablo introduced its HyType printwheel.

1973 QUME first established by David Lee.

1973 Xerox 1200 computer printing system. First non-impact xerographic printer for computer output.

1974 QUME: First 45 cps daisywheel printer.

1975 QUME: First 55 cps daisywheel printer.

1975 Olivetti introduced dot matrix printer: PR1470.

1975 IBM 3800 Printing Subsystem.

1975 QUME. Twin-track serial printer with 2 daisy wheels in tandem.

1976 IBM 6640 Document Writer ink jet printer.

1977 **August.** QMS shipped its first product, the MAGNUM controller board giving dot matrix printers the capability to provide sophisticated graphics, different sizes and varieties of type, forms, bar codes, and coding forms for repetitive use.

1977 Olivetti: TES401; first daisywheel word processor on market.

1977 NEC introduced the company's thimble-type printer, the Spinwriter.[183]

1978 Epson introduced its dot matrix printer for personal computers, the TX-80.

1979 Epson introduced the MX-80 dot matrix printer.

1979 Apple's first printer, the Silentype, is introduced.

1980 IBM DisplayPrinter 5218 and 5228 introduced.

1980 IBM Displaywriter 5215 printer introduced.

1980 Okidata introduced its dot matrix printer, the ML 80.

1982 **January.** Canon introduced the Electronic daisywheel typewriter, the Model AP 400.

1982 **July.** Apple's dot matrix printer introduced.

1982 **November.** Xerox introduced custom plastic printwheel.

1982 **December 8.** Diablo introduced the EPM 1 printer.

1982 Only way to print from a computer is a 9-pin dot matrix.

1982 IBM PC Graphics printer introduced.

1982 SCM introduced the TPI, a 12 cps daisywheel.[184]

1982 Tektronix 4691 color inkjet announced.

1983 **January.** QMS introduced its first intelligent laser print system, Lasergrafix 1200.

1983 Color inkjet: Canon PJ 1080A announced.
Sharp I. 0700 announced.
Sanyo (Benson) announced.[185]

1983 IBM PC Color printer introduced.

1983 IBM PC Compact printer introduced.

1983 Epson entered the U.S. market with inkjet.

1984 **April.** Apple Scribe printer introduced.

1984 **May.** HP LaserJet, 2 fonts.

1984 IBM Quietwriter printer introduced.

1984 IBM Wheelprinter introduced.

1984 Hewlett-Packard: first ink jet printer based on thermal drop-on-demand ink jet technology.

1984 Minolta announced its color ink jet printer.

1984 Ink jet: 2.8 million ink jet printers sold.

1984 Laser: first available to the public but high cost limited to corporate & executive level.

1985 **September.** HP LaserJet Plus printer with 3 fonts.

1985 **November.** QMS introduced the QMS KISS system under $2000.

1985 Citizen introduces its Model D, a 9-wire dot matrix.

1985 Apple's LaserWriter printer.

1985 IBM 3812 Page printer using LED technology and electrophotographic printing.

1985 IBM Wheelprinter E introduced.

1985 IBM Color Jetprinter introduced.

1985 IBM Proprinter introduced.

1985 Postscript. Developed by Adobe Systems, PostScript exceeds capabilities of the LaserJet's native printer control language.

1986 IBM PC Convertible Printer introduced.

1987 **May.** Citizen introduced its laser printer, the Overture 110.

1987 IBM Correcting Wheelwriter Printer introduced.

1987 IBM Correcting "Quietwriter" Printer introduced.

1987 IBM Proprinter II introduced.

1987 HP LaserJet 2000 printer introduced.

1988 **January.** Apple introduced its desktop laser printer, LaserWriter II.

1988 IBM Proprinter III introduced.

1988 IBM Quickwriter Printer introduced.

1990 **February.** Hewlett-Packard introduced the HP LaserJet III.

1990 **July.** Apple introduced the Personal LaserWriter SC and the Personal LaserWriter NT.

1990 IBM PS/1 Printer introduced.

1990 IBM ExecJet Printer introduced.

1990 IBM LaserPrinter introduced.

1990 Epson introduced the ES-300C color scanner and a family of personal computers, the Equity Plus series.

1991 **March.** Apple low-cost laser printer introduced including Stylewriter, & Personal LaserWriter LS.

1991 **March.** HP LaserJet IIISi printer introduced.

1991 **August.** HP LaserJet IIISi for Macintosh introduced.

1991 **August.** HP LaserJet Postscript printers with Apple talk.

1991 **August.** Citizen introduced its notebook printer, the PN 48 Standard notebook printer and the PN48 Professional notebook printer.

