refused to authenticate reply telegrams as they would reply letters.[74] Such telegrams had to be authenticated like ordinary telegrams. Later decisions, responding to the increasing reliability and acceptance of this medium, rejected this exception to the reply letter doctrine.[75] Courts also broadly accepted teletyped messages as writings and held them to the same standards of authentication as more traditional writings.[76]

Contemporary judicial attitudes toward contracts memorialized through telegraph or teletype are thus straightforward with regard to the Statute of Frauds and authentication requirements. Courts consider such contracts as writings within the Statute of Frauds, and will also accept typed names as substitutes for handwritten signatures. Additionally, some decisions regard teletype terminals' answerbacks as signatures. Parties may also authenticate both sorts of messages as readily as more traditional writings, without regard to a detailed showing of the technical underpinnings or reliability of the media.

B. *Novel Communications Media, the Statute of Frauds and Authentication*

1. *Telefacsimile Machines*

For both the Statute of Frauds and the authentication requirements, the threshold question is whether courts will adopt telefacsimiles as writings. If so, the writing portion of the Statute would be satisfied, and adoption of the standard of authentication that exists for other writings would follow.[77] The policy of deference to commercial use displayed in the telegraph and teletype cases may lead contemporary judges to accept telefacsimiles as writings also. The nearly universal presence and extensive use of telefacsimile machines in modern offices supports finding telefacsimiled messages to be "writings." The Uniform Commercial Code also supports acceptance: a telefacsimile should logically be considered an "intentional reduction to tangible form."[78] Further, a court will likely imply assent to one who telefacsimiles a document bearing his signature to a commercial partner.

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74. *See* Drexel v. True, 74 F. 12 (8th Cir. 1896); Smith v. Easton, 54 Md. 138, 146 (1880); Howley v. Whipple, 48 N.H. 487, 488 (1869); Chester v. State, 5 S.W. 125 (Texas Crim. App. 1887).

75. *See* McCormick, *supra* note 23, § 225 ("The contrary view, that the inference of authenticity of the reply telegram is substantial and sufficient, seems more reasonable and expedient.") (citations omitted).

76. *See, e.g.*, Guynn v. Corpus Christi Bank & Trust, 589 S.W.2d 764 (Tex. 1979). *But see* Joseph J. van Dort, *Bank Guarantee by Telex*, 14 Intl. Bus. Law. 173 (June 1986), describing a Dutch case where a bank allegedly issued a guarantee by teletype. The court accepted expert testimony regarding the ease of altering the indicated source of the message when the parties fail to employ special security measures. The court thus ruled that the bank was not responsible for the teletyped guarantee.

77. *See supra* text accompanying notes 68-69.

78. U.C.C. § 1-201 (1990) (defining "writing").

The few courts considering the application of the Statute of Frauds and authentication to telefacsimiles have reached this result.[79] These decisions are notable for their brevity as well as their outcome. In *Beatty v. First Exploration Fund 1987 & Co.*,[80] the court simply equated telefacsimiles to photocopies, and found no greater uncertainty or opportunity for fraud through the use of telefacsimiles than for original documents. The court wrote that technological improvements in communication "should be considered, and, unless there are compelling reasons for rejection, they should be encouraged, applied, and approved."[81] In *People v. Hagan*,[82] the court faced a choice between the standard for telegrams or the standard for computer records as the appropriate authentication standard of telefacsimiled documents. In most jurisdictions, telegrams are authenticated like any other writing.[83] Computer records, however, require proof that the "generating system was standard, unmodified, and properly operated."[84] Although the *Hagan* court did not select a standard, it did consider a telefacsimile "more trustworthy than the telegram since it does not rely on a transcribing of the document at the receiving end."[85] This conclusion supports applying the lower standard of writings for telefacsimiles, rather than the standard of computer records.

The *Beatty* and *Hagan* courts analyzed telefacsimiles by measuring them against earlier media for which well-established legal norms exist. Both concluded that the reliability of the new technology rivals that of telegraphy and photocopying, and that telefacsimiles therefore similarly warrant approval under the Statute of Frauds and the standards of authentication for ordinary writings. Such comparisons must carefully consider the specific characteristics of the contrasted media, however. The level of trust commercial users place in a technology, often referred to in earlier telegraph and teletype cases but not considered in *Beatty* or *Hagan*, offers another measure of dependability. The overwhelming business acceptance of devices such as telefacsimile machines strongly evidences their trustworthiness. Commercial acceptance does not end the inquiry, however, for legal standards may dictate, in addition to being dictated by, business practices. Courts

79. *See, e.g.*, Hessenthaler v. Farzin, 564 A.2d 990 (Pa. Super. 1989); Bazak Intl. Corp. v. Mast Indus., 535 N.E.2d 633 (N.Y. 1989).

80. 25 B.C.L.R.2d 377 (1988). This decision actually concerns the validity of telefacsimiled proxies under a limited partnership agreement requiring proxies to be signed and in writing. Because these requirements are identical to those imposed by the Statute of Frauds, an analysis of this decision is relevant.

81. 25 B.C.L.R.2d at 385.

82. 556 N.E.2d 1224 (Ill. App. Ct. 1990), *affd.*, 1991 WL 242340 (Ill. 1991). The case concerned falsified banking records which had been transmitted by a telefacsimile machine. The court upheld the defendant's conviction on one court of forgery.

83. 29 AM. JUR. 2D *Evidence* § 883 (1967).

84. 556 N.E.2d at 1239.

85. 556 N.E.2d at 1239.

should exercise caution when approving new technologies, and fully examine their unique characteristics when considering the possibility of mistake, fraud, and perjury.

a. *Difficulties with telefacsimile machines.* Telefacsimile machines possess unique characteristics that may increase the opportunity for mistake or fraud as compared with ordinary writings. These factors are not, however, sufficiently distressing to warrant the removal of telefacsimiles from the scope of the term "writing." The first distinguishing feature, the tendency for telefacsimiled documents to deteriorate, departs significantly from ordinary paper, and works against the requirement that a writing must be both durable and safe to be within the Statute of Frauds.[86] Current telefacsimile technology prints the recipient's document through the oxidation of chemically treated, thermally activated paper.[87] This treatment renders the resulting document susceptible to darkening. Some observers indicate that telefacsimiles will deteriorate in less than a week when exposed to bright light, and even those safely stored can become unreadable in two years or less.[88]

In addition to generating fragile documents, telefacsimile machines sometimes skip lines, paragraphs, or even entire pages during the transmission process.[89] A court recently faced this problem in *American Multimedia Inc. v. Dalton Packaging,*[90] where a supplier failed to receive a page of a telefacsimiled purchase order. The missing page contained an arbitration clause, which became relevant when the purchaser received allegedly defective goods. Since the disputing parties had previously made use of the same purchase order form, and the portion of the document received referred to the missing page, the court held the supplier had notice of the arbitration clause. The resolution of this issue becomes more difficult when a course of dealing rationale does not apply.

A third troubling characteristic of telefacsimile technology is the heightened opportunity for individuals to commit fraud by altering documents. The use of original documents, rather than telefacsimiles, provides greater assurance that the document is accurate and unmodified. For this reason, the banking industry in particular has become increasingly wary of accepting payment orders via telefacsimile.[91]

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86. *See supra* text accompanying note 42.

87. *See supra* note 8.

88. *See* Belden Menkus, *Bits and Pieces: Overview of Telecommunications News,* 35 MODERN OFF. TECH., Jan. 1990, at 150; *see also* David B. Pearson & Douglas P. Sauter, *Assessing the Risks of Fax Confirmations,* J. ACCT., Mar. 1990, at 75, 78.

89. *See* Benjamin Wright, *Fax Pacts: Contracting via Fax Machines Could Leave the User on Shaky Legal Ground,* NETWORK WORLD, Feb. 5, 1990, at 69.

90. 540 N.Y.S.2d 410 (1989).

91. *See Beware! Fax Attacks!,* A.B.A. BANKING J., June 1990, at 52, 53.

