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TOWARD A COMPUTERIZED SYSTEM FOR NEGOTIATING OCEAN BILLS OF LADING†

Robert P. Merges*
and Glenn H. Reynolds**

INTRODUCTION

Despite its reputation among lawyers as an island of tradition in a surging sea of legal change,¹ the law of admiralty has demonstrated a surprising degree of adaptability to changing commercial conditions over the years. Maritime liens, for example, were developed in the early nineteenth century in response to the desire of dockside merchants for a security interest in the vessels to which they extended credit. The maritime industry was also the first to make use of insurance on a broad scale. Likewise, maritime lawyers have demonstrated a good deal of imagination in responding to the increasing “containerization” of cargo shipments. Many other legal innovations were first called to life by the needs of the complex and ever-expanding system of ocean commerce.

There is, however, at least one area of maritime law that has escaped innovation throughout essentially all of modern history: the maritime bill of lading.² It is easy to understand why individual merchants have been unwilling to break new ground in this area, since stability is among their primary concerns and since the benefits of innovation would rapidly accrue to others who did not share in the risks.³ Nonetheless, there are profound inefficiencies in the current

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bill of lading exchange system which seriously restrict trading in seaborne goods. This limited trading in bills of lading is primarily the result of a lack of centralized information on the nature, location, and destination of goods being transported by sea.4

With the rapid fluctuations in the market prices of commodities and finished goods that have become commonplace in recent years, trading of cargoes in transit—especially those whose prices have been particularly volatile, such as oil—appears to have become more frequent.5 The prosperity of "freight locator" services, such as that offered by Lloyd's, would seem to support this observation.6 More importantly, it is clear that the existence of these services signals a need for a more fully developed market in bills of lading. This paper will demonstrate that new technology can substantially improve the manner in which bills of lading are traded, thereby creating efficiencies that would make ocean transportation of goods more attractive. In so doing, the discussion will center around American law and international sale of goods law as embodied in custom and the United Nations Convention on Contracts for the International Sale of Goods.7 The law of individual nations other than the United States will also be touched on where relevant.

Currently, bills of lading are paper documents evidencing an ownership interest in sea-borne goods. Under the system we are proposing, bills of lading would retain their character as ownership documents, but would be represented in world trade by facsimiles drawn from an electronic original. The primary advantages of electronic documents lie in the ease and speed with which they can be exchanged. A system using such documents would also centralize information that is currently fragmented, such as the location and destination of particular cargoes. Electronic documents can thus resolve the two primary problems associated with current "freight locator" services: their slowness, at least relative to the sort of system we

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4. This is not to say that some such trading does not go on. See note 49, infra, and accompanying text. Rather, it is to say that much more would go on if the information costs involved were reduced substantially.

5. See note 49, infra.


are proposing, and their cost per transaction. In addition, electronic documents can more effectively facilitate the secondary aspects of transferring bills of lading, such as financing.

Electronic bills of lading would also reduce the amount of paper shuffling that exists at present. It has been estimated that “[t]he complete documentation for all consignments on board a modern container ship may weigh over 40 kilograms.” Not only are postage and handling costs high, but the international mails are slow and unreliable, so that the number of documents lost is significant.

Finally, electronic documents would greatly enhance the market for goods shipped under bills of lading. Potential buyers—among them distributors, end users and arbitrageurs—would be able to locate goods much more quickly using the computer system than is possible at present. This would result in a more efficient market for goods in transit. Such increased efficiency might also lead to an increase in the quantity of goods shipped, thus helping the shipping industry to deal with its chronic surplus of capacity.