1991 Epson introduced the EPL-7500, the first RISC-based laser printer with built-in PostScript.[186]

1991 Epson introduced ESC/P 2, the next generation control language for dot matrix printers that incorporates scalable fonts.[187]

1991 IBM Personal Printer Series II: 9-wire dot matrix. Marketed with narrow or wide carriage printer.

1991 IBM LaserPrinter 10: Standard office laser printer.

1991 IBM LaserPrinter 10P: 600 x 600 dpi laser printer.

1992 **January.** HP LaserJet IIISi printer for MacIntosh with EitherTalk.

1992 **September.** OKIDATA desktop DOC-IT combines functions of laser printer, scanner, copier, and facsimile machine.

1992 **October.** HP introduced two new color ink jet printers.

1992 **November.** HP Deskwriter 550C for Apple MacIntosh color printer.

1992 IBM Portable Printer introduced.

1992 IBM 4070 InkJet Printer introduced.

1992 IBM Color Jetprinter PS introduced.

1992 Epson introduced the ActionPrinter 3250 dot matrix printer.[188]

1992 Epson states 9-pin printers will comprise 30-40% of all dot matrix models.

Section III

CORRECTING FLUIDS
LIFT-OFF TAPES
POST-IT NOTES
CARBON PAPER

CORRECTING FLUIDS

1951 Bette Nesmith established a company called Mistake Out. Made of tempera water base paint. Colored tempera to match stationery. Operated from home.[189]

1956 Bette Nesmith changed her product name from Mistake Out to Liquid Paper and applied for a trademark.[189]

1960 **June 6.** Ko-Rec-Type manufactured by Eaton Allen Corp.[190]

1960 **June 17.** Ko-Rec-Copy in commerce.[190]

1965 Wite-Out Company started.[191]

1968 Mistake Out Company becomes Liquid Paper Corp.[189]

1970 Correction fluid marketing in the 1970's was regional. Wite-Out served East Coast.[192]

1970 Liquid Paper Slipstick marketed.[189]

1970 Liquid Paper market areas: Texas, California, and Chicago.[189]

1972 Liquid Paper manufactured in Toronto, Canada.[189]

1973 Liquid Paper stopped making Slipstick due to pen reacting with the fluid, changing its color.[189]

1974 Liquid Paper developed European markets.[189]

1976 Liquid Paper manufactured in Australia.[189]

1979 Gillette Company purchased Liquid Paper. Products offered Bond White, Pen & Ink, Just for Copies, Mistake Out, Thinner, and all stock colors except grey.[193]

1980 Liquid Paper; PaperMate Office Products (PMOP) correction fluids introduced: Bond White, Pen & Ink, stock colors, etc. PMOP fluids do not carry the Liquid Paper brand name and are sold in select "bid" cases.[194]

1981 Liquid Paper added mustard oil to the Bond White formula to discourage inhalation abuse.[195]

1984 Liquid Paper stock color grey is introduced. Total colors: 9.[196]

1985 Liquid Paper's Just for Forms introduced. Only one product line was completed. The product line received poor consumer acceptance and was discontinued shortly after its introduction.[197]

1990 **June.** Wite-Out's multi-purpose correction fluid. Covers red ink.[198]

1990 Liquid Paper introduced Fax Fluid and the Liquid Paper Correction Pen.[199]

1992 **June.** Wite-Out company bought by BIC.[200]

1992 Liquid Paper introduced MultiFluid, a multi-purpose correction fluid.[201]

LIFT-OFF TAPES

1972 3M manufactured "Scotch" Brand #555 lift-off tape and sold it in bulk to IBM. IBM then slit the bulk rolls to size and packaged the tape as spools for sale in the IBM Selectric II starting in 1973.[88]

1973 **March 1.** IBM introduced "lift-off" correcting tapes. IBM Tech III Cover-Up tape.[202]

1978 3M sold the "Scotch" Brand #555 lift-off tape through its own commercial supply division.[203]

1983 3M discontinued manufacturing "Scotch" Brand #555.[92]

1984 IBM's Easystrike Lift off Tape: manufactured by an ultraviolet curing process producing a low-tack, shear-sensitive tape.[204]

POST-IT™ NOTES

1977 Test market for Post-it™ note pad by 3M.[205]

1980 **May.** 3M first nationally marketed Post-it™ Note Pad. Sizes: approximately 1 1/2" x 2", 3" x 3", 3" x 5". Color: Yellow.[206]

1983 **November.** New size 2" X 3" introduced and available in 5 colors: white, pink, green, blue & yellow. Pads plain and no printing.[207]

1983 **November.** 3M started labeling the back side of each paper with the 3M logo.[208]

The 3M Corporation maintains introductory dates, but would not verify the below-listed dates stating it is against corporate policy to release such information. Therefore these dates could not be verified specifically and are approximate dates of introduction.[209]

1985 (circa) 3M changed the logo on the backside of each Post-it™ Note from "3M" to the words "Post-it™ Note".