Anecdotes describe thieves cutting signatures from company communications, attaching them to payment orders, and sending the order to the bank.[92] The quality of telefacsimiled documents makes these frauds difficult to detect, even if accepted sciences such as signature analysis are employed.[93] Current telefacsimile technology is also susceptible to page-swapping[94] and alteration of the indicated source of the telefacsimile.[95]

b. *Responses to these concerns.* Although the propensity of telefacsimiles toward darkening, skipped lines or pages, and undetected alteration is worrisome, these characteristics should not render telefacsimiled contracts invalid under the Statute of Frauds, or increase the required standard of authentication beyond that of ordinary writings. First, darkened documents are often difficult to read, but they do not noticeably increase the opportunity for fraud, perjury, or mistake, the chief concern of these standards. Courts have accepted far more fragile media in the past.[96] Furthermore, courts have held that even writings which are lost or destroyed satisfy the Statute of Frauds.[97] Telefacsimiles rendered unreadable through aging or exposure to light fit easily within this category. The self-interest of parties who have selected the telefacsimile as a contracting medium and are aware of its limitations provides an additional safeguard. These parties are capable of recording important telefacsimiled documents on a more stable medium, by photocopying or other techniques.[98]

Skipped pages or other telefacsimile errors are also not so pervasive as to disqualify telefacsimiled documents as writings for the purposes of the Statute of Frauds or authentication. Mistakes occur in other means of communication as well. Mailed documents get damaged or fail to arrive, telegrams become garbled in transmission, and it is sometimes difficult to hold a conversation over the telephone. Nonetheless, contracting parties continue to rely heavily on these media, for such events are recognized as exceptions to what are generally reliable means of communication. Courts have acknowledged this acceptance as a compelling reason for recognition of a given technology under the Statute of Frauds. A similar awareness of the tremendous

92. *Id.; see also* Benjamin Wright, *A Signature Is a Signature,* NETWORK WORLD, Feb. 5, 1990, at 70.

93. *See* Patricia Bordman, Note, *Telefacsimile Documents: A Survey of Uses in the Legal Setting*, 36 WAYNE L. REV. 1361, 1364-65 (1990); Dziewit et al., *supra* note 13, at 86.

94. *See* Wright, *supra* note 89, at 69 ("A dishonest [telefacsimile] recipient could fabricate a page and substitute it for one of the genuine pages.").

95. *See Beware! Fax Attacks!, supra* note 91, at 52.

96. *See supra* notes 32-38 and accompanying text.

97. *See* RESTATEMENT (SECOND) OF CONTRACTS § 137 (1979) ("The loss or destruction of a memorandum does not deprive it of effect under the Statute.").

98. *See, e.g.,* BANKS, *supra* note 8, at 50.

business acceptance of the telefacsimile, rather than a casual comparison with telegraphy or photocopiers, should guide courts in setting standards of authentication.[99]

The final distinguishing feature of telefacsimiles, their susceptibility to undetected alteration, presents a question of approach with respect to the Statute of Frauds. Some courts and commentators have considered the problem of fraudulent document changes not as a Statute of Frauds issue, but as one of contract formation.[100] This conclusion sidesteps the principle role of the Statute of Frauds, the preservation of the terms of a contract. If the submitted memorandum presents a significant likelihood of fraud, the Statute of Frauds cannot truly be satisfied. The better analysis looks first to the primary thrust of the Statute: "whether the contract was made as alleged and whether there is any substantial danger that it is being established by perjury and fraud."[101] A Statute of Frauds defense to telefacsimiled contracts, however, should not necessarily be recognized under this approach. Other sorts of duplicative techniques present greater difficulties. Carbon copies, for example, fail to reflect changes in the original document once detached, but have long been accepted as memoranda within the Statute of Frauds.[102]

Concern for the possibility of fraudulent alteration also motivates the authentication requirement for writings. Only if telefacsimiles present a sufficiently greater opportunity for fraud than other documents, such as telegrams or handwritten letters, is a stricter standard of authentication justified. Although telefacsimiles present possibilities for alteration which were not feasible with earlier technologies, these opportunities do not justify imposing a stricter standard of authentication. Indeed, no special authentication standards have been promulgated for carbon copies,[103] which offer greater opportunities for fraud than telefacsimiles. Further, many telefacsimile machines have the ability to generate transaction reports, which provide a record of the documents sent and received, the date and time of the transmissions, the length of the telefacsimiled documents, and the phone number of the other party.[104] These reports provide an additional de-

99. Of course, once a transmission error has occurred, interest arises in which party should bear a consequential loss. *See infra* Part III for a discussion of the potential liability of the telefacsimile manufacturer in such circumstances.

100. *See, e.g.*, Rork v. Las Olas Co., 23 So. 2d 839 (Fla. 1945); *Report and Model Trading Agreement, supra* note 9, at 1683-84.

101. CORBIN, *supra* note 24, § 522.

102. *See* Panko v. Alessi, 524 A.2d 930, 931 (Pa. Super. Ct. 1987).

103. *See, e.g.*, Young v. Sorenson, 121 Cal. Rptr. 236 (Ct. App. 1975); Ma-Jet-Ic Furnace Corp. v. Great S. Trucking Co., 93 S.E.2d 589 (Ga. Ct. App. 1956); Furrer v. State Indus. Accident Commn. of Or., 353 P.2d 565 (Or. 1960). Note that carbon copies, like telegraph, teletype, telefacsimile, and electronic mail transmissions, often raise Best Evidence Rule issues. *See infra* Part II.

104. *See* BANKS, *supra* note 8, at 56-57.

gree of protection against fraud during commercial telefacsimile use.[105]

The increasing reliability of newer telefacsimile machines should lessen the opportunity for fraud and mistake. For instance, the recent introduction of telefacsimile machines which employ ordinary, rather than thermally activated, paper has lessened worries of sudden deterioration of important telefacsimiled documents.[106] Innovations such as these are often expensive, however. Even as prices drop, older forms of the technology frequently find their way into new markets.[107] The rapid spread of refinements should not be relied upon to resolve problematic aspects of new technologies. Courts will continue to encounter, and must be sure to recognize, these unique traits of telefacsimile communication for years to come.

2. *Electronic Mail*

As with telefacsimiles, the threshold question is whether contracts memorialized through electronic mail constitute legal "writings." No court has yet considered this issue.[108] Courts' broad interpretation of "writing" in other contexts strongly indicates that electronic mail should fare equally well under the Statute of Frauds. The novel characteristics of this medium, however, require an even broader interpretation of the Statute than for any established technology. For example, transactions conducted through electronic mail do not necessarily involve a "tangible form" as the Uniform Commercial Code requires.[109] Unlike telegraph, teletype, and telefacsimile technologies, the transmitted data may remain in electronic form, or be stored on magnetic media rather than paper. The signature requirement may also prove troubling. Either a mere indication of the message's source may be deemed to constitute a "signature," or some other aspect of the technology must suffice.

Despite the unique features of electronic mail, the writing requirement of the Statute of Frauds should be less of a concern for contracts memorialized through this media than it may initially appear. Although electronic mail transmissions do not necessarily involve writings, users may employ these computer systems to generate a pa-

105. *See* Zink Communications v. Elliott, 1990 U.S. Dist. LEXIS 14784, at 30-32, 38 (judicial treatment of telefacsimile machine's transaction report); Liberty Mut. Fire Ins. Co. v. Ybarra, 751 S.W.2d 615, 618 (Texas Ct. App. 1988) (same).

106. *See How to Buy a Fax Machine*, 1 HOME & OFFICE FAX BUYER'S GUIDE 11, 13 (1990); *see also* Tracey Tucker, *Did You Get My Fax: Proof of Content and Delivery Raises Questions of Security and Legality*, 8 TELECONNECT, no. 7 at 38 (July 1990).

107. *See* Don Dailey, *The Fax Boom of the '90s*, 1 HOME & OFFICE FAX BUYER'S GUIDE 5, 8 (1990) (reporting prediction of a $300 telefacsimile machine designed for home use by 1993).

108. *See* WRIGHT, *supra* note 7, § 16.4.4.