I. THE CURRENT SYSTEM

Before discussing the mechanics of an electronic system for bill

8. Grönfors, supra note 6, at 253.
9. Grönfors, supra note 6, at 250. See also R. Henriksen, THE LEGAL ASPECTS OF PAPERLESS TRADE AND TRANSPORT (1982) at 13-14 (hereafter Henriksen) (citing studies showing that document handling costs account for 7-10% of the dollar volume of international trade).
10. See note 47, infra. See also note 28, infra and accompanying text. The need for standardized document transfer procedures, and, ultimately, paperless or electronic transfers, has been recognized for some time by European nations. The United Nations Economic Commission for Europe (ECE) has a standing Working Party on Facilitation of International Trade Documents, which includes delegates from the United States and Great Britain. See ECE doc. Trade/Wp. 4/R. 71, 2 August 1979. Scandinavian countries have long sponsored projects aimed at standardizing export documents and eventually moving to electronic transfer systems. Finland (via a group known as FINPRO), Sweden (via SWEPRO), and Denmark (DANPRO) pioneered the field. See Henriksen, supra note 9, at 21-27. Delegates from these three nations now form the core of NORDIPRO, which is actively working toward an electronic transfer system for its members. Id. at 22.

The important work of NORDIPRO and the ECE is related to, but not coextensive with, the system we are proposing. The NORDIPRO and ECE groups have so far concentrated primarily on the benefits of electronic document transfer at the level of the individual transaction: i.e., to the shipper, carrier, and consignee of particular cargoes. No doubt the cost savings of an electronic system are significant at this level.

The focus of this article, however, goes far beyond these benefits. We are interested primarily in the use of electronic documents to create a market for bills of lading. Thus we see an electronic system as a replacement for both paper documents and freight locator services. Our emphasis is not meant in any way to minimize the importance of work done in this area to date. Indeed, consideration of such “second order” effects would be impossible without the ground work laid by groups such as NORDIPRO and the ECE.
of lading transfer, it might be worthwhile to review briefly the workings of the current system. Shipment of a typical cargo at sea under a bill of lading now goes as follows:

1. The bill of lading (BOL) is issued to the shipper when the goods to be shipped are received by the carrier, either on board the vessel or at dockside. Additionally, so-called “through” bills of lading are issued by freight forwarders at the beginning of the cargo’s journey, wherever that may be. The bill is a receipt for the goods and a contract of carriage.

2. The BOL is a document of title. The shipper sends one “original” (there are multiple originals and several copies) to the buyer, so that the buyer can claim the goods when they arrive at their destination.

11. GILMORE & BLACK at 93. Although the U.C.C. does not apply to international shipments (see infra note 15), its definition of a bill of lading is useful for its clarity:

‘Bill of lading’ means a document evidencing the receipt of goods for shipment issued by a person engaged in the business of transporting or forwarding goods.

U.C.C. § 1-201(6).

Arthur Leff defined a bill of lading as:

A receipt given by a carrier for goods put into its possession, together with its promise to ship and deliver them, and other contractual provisions. A ‘clean bill of lading’ is one without special conditions or instructions written in the margin. A ‘straight bill of lading’ is one naming a particular consignee; only he can claim the goods. A bill may have negotiability, however, if made out ‘to bearer’ or ‘to X order,’ or otherwise recognized as negotiable by the customs of international trade (see U.C.C. § 7-104), it may be transferred by endorsement and any holder has the right to claim the goods. (A negotiable bill of lading is sometimes called an ‘order bill’.) Negotiable bills of lading make it possible to transfer the right to goods without delivering the goods themselves, which is useful in general and especially in connection with a documentary sale.


13. GILMORE & BLACK at 93; 1 T. PARSONS, A TREATISE ON THE LAW OF SHIPPING AND THE LAW AND PRACTICE OF ADMIRALTY 190 (Boston 1869) (hereinafter cited as PARSONS).

14. GILMORE & BLACK at 93; PARSONS at 190. See Baker Oil Tools, Inc. v. Delta S.S. Lines, Inc., 562 F.2d 938, 940 (5th Cir. 1977), modified per curiam on other grounds, 571 F.2d 978 (5th Cir. 1978). For an excellent discussion of British law on the subject, see Lord Diplock’s opinion in The Miramar (Miramar Maritime Corp. v. Holborn Oil Trading Ltd.), [1984] (H.L.) 2 All E.R. 326; [1984] 2 Lloyd’s Rep. 129. Aside from its general discussion of the subject, this case is notable for its holding that not all charterparty terms may be incorporated in a bill of lading.