1989 (circa) Post-it Tape Flags.

1991 (circa) Neon Post-it Notes.

CARBON PAPER

1806 Englishman Ralph Wedgewood patented carbon paper.[210]

1900 Exact date unknown. Early 1900's, carbon paper was coated with carnauba wax from Brazil. Earlier coatings were beeswax, lampblack, and grease which made the paper more difficult to handle, and the grease would be absorbed into the paper.[211]

1957 IBM released carbon paper.[212]

1957 IBM released carbon paper ribbons.[213]

Modern carbon papers are coated on one side with a mixture of pigments and waxy oily materials. These coatings can be applied to either tissue paper or a polymeric film such as mylar.

There are four categories of carbon paper:

1. The one time and manifold carbon papers consisting of tissue paper which is thinly coated on one side;
2. The unprocessed back carbons which are economy-grade and are usable more than once, but wear out quickly;
3. The processed back carbon papers are the most common and can be used 7 to 10 times. They have a non-curl wax coating on the non-pigment-coated side;
4. The mylar-film sheet is the most expensive, durable, and difficult to tear.

There is a "solvent-coated" carbon paper found on both paper and mylar carbons and tends to refill overnight.

Pencil carbon paper almost always contains blue pigment while typewriter carbons are black. The pencil carbon waxes are much softer than typewriter carbon waxes and react to rubbing pressure rather than a blow from a typewriter character.[214]

CARBONLESS PAPER[215]

1939 First patent for carbonless process awarded to National Cash Register (NCR).

1954 NCR paper introduced to the public.

1969 Frye Manufacturing test-marketed a physical self-imaging system of carbonless paper called "Hi-Mark".

1971 **March 22.** Frye Manufacturing introduced their product the "Hi-Mark".

Section IV

CHRONOLOGY OF RIBBONS AND TYPEWRITERS

RIBBONS

1841 Patent on inventing typewriter ribbon by Alexander Bain.[216]

1843 Bain obtained patent #9745 rollers carrying an endless silk ribbon which was saturated with printers ink and dried.[217]

1855 Giuseppe Ravizza with Cembalo Scrivana historically credited for inventing the ribbon using fats and dyes.[218]

1876 First typewritten book manuscript. Done on a Remington Type-Writer by Mark Twain.[219]

1896 Remington claims to have invented automatic ribbon reverse. Other sources say BAR-LOCK invented by Charles Spiro.[220]

1909 Bicolor red & black ribbon by Underwood.

1957 IBM began manufacturing typewriter supplies such as typewriter ribbon and carbon paper.

1957 IBM started production of black cotton fabric and carbon paper ribbons.

1958 IBM manufacturing cotton fabric, carbon paper, nylon fabric black/red bicolor fabric, and polyester ribbons.

1960 IBM introduced ribbon #5121: single strike wax-based ink on polyethylene substrate.

1961 IBM Selectric uses cartridge fabric ribbon.

1962 IBM polyester carbon ribbons.

1963 IBM Selectric polyethylene film ribbon, #3121.

1965 IBM cartridge for #5121 carbon film ribbon.

1966 IBM introduced #2122: solvent film ribbon; #5121 color ribbon; #1202/1203 MICR ribbon.

1967 IBM #5122 carbon film ribbon.

1968 IBM introduced the OCR ribbon.

1971 IBM Tech III ribbon: cartridge film ribbon for Selectric II.

1973 **March 1.** IBM introduced correctable film ribbon Lift-Off Tape.

1975 IBM introduced its Thermal Transfer ribbon.

1977 IBM High Yield Correctable film ribbon.

1977 Olivetti introduced its polyurethane ribbons: Too bulky when manufacturers went to cartridges.

1979 IBM: Color Correctable ribbons for Correcting Selectric III.

1979 IBM: Electronic Typewriter Ribbon Cassette System.

1984 IBM: Wheelprinter ribbons
Easystrike ribbons
Quietwriter ribbons which is self-correcting.
3890 Fluorescent Jet ink.

1984 IBM introduced the Easystrike ribbon cassette system.

1985 **August 20.** IBM replaced the "Quiet" non-correcting ribbon with a non-eradicable, non-correcting ribbon to be recommended for use on negotiable instruments. Prior to this date, IBM had to print a warning that this ribbon should not be used for negotiable instruments.