109. U.C.C. § 1-201(46) (1990).

per record at any point in the process.[110] Electronic mail systems are more flexible than the other communications systems considered here, in that paper may be generated, but more efficient storage mechanisms may be used as well.[111] Most of the paper produced by these systems will likely be generated at some time following the start of the contract, such as when a conflict has arisen. This characteristic is not necessarily a fatal flaw under the Statute of Frauds, however; dilatory memorialization of contracts has not voided such documents in the past.[112]

The signature requirement of the Statute of Frauds is not resolved so readily. In the normal course of events an electronic message cannot be accompanied by a handwritten signature. But several possible replacements for a normal signature seem appropriate, including a confirmation technology resembling a teletype terminal's answerback feature,[113] the user's use of a network access code,[114] perhaps in combination with the input of a "send" or "post" command which results in message transmission,[115] or simply the inclusion of the sender's typewritten name at the close of the message.

Of these options, the last is most desirable. The acceptance of answerbacks as signature substitutes for teletyped documents is more troubling than judicial approval of telegraphed names as signatures. Every teletype communication includes an exchange of answerbacks, not merely those where an individual intends to validate a contract.[116] Similarly, user access codes and system commands merely provide users with the capability to send and to receive messages. The intent to be bound by the terms of the contract, readily inferred from the signing of a document, should not be so implied from using the necessary elements of a technology.[117] In contrast, a judicial determination that a voluntarily typed name accompanying an electronic mail

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110. Of course, the integrity of the system's storage, retrieval and printing mechanisms becomes increasingly important here as well. *See infra* notes 121-24 and accompanying text.

111. *See Report and Model Trading Agreement, supra* note 9, at 1686.

112. *See* Crabtree v. Elizabeth Arden Sales Corp., 110 N.E.2d 551, 553 (N.Y. 1952) (Payroll cards, prepared months after an employment contract was entered into, "unquestionably constitute . . . memorand[a] under the [S]tatute.").

113. Internet, a national electronic mail network, has proffered draft standards for authentication of messages based on public key encryption. "Developers of the technology say the encryption will provide users with 'digital envelopes' that cannot be opened except by the addressee, and the contents will have 'digital signatures' that cannot be forged." Vin McLellan, *Data Network to Use Code to Insure Privacy*, N.Y. TIMES, late city ed., Mar. 21, 1989, at D5.

114. A password may be substituted for the access code. *See Report and Model Trading Agreement, supra* note 9, at 1687.

115. *See* ELECTRONIC MESSAGING, *supra* note 2, at 16.

116. In Clipper Maritime Ltd. v. Shirlstar Container Transp. Ltd., 1 Lloyd's Rep. 546, 554 (1987), the court distinguished between the answerback of the sender and that of the receiver. The latter would not be considered a signature since it "only authenticates the document and does not convey approval of the contents."

117. *See Report and Model Trading Agreement, supra* note 9, at 1680 n.148.

message constitutes a signature comports with case law approving signature variants that indicate acceptance of a contract.[118]

The courts' unwillingness to upset settled business practice through rulings on the technical requirements of the law of evidence lends additional support to the conclusion that contracts made and recorded on electronic mail systems should survive scrutiny under the Statute of Frauds. The use of electronic mail in a commercial context is widespread,[119] and some observers have predicted a staggering increase of use within the next five years.[120] This trend should bolster legal findings that electronic mail is a legally valid commercial medium.

In contrast, commercial acceptance does not necessarily justify inclusion of electronic mail messages within the ordinary authentication standards for writings. Since such messages are ordinarily stored in the memory unit of general purpose computer systems,[121] their introduction into evidence raises questions both of origin and manner of storage. As such, electronic mail messages should be subject to both the same authentication standards as any computer record, and the requirement of showing a connection of a person with the message. The former standard is more burdensome: as with early telegraph systems, the susceptibility of computer systems to mistake or fraud concerns many observers.[122] Authentication of a computer record consists of a showing of the "process or system used to produce a result and showing that the process or system produces an accurate result."[123] Such a standard requires a showing of the reliability of the equipment and programs used, the method of entering and storing the data in the system, and the measures taken to assure the accuracy of the system.[124]

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118. *See supra* notes 48-53 and accompanying text. Because courts have considered testimony beyond the face of a writing to determine whether a writing is "signed," *see* CORBIN, *supra* note 24, § 522; electronic mail message headings, which indicate a message's source and time of delivery, *see* BANKS, *supra* note 8, at 133-35, may prove useful in cases concerning the Statute of Frauds.

119. *See, e.g.*, Leila Davis, *Retailers Go Shopping for EDI*, DATAMATION, Mar. 1, 1989, at 53.

120. *See* Averil Reisman, *EDI Clearing New Paths for Distribution*, COMPUTER & SOFTWARE NEWS, May 23, 1988, at 61.

121. *See* BANKS, *supra* note 8, at 175.

122. One analyst noted that "[a] skilled programmer who understands a given computer system and has direct access to the system can alter the data stored within the system, leaving no trace of the alteration." James A. Sprowl, *Evaluating the Credibility of Computer-Generated Evidence*, 52 CHI.-KENT L. REV. 547, 560 (1976).

123. FED. R. EVID. 901(b)(9).

124. *See* William A. Fenwick & Gordon K. Davidson, *Use of Computerized Business Records as Evidence*, 19 JURIMETRICS J., Fall 1978, at 9, 19. Because the Federal Rules of Evidence already contemplate computer records, this Note considers only electronic mail transmission systems, rather than the underlying computer systems used to generate and store electronic mail messages. However, as electronic mail systems become increasingly common in small offices, parties wishing to introduce such evidence may find these authentication standards extremely

No court has yet considered what constitutes competent evidence that an individual sent an electronic offer or acceptance.[125] This standard of authentication should depend upon the reliability of electronic mail systems. The more confidence placed in a medium, the more deference the medium should receive for authentication and other evidentiary issues. As with other media employing electricity, errors in electronic mail messages may result from low quality transmission lines, radio interference, electrical storms, power supplies, various properties of switching and signaling equipment, and numerous other sources.[126] These concerns are amplified for systems like electronic mail, which transmit encoded characters,[127] rather than the encoded images of telefacsimile machines[128] or converted sound of telephones.[129] The consequences of an unintended alteration of the transmitted electrical signal may result in altered characters, rather than miscolored dots and completely incomprehensible images on a telefacsimile, or mere background noise and garbled voices over a telephone.

To negate these sources of error and increase the accuracy of transmitted data in electronic mail systems, designers have developed error-correcting protocols.[130] Such protocols introduce redundancy into the data when it is sent.[131] The transmission of a message multiple times presents a simple redundancy,[132] although more efficient schemes have been developed.[133] Despite these protocols, designers expect undetected errors to occur;[134] a typical error-correcting protocol provides a probability of undetected error on the order of three bits, or digits in the binary number system employed by electronic computer sys-

onerous. Unlike corporate mainframe computers, the personal computers used in these smaller settings typically employ unaudited software with few security measures. Whether courts should develop authentication standards which are more appropriate for typical personal computer systems is outside the scope of this Note.

125. *See* Dziewit et al., *supra* note 13, at 87.

126. *See* Jack Douglass, *How To Find Phone-line Faults and What To Do About Them*, DATA COMMUNICATIONS, Sept. 1988, at 179.

127. *See* BANKS, *supra* note 8, at 119-24.

128. *See id.* at 36.

129. JOEL EFFRON, DATA COMMUNICATIONS TECHNIQUES AND TECHNOLOGIES 18-27 (1984).

130. MAN YOUNG RHEE, ERROR-CORRECTING CODING THEORY 8-10 (1989).

131. JERRY FITZGERALD, BUSINESS DATA COMMUNICATIONS: BASIC CONCEPTS, SECURITY, AND DESIGN 243 (1984).

132. PIERRE LAFRANCE, FUNDAMENTAL CONCEPTS IN COMMUNICATION 202-03 (1990).

133. *Id.* at 297-370.

134. *Id.* at 297.

tems,[135] in one hundred million.[136] Although this appears to be an extremely strong assurance of data accuracy, modern communication systems transmit a phenomenal number of bits. For example, the newly proposed gigabit network, a national electronic mail network, will operate at speeds of one billion bits per second or more.[137] If systems designers employ the aforementioned error-correcting code, operators of this system could discover as many as thirty transmission errors each second in a "worst-case" scenario. Fortunately, proper use of powerful error-correcting protocols can provide nearly error-free data transmission,[138] and this network need not be nearly so error prone. Service providers may simply dispatch more redundant data with transmitted messages, allowing more accurate operation of an error-correcting protocol, although decreasing the rate by which the network may transmit information.[139]

Considerations of these design trade-offs should weigh heavily during the establishment of a presumption of reliability, and therefore the appropriate standard of authentication, for various electronic mail systems. Thus, courts should consider testimony concerning a system's error-correcting protocols, as well as the method, accuracy, and security of its storage and retrieval mechanisms,[140] to reach a sensible determination of the system's reliability and susceptibility to fraud and error. Ordinary standards of authentication are appropriate only if system designers have implemented protocols which ensure the reliable exchange of information. Such a standard not only prevents fraud, perjury, and mistake, but encourages business users to utilize those

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135. Each binary digit, or bit, has a value of 0 or 1, corresponding to the presence of low or high voltage in the transmitted electrical signal. Computers and electronic mail systems represent alphabetic or numerical characters with a fixed number of bits. System designers usually set this number at eight, and call the 8-bit units "bytes." *See* FRED HALSALL, INTRODUCTION TO DATA COMMUNICATIONS AND COMPUTER NETWORKS 11 (1985). If an undetected transmission error alters the value of one or more bits, the receiving unit will interpret the byte as a different character. For example, a system employing the Extended Binary-Coded Decimal Interchanged Code (EBCDIC) will transmit the number "7" as "11110111." If the right-most bit is changed during transmission to "0," the receiving unit will read "11110110," which is then interpreted as the number "6" under the EBCDIC. *See* BRITT RORABAUGH, DATA COMMUNICATIONS AND LOCAL AREA NETWORKING HANDBOOK 16, 19 (1985).

136. This protocol adds 25 bits to each block of 1000 bits according to the "cyclical redundancy check" detecting scheme. This figure assumes use of an "automatic repeat request" system, which requests data retransmission once it detects an error. FITZGERALD, *supra* note 131, at 249.

137. *See* John Markoff, *Fiber Optics: New Networks for the Nation*, N.Y. TIMES, Jan. 1, 1991, at 39; *Research on Gigabit Networks Jointly Funded by NSF and DARPA*, PR NEWSWIRE, June 8, 1990.

138. *See* EFFRON, *supra* note 129, at 163.

139. *See* FITZGERALD, *supra* note 131, at 243.

140. A simple example of one system design feature which courts should consider is the ability of users to modify the text of received messages. While commercial electronic mail systems like AT&T Mail, DASnet, MCI Mail, and TELEMAIL allow users to reread, delete, and forward messages, along with many other services, they prevent users from tampering with received messages. *See* BANKS, *supra* note 8, at 191-204.

electronic mail services with accuracy appropriate for commercial dealings.

Neither the often maligned[141] Statute of Frauds nor the evidentiary requirement of authentication impeded the adoption of telegraphy or teletype as valid means of conducting and memorializing commercial transactions. When considering these media, courts relied primarily on their commercial acceptance, rather than on a more technical evaluation of their reliability or susceptibility to fraud. Under this approach, the widespread acceptance of both telefacsimile and electronic mail technology should readily extinguish a Statute of Frauds defense for contracts conducted through these technologies. However, concerns over increased opportunity for fraud and mistake in new technologies may warrant more difficult standards of authentication for these technologies, particularly for electronic mail networks that employ insufficient error-correcting techniques.

II. THE BEST EVIDENCE RULE

The Best Evidence Rule presents separate evidentiary concerns for users of telefacsimile machines and electronic mail systems.[142] The Rule provides that the offering party must produce an available original to prove the terms of a document.[143] Here too, characteristics of these novel media strain legal conceptions that are ordinarily straightforward. Unlike copying by hand or photocopier, the processes employed by telefacsimile and electronic mail systems make proper identification of an "original document" difficult. Curiously, an analysis of available authority indicates that the rules governing electronic mail, the newest media considered here, are largely settled,[144] while those concerning telefacsimile machines, the earliest of these technologies,[145] remain unsettled. Section II.A of this Part reviews the development of the Best Evidence Rule, including its reach to electronic mail messages. Section II.B argues that telefacsimiles should also be considered as best evidence within the scope of this rule.

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141. *See, e.g.*, Francis M. Burdick, *A Statute for Promoting Fraud*, 16 COLUM. L. REV. 273 (1916).

142. *See, e.g.*, Wright, *supra* note 89, at 69; Dziewit et al., *supra* note 13, at 89-90; Anita Micossi, *Paperless Office: Legal Liability*, 17 COMPUTER & COMMUNICATIONS DECISIONS, July 15, 1985, at 16.

143. MCCORMICK, *supra* note 23, § 230. Rule 1002 of the *Federal Rules of Evidence* provides, "[t]o prove the content of a writing, recording, or photograph, the original writing, recording, or photograph is required, except as otherwise provided in these rules or by Act of Congress." FED. R. EVID. 1002.

144. The Federal Rules of Evidence provide that accurate computer printouts of data such as stored electronic mail messages are original documents for the purposes of the Best Evidence Rule. *See infra* text accompanying notes 164-67.

145. The concept of transmitting fixed images through electrical signals predates even telegraphy. Alexander Bain first conceived of the facsimile machine in 1848. *See* JOHN G. TRUXAL, THE AGE OF ELECTRONIC MESSAGES 482 (1990).

A. *The Development of the Best Evidence Rule*

Scholars have linked the Best Evidence Rule with the ancient pleading doctrine of *profert in curia.*[146] This doctrine essentially required a plaintiff to allege that he could produce a document on which his suit was founded.[147] The rule requiring production of original documents grew gradually out of this doctrine,[148] reaching its apotheosis in 1700 as Chief Justice Holt said "the best proof that the nature of the thing will afford is only required."[149] Most modern commentators give a more narrow reading to the Best Evidence Rule, confining it to a requirement that parties produce available original documents rather than copies.[150] Observers differ on the appropriate rationale for the Best Evidence Rule; possible theories include a desire to prevent fraud, cognizance of the high probability of error when individuals manually transcribe copies, and belief that a substantial risk of error exists when the terms of a writing are disclosed through oral testimony.[151]

The development of telegraphy introduced a new wrinkle into this doctrine. Jurisdictions differed on whether the "original" writing was the message as delivered to the telegraph company for transmission, or the telegram ultimately received.[152] These cases framed the issue as one of contract law rather than evidence.[153] Some courts considered the telegraph company to be the agent of an individual sending a message.[154] As such, the sender was responsible for the telegram's contents even in case of an error.[155] This substantive law dictated that the telegram as received was the original.[156] Other courts deemed employee rather than agency status more appropriate for telegraph companies, and denied the existence of a contract formed on the basis of

146. 9 WILLIAM HOLDSWORTH, A HISTORY OF ENGLISH LAW 168 (1926).

147. BLACK'S LAW DICTIONARY 1210 (6th ed. 1990).

148. Edward W. Cleary & John W. Strong, *The Best Evidence Rule: An Evaluation in Context,* 51 IOWA L. REV. 825, 825 (1966).

149. Ford v. Hopkins, 1 Salk. 283, 91 Eng.Rep. 250 (K.B. 1700).

150. MCCORMICK, *supra* note 23, § 229. *But see* Dale A. Nance, *The Best Evidence Principle,* 73 IOWA L. REV. 227, 227 (1988).

151. MCCORMICK, *supra* note 23, § 231.

152. 29 AM. JUR. 2D *Evidence* § 474 (1967).