1985 **September.** IBM's "Quiet" high density correcting ribbon provided more ink coverage and better stability of typed characters on rougher surfaced paper.

1985 IBM's 4201 Proprinter ribbon announced.

1986 IBM's 4224 Matrix printer ribbon announced.
4234 Dot-band printer ribbon
4202 Proprinter XL ribbon.
Thermal transfer ribbon for the PC Convertible printer

1986 IBM announced two 4-color and 5 black fabric ribbon cartridges for IBM printers.

1987 IBM introduced the Quiet III Ribbon.

1988 IBM introduced the "Easystrike" High Yield ribbon and "Easystrike" SuperiorWrite ribbon.

TYPEWRITERS

1714 **January 7.** Henry Mill credited with basic idea of the typewriter. Queen Anne granted him a Royal Letters Patent.[221]

1808 Pellegrino Turri invented the first known typewriter.[1]

1865 Malling Hansen invented the Writing Ball typewriter.[222]

1866 Final model of Pratt's typewheel typewriter, the "Pterotype". The paper was held in a vertical frame, and a hammer produced the impression. Carbon paper was used for the impression.[223]

1867 Christopher Lathem Sholes of Milwaukee, was the 52nd man to invent the typewriter. His machine, the Type-Writer, was the first practical commercial machine.[224]

1872 First patent for electric typewriter by Thomas Edison.[225]

1873 **September.** Remington began manufacturing one thousand Type-Writers.[226]

1874 Remington shipped its first shipment of the Type-Writer.

1875 **March.** Mark Twain (Samuel Clemens) wrote a testimonial to the Remington Type-Writer.[227]

1876 Mark Twain was the first author in history to turn in a typewritten manuscript from Remington's Type-Writer.[228]

1879 Crandall was the first type-sleeve typewriter in the typewheel class. Printing was by ribbon.[229]

1884 Hammond Typewriter had interchangeable type and proportional spacing.[230]

1891 "A Case of Identity" printed in Strand Magazine. Consulting detective wrote of the typewriter, its potential for use in crime and its individuality.[231]

1894 W.E. Hagan's treatise, "A Treatise on Disputed Handwriting and the Determination of Genuine from Forged Signatures" commented on the role of document examiner and that of typewriter ID. First work of merit.[232]

1897 Blickensderfer's typewriter was a typewheel with the impression printed from an ink roll. It had a travel bag for portability.[233]

1907 The Standard Folding Type-Bar Visible Writing Typewriter introduced by the Standard Typewriting Company. First folding portable typewriter.[234]

1908 Blickensderfer first electrically operated typewriter.[235]

1919 **November.** Underwood portable introduced. It was discontinued in November, 1959.

1924 Auto-Typist automatic typewriter. Operated from an 11-inch player-piano perforated roll.[236]

1925 Remington Electric, Model 112 with electric typebars, shift, back spacer, tabulator, and carriage return. America's first fully electric typewriter.

1927 Hammond Varityper manufactured a typewheel typewriter featuring changeable fonts and using carbon ribbon.[237]

1933 IBM purchased tools and patents for Electromatic Typewriters.

1935 IBM introduced the IBM Electric, Model 01. First commercially successful electric in U.S.

1941 IBM announced its IBM Proportional.

1944 IBM introduced the IBM Proportional typewriter.

1946 The name "Smith Corona" used on all office and portable typewriters and adding machines from 1946 through 1962. Since 1962, the initials "SCM" has been used.

1947 **March.** Underwood Electric typewriter.

1949 Western Stamping Company marketed the "Tom Thumb" toy typewriter. The "Tom Thumb Junior" toy typewriter was a typewheel machine with raised characters on a plastic strip encircling a wheel.[238]

1949 Remington. Introduced its Electric typewriter.

1951 Univac Automatic. Uni-Typer recorded on magnetic tape.[239]

1952 Olivetti's electric typewriter, the Lexikon.

1955 **February.** Smith Corona's first electric office machine, Model 2E, was introduced.

1955 R.C. Allen imported Ransmaier and Rodrian typefaces from Germany for use on the Allen typewriters.[240]

1956 IBM introduced the Model B Standard Typewriter.

1956 IBM introduced the Model B Executive Typewriter.

1956 Remington manufactured the "Statesman", the company's first proportional.

1957 **February.** Smith Corona introduced their first electric portable machine, the "Smith Corona Electric".

1959 **September.** Olivetti merged with Underwood buying Underwood stock.

1960 **March.** Underwood released "The Raphael".

1960 **July 1.** Underwood acquired Olivetti Corp. of America.