153. *See* MCCORMICK, *supra* note 23, § 235 (When considering whether a document is an original or a copy, "[t]he question to be asked . . . is whether, under the substantive law, the creation, publication, or other use of [the document] may be viewed as affecting the rights of the parties in a way material to the litigation.").

154. *See, e.g.,* Des Arc Oil Mill v. Western Union Tel. Co., 201 S.W. 273, 274 (Ark. 1918); Brooke v. Western Union Tel. Co., 46 S.E. 826, 826 (Ga. 1904); J.L. Price Brokerage Co. v. Chicago, Burlington & Quincy R.R., 199 S.W. 732, 733 (Mo. 1917).

155. *See* Ayer v. Western Union Tel. Co., 10 A. 495, 497 (Me. 1887).

156. *See* Collins v. Western Union Tel. Co., 41 So. 160, 162 (Ala. 1906); Anheuser-Busch Brewing Co. v. Hutmacher, 21 N.E. 626, 628 (Ill. 1889); Magie v. Herman, 52 N.W. 909, 909 (Minn. 1892).

transmissions where an error had occurred.[157] Thus, the original document was the message delivered to the telegraph company.[158]

The impact of the Best Evidence Rule softened considerably as duplication techniques developed beyond scriveners toiling in candle-lit halls. Initially, courts excepted carbon copies from the Rule, under the rationale that the same impression made both original and duplicate.[159] Courts labeled such copies "duplicate originals."[160] Photocopies and products of other technologies lacked this characteristic, but the Uniform Photographic Copies of Business and Public Records as Evidence Act[161] and Article X of the Federal Rules of Evidence[162] ultimately accepted them as best evidence as well. One court justified this result by noting that the chief concern of the Best Evidence Rule was

> the human frailty of a copier, as a Bob Cratchit, fingers numbed by the cold in the counting house and fraught with anxiety over the health of Tiny Tim, might distractedly misplace a decimal, invert a pair of digits or drop a line. A Xerox machine, by way of contrast, does not worry about Tiny Tim and does not, therefore, misplace decimal points, invert digits, drop lines, or suffer any of the mental lapses that flesh is heir to.[163]

The latest communications technology, electronic mail, presents perplexing questions regarding the original document requirement of the Best Evidence Rule. Since this medium employs intangible electronic transmissions instead of paper during the communications process, determination of which — if any — of the transmissions should be considered an original document is difficult. Most of these issues have been mooted, however, by Article X of the Federal Rules of Evidence, which considers a broad range of computer-generated documents.[164] As with telegrams, determination of the original electronic mail transmission will be governed by a jurisdiction's substantive law of contracts. Federal Rule of Evidence 1001(3) then provides that "[i]f data are stored on a computer or similar device, any printout or

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157. *See* Annotation, *Telegraph Company as Agent of Sender so as To Bind Him as Against Addressee by Mistake in Transmitting Message*, 42 A.L.R. 293, 296-98 (1926).

158. *See, e.g.*, Smith v. Easton, 54 Md. 138, 145 (1880); Howley v. Whipple, 48 N.H. 487, 488 (1869).

159. McCormick, *supra* note 23, § 236.

160. *See* Toho Bussan Kaisha, Ltd. v. American President Lines, Ltd., 265 F.2d 418, 423-24 (2d Cir. 1959).

161. 9 U.L.A. 417 (1951). Under this widely adopted act, regularly kept photocopies of business and public records are admissible without regard to the original.

162. Fed. R. Evid. 1001-1008.

163. Thompson v. State, 488 A.2d 995, 1006 (Md. Ct. Spec. App. 1985).

164. *See* Fed. R. Evid. 1001 advisory committee's note ¶ 1 ("Present day techniques have expanded methods of storing data, yet the essential form which the information ultimately assumes for usable purposes is words and figures. Hence the considerations underlying the rule dictate its expansion to include computers, photographic systems, and other modern developments.").

other output readable by sight, shown to reflect the data accurately, is an 'original.' "[165] Since electronic mail messages are ordinarily stored on general purpose computers or similar systems, their introduction into evidence poses no difficulties under the current language of the Best Evidence Rule.[166] Under this rule, computer printouts of electronic mail transmissions should fare as well as telegrams for purposes of determining the best evidence.[167]

B. *Telefacsimiles and the Best Evidence Rule*

Surprisingly, questions linger over the application of the Best Evidence Rule to telefacsimiled documents, despite the maturity and broader use of telefacsimile machines relative to electronic mail. Of course, the substantive law of contracts governs transactions conducted by telefacsimile. But unlike the other technologies considered here, the telefacsimile transmits images of documents, prompting some courts to draw analogies with photocopiers rather than telegraphy or teletype.[168] Indeed, the term "telefacsimile" itself implies duplication as well as communications capabilities. Consideration of the telefacsimile machine as a duplication technology, albeit as one more susceptible to error or fraud than a modern photocopier,[169] adds uncertainty to the potential admissibility of telefacsimiles within the Best Evidence Rule. The few courts that have considered this issue have approved telefacsimiled documents under the Rule,[170] although at least one dissenting voice exists.[171]

Several arguments support the majority position. First, the Federal Rules of Evidence may be read to include telefacsimiled documents as duplicates, which are admissible to the same extent as an original.[172] The definition of duplicate includes "a counterpart produced by . . . electronic rerecording, . . . or by other equivalent techniques which accurately reproduces the original."[173] Despite the

165. FED. R. EVID. 1001(3).

166. Assurance that the message as stored is the one that the sender originally forwarded is presumably met by the authentication requirements for such messages. *See supra* notes 121-39 and accompanying text.

167. *But see* WRIGHT, *supra* note 7, § 10.5 (noting two somewhat attenuated ambiguities with respect to the Best Evidence Rule and electronic mail messages, and arguing that the Rule should not apply to such messages).

168. *See, e.g.*, People v. May, 557 N.Y.S.2d 203 (App. Div.), *app. denied*, 561 N.E.2d 900 (1990).

169. *See supra* notes 91-95 and accompanying text.

170. *May*, 557 N.Y.S.2d at 204; State v. Hutchison, No. 89-2148-CR-NM, 1990 Wis. App. LEXIS 303 (Apr. 11, 1990).

171. *See* Barraclough v. Secretary of State for the Envt., CO/47/89 (Q.B. July 19, 1989) (LEXIS, Enggen library, Cases file) ("In my view [a telefacsimile] is not an original document. . . .' " (quoting *In re* A Company (No. 002634 of 1987) (unreported))).

172. FED. R. EVID. 1003.

173. FED. R. EVID. 1001(4).

chance of error during telefacsimile machine transmissions,[174] few would argue that telefacsimiled documents are ordinarily inaccurate reproductions. The telefacsimile machine may be distinguished from the more localized duplication techniques mentioned in the Federal Rules,[175] however, because it is primarily a communications device which operates through long-distance duplication.

A second argument for admission of telefacsimiles under the Best Evidence Rule concedes that telefacsimiles are physically only copies, but contends that they are the documents actually relied upon by one party in a commercial setting.[176] As such, telefacsimiles should be treated as legally operative originals. Courts have accepted this reasoning in other contexts,[177] and have also adopted local rules allowing attorneys to file court documents through the telefacsimile machine.[178] These courts consider, and often stamp, telefacsimiled filings as "original" when received, tacitly approving this argument.[179]

An examination of the purposes of the Best Evidence Rule also demonstrates that it should not bar the admission of telefacsimiles.[180] Telefacsimile machines do not generate the kinds of error which motivated the Best Evidence Rule.[181] Unlike manual copying, the telefacsimile process cannot invert, delete, or insert characters into a writing. Although errors such as line or page skipping occur infrequently,[182] telefacsimile machine users typically adopt protocols, such as numbering the pages and paragraphs of telefacsimiled documents, to ensure accurate communication.[183] Judicial acceptance of computer generated evidence, which is more prone to mistake or fraud than a telefacsimile,[184] further indicates that telefacsimiles should be adopted as best evidence.

As commercial use of telefacsimiles becomes commonplace, courts

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174. *See supra* notes 89-90 and accompanying text.