1960 **October.** Underwood introduced the "FORM".

1960 Remington discontinued the manufacture of the "Statesman".

1961 **March.** Brother began producing their portable typewriter, the "Valiant".

1961 **March.** Brother began producing the "Valiant" model typewriter.

1961 **July 31.** IBM introduced the Selectric I with golf ball typehead.

1961 Brother began selling typewriters in the U.S.

1962 **January.** Royal's office model, the "Empress" introduced.

1962 **December.** Royal's electric machine, the "Electress" introduced.

1962 Smith Corona started using the initials "SCM" on their typewriters and adding machines.

1964 **March.** Brother produced the full size model of the "Valiant".

1964 IBM introduced the Magnetic Tape Selectric Typewriter MT/ST.

1965 **February.** Brother produced the deluxe model of the "Valiant".

1965 **August.** The electric portable model of the "Valiant" was produced.

1967 **July.** Brother introduced Dial-A-Type.

1967 **December.** Brother making typewriters for Remington.

1967 IBM Executive Model D introduced. It is the last IBM typebar typewriter.

1969 IBM introduced the IBM MagCard Selectric. First typewriter that records on magnetic cards.

1971 **July 16.** IBM Selectric II introduced.

1971 IBM MagCard Executive Type Elements introduced enabled proportional spacing.

1972 **April.** MagCard "Executive" introduced.

1972 **April 21.** 12 new styles of type introduced for the MagCard "Executive".

1973 **March 1.** IBM Correcting Selectric introduced.

1973 **April.** IBM MagCard II introduced.

1974 Royal introduced the Royal 500 (also known as Imperial 500).

1974 Remington introduced the Sperry-Remington SE-100, the company's ball element typewriter.

1974 IBM introduced two models of its Memory Typewriter.

1975 **May.** Royal/Imperial 500 first sold to the public.

1975 **Fall.** Olivetti introduced the Lexikon 82 and the Lexikon 90, both ball element machines.

1976 **Summer.** Olivetti marketed their Model 92C, proportional space typewriter.

1977 IBM 6240 MagCard Typewriter introduced.

1978 **May 23.** IBM introduced two models of its electronic typewriter that used a golf ball element with 96 characters, the Model 50 and the Model 60.

1978 Olivetti introduced its electronic daisywheel typewriter: the ET201 and ET221.

1979 **July.** IBM's Model D and the MTST discontinued.

1979 **October 1.** IBM introduced its Model 75 Electronic Typewriter.

1979 IBM Audio Typing Unit: Produced synthetic speech. Attachment for magnetic card typewriters enabled blind typists to proof and revise their documents.

1980 **May 7.** IBM introduced the Selectric III.

1982 **January.** Canon introduced their daisywheel typewriter, the AP 400.

1982 **January.** Xerox introduced their electronic typewriter, the Memorywriter. Will only use Diablo printwheels; will not accommodate printwheels manufactured for other typewriters.

1982 **March 1.** IBM discontinued IBM Memory 50 Typewriter.

1982 **November 18.** IBM introduced two models of its Electronic Typewriters, Model 65 and Model 85.

1982 **November 22.** IBM test marketed the IBM Personal Typewriter.

1982 **December 15.** IBM discontinued Electronic Models 50, 60, and 75.

1982 Brother entered the personal printer market with the production of the EP-20 which uses dot matrix impulse printing.

1983 **January.** IBM introduced the IBM Personal Typewriter.

1983 **February 28.** SCM announced it will end manual typewriter production.

1983 **May 12.** Smith Corona announced its last manual typewriter came off the line.

1983 IBM introduced the Typewriter Communication-Module; enables Electronic 85 to communicate with variety of terminals, word processors, computers, and other Electronic 85's.

1983 IBM: Personal computer attachment permits Electronic 65 and 85 to be used as letter-quality printers for IBM PC.

1983 IBM introduced the electronic typewriter Model 95.

1984 **October 16.** IBM introduces Quietwriter® 7 Typewriter.

1984 IBM Wheelwriter® 5 and Wheelwriter® 3 introduced.

1984 IBM Diskette Module can be used with the Electronic 65, 85, or 95 for off-line document storage.

1985 IBM Actionwriter 1 Typewriter introduced.

1987 IBM Personal Typing System: Integrates functions of a word processor and a typewriter in a single application-specific work station. Can also be used as a computer. Printer can be impact or non-impact.