175. *See* FED. R. EVID. 1001(4) (mentioning "a counterpart produced by the same impression as the original, . . . photography, . . . mechanical or electronic re-recording . . . [and] chemical reproduction . . . .").

176. *See* WRIGHT, *supra* note 7, § 10.5.

177. *See, e.g.*, United States v. Taylor, 648 F.2d 565, 568 n.3 (9th Cir. 1981) (Here, a bank officer allowed a loan in reliance upon either a telefacsimile or a photocopy of a telefacsimile of a fraudulent letter. The court upheld the admissibility of this document on other grounds, but mentioned the argument that the bank had relied on the telefacsimile. The court also upheld the defendant's conviction of wire fraud.).

178. *See* Sokasits, *supra* note 8; Bordman, *supra* note 93, at 1370-73.

179. *See* Wright, *supra* note 89.

180. *See supra* text accompanying note 151; *see also* Bordman, *supra* note 93, at 1383 ("Faxed documents of undisputed accuracy . . . are sufficiently trustworthy to be admitted as primary evidence.").

181. *See supra* notes 86-95 and accompanying text.

182. *See supra* notes 89-90 and accompanying text.

183. *See* Wright, *supra* note 89.

184. *See supra* note 122 and accompanying text.

will increasingly be called upon to consider their evidentiary status. An anomalous invalidation of telefacsimiles under the Best Evidence Rule would only serve to inhibit business users from taking full advantage of a useful communications tool. Past judicial cognizance of the increasing reliability of and reliance upon communications, duplication, and computer technologies should serve as useful precedents for courts facing this novel issue.

III. LIABILITY ALLOCATION

Although most users consider telegraph, teletype, telefacsimile, and electronic mail technologies to be extremely reliable,[185] communication errors still occur. Sources of these errors range from atmospheric phenomena to properties of the transmitting equipment itself.[186] If any of these events takes place, the contents of the message, including key contractual terms such as price or quantity, may be altered.[187] This Part examines the legal consequences of such modifications. Section III.A evaluates competing views on whether an offeror is bound by the contractual terms as he sent them, or as they were received, through telegraph and teletype systems. This section also explores the potential liability of the telegraph or teletype company for such lapses. Section III.B applies these standards to telefacsimile and electronic mail systems, while also noting the significance of modern business practices and error-correcting protocols to the development of appropriate liability allocation standards. This Part concludes that the competing views of liability allocation rest on theories of agency, common carriage, and contract law, rather than characteristics of individual media, and argues that these doctrines should be unaffected by the advent of new technologies.

A. *Telegraph and Teletype*

As a consequence of the frailty of early telegraphy, courts heard a large number of cases concerning transmission errors altering crucial contract terms.[188] From these decisions, two views on the validity of the modified contract and the liability of the telegraph company emerged. A minority of cases considered the telegraph company to be the offeror's agent, and bound the offeror to the terms of the message

185. *See, e.g.*, Western Twine Co. v. Wright, 78 N.W. 942, 943-44 (S.D. 1899) (telegraphy); Charles Christian, *Telex Holds Its Own*, 131 SOLIC. J. 880 (1987) (teletype); Sokasits, *supra* note 8, at 535 (telefacsimile machine); *Report and Model Trading Agreement*, *supra* note 9, at 1686 (electronic mail).

186. *See supra* text accompanying note 126.

187. *See, e.g.*, Peter H. Lewis, *The Executive Computer: New Modems Pick Up the Pace*, N.Y. TIMES, Apr. 3, 1988, § 3, at 11 ("[I]t is wise to pause and reflect on the dangers of high-speed transmission. . . . [T]he accidental introduction of an extra goose egg or two in a batch of contract bids can cost you more than a night's sleep.").

188. *See* Annotation, *supra* note 157.

as delivered in its modified form.[189] Since the offeror had selected the telegraph as its communications medium, courts reasoned that the offeror was the appropriate party to bear the burden of miscommunication.[190] The offeror could, however, seek damages from the telegraph company for its negligent conduct.[191] These courts cast telegraph companies as common carriers, held them to a correspondingly high standard of care[192] and voided attempts by telegraph companies to limit liability by contract.[193]

The majority of the courts facing this issue, although similarly considering telegraph companies to be common carriers, came to a much different result. These courts used this status not to hold the company to a high standard of care, but to deny an agency relationship between the carrier and its customer.[194] These courts recognized that telegraph companies did not have the offeror's authority to alter a submitted message,[195] nor could the offeror supervise the company's operations.[196] Instead, the telegraph company merely served the function of providing rapid communication.[197] Furthermore, because each party had agreed to different terms, these courts denied the existence of a contract.[198] These decisions allowed injured parties to recover damages from the telegraph company for negligent conduct,[199] but upheld the contractual limit on liability maintained by the telegraph company, which typically restricted recovery to the transmission fee unless the user paid a higher fee for multiple transmissions.[200]

In sum, then, the majority of courts adopted the principle that parties could not form a contract through erroneously altered telegraph transmissions. A significant minority of jurisdictions,[201] however, maintained that the sender was the principal of the telegraph company, and bound him to altered contract terms.

The seminal case of *Primrose v. Western Union Telegraph Company*,[202] concerning telegraphic communications between principal

189. *See, e.g.*, Des Arc Oil Mill v. Western Union Tel. Co., 201 S.W. 273 (Ark. 1918); J.L. Price Brokerage Co. v. Chicago, B. & Q. Ry., 199 S.W. 732 (Mo. 1917); Brooke v. Western Union Tel. Co., 46 S.E. 826 (Ga. 1904).

190. *See* Ayer v. Western Union Tel. Co., 10 A. 495, 497 (Me. 1887).

191. *See* Des Arc Oil Mill v. Western Union Tel. Co., 201 S.W. 273 (Ark. 1918).

192. *See Ayer*, 10 A. at 496.

193. *See* 10 A. at 496.

194. *See* Annotation, *supra* note 157, at 293.

195. *See, e.g.*, Pegram v. Western Union Tel. Co., 6 S.E. 770, 773 (N.C. 1888).

196. *See, e.g.*, Pepper v. Western Union Tel. Co., 11 S.W. 783, 784 (Tenn. 1889).

197. *See, e.g.*, Smith v. Western Union Tel. Co., 83 Ky. 104, 113-14 (1885).

198. *See, e.g.*, *Pepper*, 11 S.W. at 784-85.

199. *See, e.g.*, *Pegram*, 6 S.E. at 770.

200. *See, e.g.*, Wann v. Western Union Tel. Co., 37 Mo. 472, 482-83 (1866).

201. *See* Annotation, *supra* note 157, at 293.

202. 154 U.S. 1 (1894).

and agent, rather than a commercial transaction between parties at arm's length, supports the majority view. Here, a wool dealer sent an encoded message to a purchaser, opting for the standard telegraph transmission fee, rather than the greater fee which included a confirmatory retransmission. A transmission error resulted in the overpurchase of wool and a loss for the dealer. The Supreme Court refused to hold the telegraph company liable, characterizing telegraphy as a media "peculiarly liable to mistakes."[203] Interestingly, it rejected the categorization of telegraph companies as common carriers, yet held them to an analogous standard of care,[204] and validated the telegraph company's restriction of liability.[205] Judge (later Justice) Cardozo faced similar facts in *Kerr S.S. Co. v. Radio Corp. of America.*[206] The *Kerr* court relied upon *Hadley v. Baxendale*[207] in stating that the telegraph company's liability would be limited to the transmission fee when the telegraph's contents did not disclose the nature of the transaction, and thus did not make the company aware of the probability and magnitude of the harm that might result from its carelessness.[208]

The majority position on liability eroded as courts increasingly recognized telegraphy as "essential and indispensable . . . to the commercial and social interests of the whole world."[209] Although most courts continued to reject contracts formed on the basis of modified transmissions, they also invalidated contractual limitations on liability established by telegraph companies.[210] Courts offered two reasons for this change. First, courts recognized that after years of experience and technological improvements, telegraphy was no longer a fragile art, but a robust and accurate communications medium.[211] Second, courts that had characterized infant telegraph companies as poor, struggling corporations charging small fees for message transmission were surprisingly candid in their realization that many telegraph companies had become "immensely rich [from] charging a great deal more than it

203. 154 U.S. at 14.