Section V

HISTORY OF THE FACSIMILE MACHINE
HISTORY OF THE COMPUTER

FACSIMILE MACHINES

In the mid-1970s, there were approximately 30,000 fax machines in the U.S. In 1988, there were 1.5 million; in 1989, 2.5 million; in 1991, approximately 7 million.[241]

1842 Scottish physicist, Alexander Bain, developed first primitive facsimile machine. The device had pendulums that created a brown stain as they swung across chemically treated paper.[242]

1848 Frederick Bakewell replaced Bain's device with a cylinder and screw mechanism. This is the forerunner of the modern fax.[243]

1850 Bakewell demonstrated the first cylinder and screw facsimile machine.[244]

1865 First commercial facsimile system available in France by Giovanni Caselli connecting Paris with several other French cities.[245]

1902 Dr. Arthur Korn developed a photoelectric scanning system for transmission and reproduction of photography.[246]

1904 Use of radio waves to transmit facsimiles called radiofacsimile came into use.[247]

1907 Dr. Korn established commercial picture transmission systems which became the world's first facsimile system, to transmit pictures between Paris, London, and Berlin.[248]

1922 Dr. Korn sent picture of Pope Pius XI from Rome to U.S. by radiofacsimile. Picture appeared in "New York World News".[249]

1929 Electrothermal paper is introduced by Western Union using a copper compound and titanium oxide coating; the forerunner of standard thermal paper today.[250]

1930 RCA began faxing maps to ships via radiofacsimile.[251]

1934 Associated Press: First wire service for distribution of photos and text.[252]

1936 Xerox: Began manufacturing facsimiles for general office use.[253]

1939 More than 1,000 households equipped with fax receivers that electronically print morning newspapers overnight. Transmitted fax via kit-built radio attachments.[254]

1941-45 U.S. military used fax to transmit maps, orders, and weather charts during WWII.[255]

1948 FCC: Federal Communications Commission authorizes commercial development of facsimile technology as element of telecommunications industry.[256]

1952 Dr. Robert Wernikoff, Boston telecommunication expert, invented facsimile terminal that utilizes digital technology.[257]

1961 FCC: FCC authorized general microwave transmission.[258]

1961 AT&T: Telpack, low cost wide-band transmission service, made it economically feasible to consider fax transmission of document as an "everyday" business system.[259]

1964 **May 5.** Xerox: LDX (Long Distance Xerography) used ordinary paper. Facsimile by xerography. Only government, railroads, and telephone companies had phone lines capable of handling LDX transmissions.[260]

1965 Muirhead developed page facsimile system over a 240-k Hz. channel.[261]

1966 Xerox: Xerox and Magnavox developed desktop fax called the Xerox Magnafax. Later known as Telecopier. A non-xerographic device capable of sending/receiving documents over ordinary telephone lines. Carbon impact printer used to produce copy on plain bond paper at receiving end. Transmission time: 6 minutes.[262]

1968 Carterfone decision: Supreme Court legalizes the use of domestic telephone lines by non-telephone companies.[263]

1968 Analog technology: Provides a faster and more efficient means to transmit images.[264]

1968 Xerox: Telecopier II: Transmission in 6 minutes, desktop.[265]

1970 Xerox Telecopier 400: Lightweight and portable, 4 minutes per page; Acoustic couplet built-in.[266]

1973 Xerox Telecopier 410: Permitted receipt of documents by unattended phone. Had automatic document feeder.[267]

1974 CCITT: Set standards for Group 1 Faxes; Exchange of rate of message at 6 minutes per page.[268]

1976 First plain paper fax machines introduced.[269]

1976 CCITT: Set standards for Group 2 machines. 3 minutes per page and more automated.[270]

1980 Japan entered the market building less expensive, faster, and compatible machines.[271]

1980 CCITT (Consultative Committee for International Telephone and Telegraph): Established standards for Group 3 machines. Standards for digital fax and 1 minute per page.[272]

1981 U.S. Senate passes Telecommunications Competition and Deregulation Act, allowing greater competition in the telecommunications industry.[273]

1982 Less costly thermal paper made from cellulose base stock, clay, fluoran dyes, alkanes, and polyvinyl alcohol.[274]

1983 Xerox Telecopier 495-I: First to develop fax terminal capable of communicating with computers.[275]

1984 Xerox: Software to enhance fax multifunctionality--Integrates fax and computer.[276]

1984 CCITT: Initiates Group 4 standards.[277]

1987 Market exploded as prices of Group 3 machines fell.[278]

1987 Apple fax modem.[279]

1991 Total unit placement of stand-alone fax machines in the U.S. number 1.6 million.[280]

1992 **September 28.** Okidata; DOC-IT desktop combines functions of laser printer, scanner, copier, and facsimile machine.