204. 154 U.S. at 14.

205. 154 U.S. at 15-16.

206. 157 N.E. 140 (N.Y. 1927).

207. 156 Eng. Rep. 145 (1854). This case, a staple of contracts courses, held that a defendant will not be liable for consequential damages resulting from a failure or delay in completing a contract, unless the defendant was aware of the circumstances giving rise to those damages. In *Hadley v. Baxendale,* the owners of a corn mill sued a carrier which had failed to deliver timely an engine shaft. Without the shaft, the plaintiffs could not operate their mill. The court denied the plaintiffs damages for lost profits, stating that in ordinary course, such damages would not have occurred, and that the carrier had no knowledge of the special circumstances present here.

208. 157 N.E. at 141.

209. Reed v. Western Union Tel. Co., 37 S.W. 904, 905 (Mo. 1896).

210. *See, e.g.*, Strong v. Western Union Tel. Co., 109 P. 910, 914 (Idaho 1910); Tyler, Ullman & Co. v. Western Union Tel. Co., 60 Ill. 421, 435-38 (1871); *Reed,* 37 S.W. at 904-05.

211. *See Reed,* 37 S.W. at 905; *Tyler, Ullman & Co.,* 60 Ill. at 435-36.

actually costs to transmit such messages and to give them a fair return upon the capital investment in the business."[212] These jurisdictions typically saw an altered transmission as prima facie evidence of negligence. Evidence of bad weather, disturbed lines, or other conditions beyond the control of the telegraph company could rebut this presumption.[213] Other courts taking the majority view did not step quite so far, but found telegraph companies liable for their gross, as distinguished from ordinary, negligence while handling messages.[214]

Courts have yet to apply these standards to teletype transmission errors, perhaps because of the reliability of this technology. Communication errors may occur, however, even when contracting parties employ this trustworthy medium. The sender might misdial the recipient's teletype number.[215] Also, the recipient's teleprinter might run out of paper during a transmission, continuing to receive, but not record, the incoming message.[216] Judge Posner considered this scenario in *Evra Corp. v. Swiss Bank Corp.*,[217] where the defendant bank failed to comply with a teletyped transfer of funds request. The bank's sloppily maintained teletype machines were the likely cause; the request was never printed or simply mishandled.[218]

Despite the likely source of the transmission error, the *Evra* court held that the sender should have taken additional precautions, for "messages sometimes get lost or delayed in transit among [parties] located 5000 miles apart . . . ."[219] The court also rejected the district court's conclusion that a bank should realize deleterious consequences can spring from a failure to fulfill a transfer of funds request.[220] Although contract formation was not at issue in this decision, the court's rather generous application of *Hadley v. Baxendale* indicates that the risk of a teletype transmission error may rest with the party that selected the media. Of course, this approach is identical to the rationale supporting the minority view of liability allocation for telegraphy. *Evra* thus suggests that at least one court will enforce agreements formed through altered teletype transmissions, rather than following the majority view which denies contract status to altered communications by telegraph.

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212. *Strong*, 109 P. at 914.

213. *See, e.g.*, Rittenhouse v. Independent Line of Tel., 44 N.Y. 263, 265 (1870).

214. *See, e.g.*, Hart v. Western Union Tel. Co., 6 P. 637, 640 (Cal. 1885); Wann v. Western Union Tel. Co., 37 Mo. 472, 482 (1866). *But see* Trammel v. Western Union Tel. Co., 129 Cal. Rptr. 361, 370-71 (Cal. Ct. App. 1976); *Strong*, 109 P. at 916-17; *Reed*, 37 S.W. at 906 (denying a distinction between gross and ordinary negligence).

215. *See* Afovos Shipping Co. SA v. Pagnan, 1 W.L.R. 195, 198 (1983).

216. *See* WRIGHT, *supra* note 7, § 4.2.

217. 673 F.2d 951 (7th Cir.), *cert. denied*, 459 U.S. 1017 (1982).

218. 673 F.2d at 953.

219. 673 F.2d at 957.

220. 673 F.2d at 959.

B. *Telefacsimile and Electronic Mail*

An examination of the arguments supporting the competing views on liability allocation for telegraph and teletype transmission errors provides guidance for cases involving telefacsimile and electronic mail systems. Most of the arguments depend very little upon the specific nature of the technology, suggesting that either doctrine of liability will readily extend to telefacsimile and electronic mail systems. Courts which deny the formation of a contract because of an altered transmission should continue to do so regardless of which medium is employed. Furthermore, a jurisdiction's acceptance or denial of agency status for telegraph companies should extend to the newer communications technologies.

A more critical distinction may be the potential categorization of electronic communications service providers as common carriers. Most courts, regardless of their view of liability allocation, considered telegraph companies to be common carriers, or placed similar responsibilities upon them.[221] Like traditional common carriers, telegraph companies provide a specified service at a standard price, engage in a business in which the public is deeply concerned, and are bound to serve all customers equally.[222] Although telegraph companies do not ship goods along a route in the manner of a traditional common carrier, the transmission of messages along a telegraph wire provides a ready analogy. These rationales are less persuasive for teletype service providers, telefacsimile machine manufacturers, and electronic mail service providers. A crucial distinction exists between an individual using owned equipment as opposed to hiring another to transmit a message. In contrast to the small fee imposed on the sender of a telegram, the user of these systems must make a significant investment in terminals, printers, modems and telefacsimile machines. Further, such devices simply present different methods of using the existing telephone network. Indeed, for many systems, particularly telefacsimile machines, courts will more accurately view service providers as more closely analogous to product manufacturers than common carriers.

To the extent either view of liability allocation for modified telegraph transmissions relies upon the categorization of telegraph companies as common carriers, the expansion of that view to more modern communication system providers, which are even further removed from traditional ideas of common carriage than their predecessors, becomes increasingly suspect. Since common carrier status is just one of several available rationales for each position,[223] however, its weight is

221. *See supra* note 194 and accompanying text; Phil Nichols, Note, *Redefining "Common Carrier": The FCC's Attempt at Deregulation by Redefinition*, 1987 DUKE L.J. 501, 508-09.

222. *See, e.g.*, Strong v. Western Union Tel. Co., 109 P. 910, 915-16 (Idaho 1910); Pegram v. Western Union Tel. Co., 6 S.E. 770, 772-73 (N.C. 1888).

223. *See supra* text accompanying notes 188-200.

unlikely to be controlling. In this instance, then, the differing aspects of more recent communications technologies do not necessarily mandate changing fundamental notions established during the rise of telegraphy as a commercially accepted medium.

Beneath the fundamental standards of liability allocation under the majority and minority views, however, lie details of application to the different technologies. Even under the majority view, if a transmission error results from ordinary or gross negligence,[224] liability will attach to a telegraph company, and thus perhaps to negligent manufacturers and users of telefacsimile machines as well. Like the teletypewriter in *Evra*, some telefacsimile machines continue to receive messages even when out of paper.[225] These systems also cannot guarantee delivery of a telefacsimile to the intended recipient, particularly when the telefacsimile machine is located in a busy mailroom.[226] A commercial partner who allows his telefacsimile machine to run out of paper, or who misplaces an important telefacsimiled document, might be considered negligent.[227] The product design itself might also be considered faulty, thus exposing the manufacturer to liability.

Although the *Evra* court was not swayed by these arguments,[228] its rationale that communications over thousands of miles are subject to some risk bears reconsideration. Transmissions over distances of this magnitude have become customary in the ordinary course of modern business. Telefacsimile machines are normally quite reliable whether the document is transmitted 5000 miles or the length of a city block; business users properly rely upon them for important communications.[229] Further, the allegedly negligent handling of the *Evra* plaintiff's teletyped message occurred not over the great distance mentioned by the court, but in the defendant's office after the data had safely arrived.[230] The mishandling would have occurred no matter where the message's source. As business users also accept telefac-

224. *See supra* note 199 and accompanying text.