1992 Hewlett-Packard: HP-200 and HP-310 are the most affordable plain paper faxes using ink jet technology.[281]

COMPUTERS/WORD PROCESSORS

1976 **July.** Apple I board released for sale to hobbyists and electronic enthusiasts.[282]

1976 Apple I computer boards sold through 10 retail stores in U.S.[283]

1977 **April.** Apple unveiled Apple II at first West Coast Computer Faire. First computer to generate computer graphics.[284]

1977 **June.** Apple II available to general public. Customer uses own TV set as a monitor and stores programs on audio cassette recorders.[285]

1977 IBM Office System 6: IBM 6/430 Information Processor. Utilizes diskettes and mag cards. Has no printer.[286]

1977 IBM 6/440 Information Processor. Utilizes diskettes; has inkjet printer; Electronic type style changing 10 and 12 pitch and proportional spacing.[287]

1977 IBM 6/442 Information Processor. Utilizes diskettes; Has printwheel printer; 96-character interchangeable non-cartridge printwheels; 10 and 12 pitch and proportional spacing.[288]

1977 Apple Computer incorporated.[289]

1978 **March.** Apple introduces various interface cards for connecting to most printers.[290]

1978 **June.** Apple's DISK II introduced at Consumer Electronics show.[291]

1979 **August.** Apple II Pascal released.[292]

1979 **October.** Personal Software, Inc. released VisiCalc for Apple II. Spreadsheet is first application to make personal computers practical tool for people who don't know how to write own programs.[293]

1979 Apple IIt introduced.[294]

1980 **March.** Apple Fortran introduced.[295]

1980 **September.** Apple III announced at the National Computer Conference.[296]

1980 IBM Displaywriter System: Primarily an information processor with capabilities for electronic document distribution and data processing. Uses IBM 5215 printer, 5218 and 5228 printer.[297]

1981 **May.** Apple Language Card introduced. Allows Apple II users to run programs in either Pascal, Fortran or Pilot.[298]

1981 **May.** IEEE-488 interface card announced by Apple. Apple II computers can be linked to over 1,400 scientific and technical instruments.[299]

1981 **August.** IBM introduced the IBM Personal Computer.[300]

1981 **September.** Apple's first mass storage system, the 5MB ProFile hard disk introduced.[301]

1982 **January.** More than 100 companies are making personal computers. Apple has installed more than 650.000 units; 10,000 Apple software programs offered by more than 1,000 developers.[302]

1982 Epson entered notebook computer market with HX20.[303]

1983 **January.** Apple Lisa computer introduced.[304]

1983 **November.** AppleWorks: an integrated package containing word processing, spreadsheet, and database applications all in one introduced and becomes best selling software.[305]

1984 **January.** Macintosh personal computer introduced.[306]

1984 **September.** Macintosh 512K introduced.[307]

1985 **January.** Apple Lisa renamed Macintosh XL.[308]

1986 **January.** Macintosh and LaserWriter Plus are unveiled at the AppleWorld conference in San Francisco.[309]

1986 **April.** Macintosh 512K Enhanced replaces Macintosh 512K.[310]

1987 **March.** Apple introduced new generation of Macintosh: Macintosh SE and Macintosh II.[311]

1987 **August.** ImageWriter LQ; AppleFax modem.[312]

1988 IBM Personal System/2 Model 30 286. Key features: General purpose 80286 microprocessor VGA provides graphics and sharp, clear text. Accepts most IBM PC XT and AT adapter cards.[313]

1989 **January.** Apple introduced high performance Macintosh SE/30 which provides users with MS/DOS and O/S2 disk compatibility.[314]

1989 **April.** Apple introduced 32-bit QuickDraw that allowed Macintosh personal computers to process and display photo-quality documents, images, and visualizations with exceptional clarity.[315]

1990 IBM Personal System/1: Designed for home consumers with limited-to-no computer knowledge.[316]

1991 **June.** Apple has communication products that extend the ability of Macintosh to integrate with IBM's System Network Architecture (SNA) environment.[317]

1991 **Fall.** GoCorp. introduced PenPoint software to enable users of notebook PC to run it with a pen instead of a keyboard.[318]

1991 **October.** Apple introduced Macintosh Classic II, the Macintosh Quadra 700 and 900, and a new line of notebook-sized computers, the Macintosh Power Book 100, 140, and 170.[319]

1991 **December.** Apple introduced QUICKTIME, a system software architecture for the integration of dynamic media for Macintosh computers.[320]

1991 IBM: 80386 SX. Designed for needs of small businesses and individuals while maintaining PS/1 ease of use.[321]

1992 **February.** Apple demonstrated CASPER, a voice recognition system.[322]