225. *See* BANKS, *supra* note 8, at 53-54.

226. *See Beware! Fax Attacks!*, *supra* note 91, at 60.

227. The calculus of negligence might also consider the ease with which a telefacsimile's sender can verify its receipt. Typically, a sender can simply call the intended recipient minutes after entering a document into a telefacsimile machine. Such a duty of care is only appropriate for weighty transactions, however, given the inefficiency it engenders and the reliability of telefacsimile machines.

228. *See supra* notes 217-20 and accompanying text. The court stated that the only issue before it "is whether [the plaintiff] was entitled to consequential damages." 673 F.2d at 955. However, the court was obviously unimpressed with the plaintiff's arguments that the defendant, a Swiss bank, was negligent. "[The plaintiff] should have known that even the Swiss are not infallible; that messages sometimes get lost or delayed in transit among three banks, two of them located 5000 miles apart, even when all banks are using reasonable care; and that therefore it should take its own precautions against the consequences — best known to itself — of a mishap that might not be due to anyone's negligence." 673 F.2d at 957.

229. *See* Sokasits, *supra* note 8, at 535.

230. 673 F.2d at 953.

simile machines as global communications tools, these liability issues warrant further consideration. Under either liability allocation scheme, then, a finding of negligence for mishandling of a commercial telefacsimiled document may be appropriate in facts similar to those of *Evra*, and the negligent party should bear the loss.

The role of error-correcting protocols[231] in the determination of negligence or breach of warranty also concerns telefacsimile machine manufacturers and electronic mail service providers. Under either a negligence or breach of warranty claim, plaintiffs will be able to demonstrate causation only with difficulty, since the presence of an error-correcting code does not immunize a system from altered transmissions.[232] If a plaintiff can show causation, courts may look to design standards to determine the adequacy of an existing error-correcting code[233] or whether a code should have been implemented at all.[234] Currently, designers widely employ such protocols in electronic mail systems;[235] use is less frequent but increasing in telefacsimile machines.[236]

Even if a system does incorporate an error-correcting code, the gigabit network's theoretical error rate[237] seems uncomfortably high for many commercial users. Much like early telegraph transmissions, which were liable to the whims of unreliable machinery, bad weather, and inexperienced operators,[238] electronic mail messages are subject to uncontrollable changes. Such an error rate might render this sort of electronic mail network "inherently unreliable" for commercial purposes, as the *Primrose* court found for early telegraph systems.[239] If so, electronic mail service providers would properly be able to limit their liability, except possibly in instances of gross negligence, under the standards the majority of these early courts provided.[240] Of course, electronic mail, although it is a new technology, has been able to profit from decades of research and experience in the earlier communications systems. Designers may also implement retransmissions or more accurate, albeit less efficient, error-correcting protocols for systems intended for commercial use. These features heighten the propriety of a presumption of reliability, which applied to mature tele-

231. *See supra* notes 130-39 and accompanying text.

232. *See supra* notes 134-36 and accompanying text.

233. *See supra* note 137-39 and accompanying text.

234. *See* Peter J. Denning, *Human Error and the Search for Blame*, 33 COMM. OF THE ASSN. FOR COMPUTING MACHINERY, Jan. 1990, at 6.

235. *See* Jerry Pournelle, *Chaos Manor Awards*, BYTE, Apr. 1990, at 53, 66.

236. *See* BANKS, *supra* note 8, at 40-41.

237. *See supra* text accompanying note 138.

238. *See* Reed v. Western Union Tel. Co., 37 S.W. 904, 905 (Mo. 1896).

239. *See supra* notes 202-05 and accompanying text.

240. *See supra* note 199 and accompanying text.

graph systems, for electronic mail networks.[241] Although it is difficult to predict the path courts will take on this issue, factors such as the expectations of users, capabilities of the protocol employed, and promises of the service providers should influence their decision. While no electronic mail network can provide perfect reliability, this technology compares favorably with other media, and a presumption of reliability seems appropriate for typical systems.

In sum, although courts have disagreed on the validity of contracts formed through altered telegrams and the resulting liability of telegraph companies, these conclusions are based upon differing theories of contract law, agency, and common carriage, rather than a careful consideration of the characteristics of telegraphy itself.[242] As a result, these theories of liability allocation are unlikely to change when courts consider new technologies such as the telefacsimile and electronic mail.[243] However, in those jurisdictions where liability is based upon the inherent reliability of a communications medium or the negligence of its operators, telefacsimile machines and electronic mail systems present unique issues. Courts in these jurisdictions should pay careful attention to both the choices made during the design of communications systems and the expectations and customs of modern business users.

CONCLUSION

Much like early telegraph and teletype systems, telefacsimile machines and electronic mail networks present new means for parties to negotiate and memorialize commercial agreements. Although the speed and accuracy of these media make them highly desirable business tools, their novel features strain traditional notions of contract law and evidence. Fortunately, the judicial experience with earlier communications technologies provides an appropriate framework for balancing competing concerns of efficiency and user protection from altered transmissions. The broad reading of the Statute of Frauds in this setting, along with deference to commercial acceptance of these devices, demonstrates that telefacsimiled and electronically mailed contracts should be as readily authenticated and admitted into evidence as more traditional writings. Courts should be cognizant of the special characteristics of these technologies, however, and stand ready to exact heightened evidentiary showings where, as with certain electronic mail systems, the possibility of fraud or mistake seems great.

Courts should also deem telefacsimiles and electronic mail

241. This presumption is consistent with recent case law which subjects computer manufacturers to an increasing standard of care as vendors of a mature technology. *See* Baum, *supra* note 16, at 53.

242. *See supra* notes 188-200 and accompanying text.

243. *See supra* text accompanying note 223.

messages to be the best evidence of the contracts they record. For electronic mail messages which have been stored on computers and printed, the Federal Rules of Evidence mandate this result. The impact of the Best Evidence Rule on telefacsimiled contracts is not yet settled, but the policy of protection against fraud and mistake that motivates the Rule suggests that telefacsimiles are appropriate best evidence. Courts should consider telefacsimiles to be duplicates or conceptual originals, and parties should be allowed to enter such documents as the best evidence of the contracts they record under the current structure of the Rule.

In the event an error modifies contractual terms as transmitted through a telefacsimile or electronic mail system, courts seeking to allocate liability will undoubtedly turn to contract law developed for telegraph and teletype systems. Although courts hold carriers liable for their negligent conduct, differing views of liability allocation govern when a contract's altered terms are not the result of negligence. Under the majority view, no contract exists when the offer and acceptance state different terms, and the carrier may limit its liability contractually. A minority view binds the offeror to the terms of the altered contract, but allows him recourse against the carrier without regard to contractual limitations. The difference between these stances is due largely to varying notions of contract law, agency, and carriage, rather than different conceptions of the technologies themselves. As such, either doctrine of liability should readily apply to the latest communications technologies.

The doctrines considered here present only a few of the potential legal problems facing commercial users of telefacsimiles and electronic mail systems.[244] Of course, further issues remain, and courts will undoubtedly encounter new communications media, like hypertext,[245] the Integrated Services Digital Network,[246] or technologies not yet dreamed of, long after they settle the rules for the technologies considered here. But the legal issues remain the same, whether the technology is a lead pencil, telegraphy, or electronic mail. Any technology will challenge courts to consider fully the purposes, as well as the letter, of the relevant legal principles, as well as the unique characteristics of that technology. The importance of these decisions should not be underestimated, for they will determine if these technologies will become the foundation of our Information Age, or unfortunately be stifled by antiquated legal doctrine.

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244. Other issues include the evidentiary rule against hearsay, liability for fraud, and record-keeping requirements. *See generally* WRIGHT, *supra* note 7.

245. ELECTRONIC MESSAGING, *supra* note 2, at 21-23.

246. *See, e.g.*, ROBERT K. HELDMAN, ISDN IN THE INFORMATION MARKETPLACE (1988).