1992 **April.** THINKPAD 700T pen based computer. The user must print block letters and does not work with cursive writing. Marketed by IBM.[323]

1992 **September 29.** IBM is close to marketing a device that can recognize vocal commands. UnixExpo trade show: Code name of IBM Tangora on RS/6000 work station. Vocabulary of 20,000 words and can take dictation at a speed ranging from 50 to 70 words per minute.[324]

1993 **June 9.** Microsoft Corporation introduces "Microsoft at Work" a software that allows copiers and facsimile machines to be run from a personal computer thereby eliminating paper records.[325]

Section IV

GLOSSARY OF TERMS

All Points Addressability
A printing concept that allows the intermixing of text, lines, images, and electronic forms and the printing of them at any point on the printable area of the page.

Bubble Jet Printing
An electrical current passes through a small resistor, heats the ink in a tiny tube. As the ink heats, the portion near the heater vaporizes and expands, pushing a drop of ink from the nozzle. The bubble contracts, creating a drop in pressure that pulls more ink into the tube.

Cassette Ribbon System
A feature that allows quick, easy ribbon replacement, with no handling of the ribbon itself. Ribbon guides are part of the ribbon cassette rather than the typewriter. Single-strike or multi-strike ribbons used.

Character Band
A high-speed impact-printing technology using a print band that contains fully formed alphanumeric characters. A bank of hammers strikes the band.

Characters Per Inch (cpi)
The number of characters printed within an inch horizontally across a page.

Characters Per Second (cps)
A common measure of printer speed.

CCITT
Consultative Committee for International Telephone & Telegraph.

Dot Band
A type of band printing in which the band contains raised dots instead of the engraved characters typically associated with band printers.

Dot Matrix
Any of a number of print technologies that uses an array of dots to create images, either alphanumeric or graphic. Dot matrix, dot-band, thermal, and ink jet are examples of dot matrix printing.

DPI
Printing term that denotes the number of dots printed per inch.

Duplex Printing
Printing on both sides of a sheet of paper.

EBCDIC
Extended Binary-Coded Decimal Interchange Code. A coded-character set consisting of 8-bit coded characters.

Electroerosion Printing
Technology using special paper coated with a thin layer of aluminum that is vaporized by small tungsten electrodes, exposing a layer of black lacquer in the form of characters.

Electronic Font
A plug-in, electronic module that determines the type style of the printed output. The electronic font sends digitized, electrical signals via microprocessor to the printer or typewriter or printhead.

Electrophotographic Printing
A type of non-impact printing in which a light source, usually laser, forms an image on a photoconductor. The image is exposed to toner and developer, then transferred and fused onto paper.

Engraved Character Printer
Any print technology using a device that contains fully formed, or "engraved" characters. Printwheel and character band are examples.

Ink Jet
A type of non-impact printing where electric current activated squeeze tubes propel drops of ink onto paper to form characters.

Line Matrix
A type of line printing where images are created by printing lines of data simultaneously.

MICR
Magnetic Inscribed Character Recognition. The process by which printed characters are read via a magnetic signal. Inks for MICR ribbons contain magnetic particles that allow the reader to sense the printed area. Specially designed characters are used.

NLQ
Near letter quality.

OCR
Optical Character Recognition. The process of optically reading printed images with a scanning device.

OEM
Original equipment manufacturer.

PEL
Picture element. Vertical and horizontal resolution of the character matrix.

Pitch
The number of characters in a linear inch.

Point Size
The vertical height of a printed character.

PostScript
A general purpose computer language invented by Adobe Systems. Its most common use is to describe the appearance of a page to an output device like a printer or display. The PostScript language can describe all the elements of any document, including text, graphics, and scanned images.

Print Quality Enhancement Technology (PQET)
Printing technology that refers to the smoothing out of the "rough" edges and curves of printed characters.

Printwheel
A circular print element with a number of spokes. On the end of each spoke is a character.

Raster
A digitized device whereby the printed or displayed image contains rectangular dots called pixels which can be addressed individually.

Resistive Ribbon Thermal Technology
A type of non-impact printing in which print wires send electric current to the ribbon. Resistance of the ribbon generates heat that melts ink onto the paper, forming characters. This print technology does not require specially treated heat-sensitive paper as does thermal transfer technology.

Scalable Fonts
Printing technology that permits characters to be made larger or smaller vertically in increments of 0.25 points to 1008 points. Scalable fonts allow the printer to actively define code pages.

Thermal Transfer
A type of print technology that uses a heated printhead and requires specially treated, heat sensitive paper.

Wire Matrix
A type of printer using an array of wires in an electric-magnetic printhead. The wires are selectively fired to create the desired image.

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