15. GILMORE & BLACK at 125. No less an authority than Lord Blackburn, in Glyn Mills & Co. v. East and West India Dock Co., 7 A.C. 591 [1984], addressed the subject:

I have never been able to learn why merchants and shipowners continue the practice of making out a bill of lading in parts [i.e., of making multiple copies; see GILMORE & BLACK at 125 n.89]. I should have thought, that at least since the introduction of quick and regular communication by steamers, and still more since the establishment of the electric telegraph,
3. Since most BOLs are negotiable, a buyer is free to sell or pledge a BOL before or after the goods arrive at their destination.  

4. For international BOLs, the Carriage of Goods By Sea Act (COGSA) limits the extent to which carriers can exculpate themselves from liability. This limits the risks of the buyer or other consignee.  

5. For domestic BOLs, the Harter Act performs much the same function as COGSA.

6. The Pomerene Act, which parallels Article 7 of the U.C.C., provides the basic framework for the negotiation of ocean bills of lading. The Pomerene Act governs bills issued in the United States or its territories which involve interstate or foreign commerce. Since the Pomerene Act is federal, it would seem that Article 7 is of no relevance. However, courts often analogize to Article 7 when dealing with problems under the Act, as that Article is the source of more case law on similar issues. This analogy should extend to the creation of every purpose would be answered by making one bill of lading only, which should be the sole document of title, and taking as many copies, certified by the master to be true copies, as is thought convenient; those copies would suffice for every legitimate purpose for which other parts [i.e., copies] of the bill can now be applied, but could not be used for the purpose of pretending to be a holder of a bill of lading already parted with. However, whether there is some practical benefit of which I am not aware, or because, as I suspect, merchants dislike to depart from an old custom for fear that the novelty may produce some unforeseen effect, bills of lading are still made out in parts, and probably will continue to be so made out.

Id. Gilmore & Black provide the rationale for which the Judge was searching when they state: "[I]t remains as wise [today] as it was a hundred years ago to provide for the safe arrival of documents by sending duplicates forward by alternate routes. The usual practice today [in international trade] is to send one part by air while the others follow by water." Gilmore & Black at 126. As for bills of lading issued for domestic cargoes, the U.C.C. prohibits the issuance of bills in a set. U.C.C. § 7-304(1). If more than one bill is issued, the issuer is liable for any damages that result. Id. The U.C.C. specifically excludes from this provision shipments "in overseas transportation" as follows: "A shipment by water or by air or a contract contemplating such shipment is 'overseas' insofar as by usage of trade or agreement it is subject to the commercial, financing or shipping practices characteristic of international deep water commerce." U.C.C. § 3-323(3). Where bills are issued in a set in compliance with this provision, they are governed by the same rules as single bills, viz., Sections 7-304(a) through 7-304(5) of the Code. Thus, to the extent the U.C.C. governs the type of shipments considered in this article, the existence of multiple originals is not prohibited. The validity of electronic, as opposed to paper, bills of lading under the U.C.C. is discussed infra at note 20. Cf. U.C.C. § 7-402 (voiding duplicate bills issued after the original "except as provided in the case of bills in a set").

16. See, e.g., West India Ind. v. Tradex Petroleum Serv., 664 F.2d 946, 949 (5th Cir. 1981) ("If the bill is negotiable (as, for all practical purposes, all ocean bills are) it controls possession of the goods and is one of the indispensable documents in financing the movement of commodities and merchandise throughout the world") (quoting Gilmore & Black at 93).


of electronic systems for negotiating bills of lading, since the possibility of such systems was envisioned by the drafters of the Uniform Commercial Code.\textsuperscript{20}

7. Bills of lading are, of course, important in letter of credit transactions, with buyer's bank paying seller (or, more frequently, seller's bank) upon presentation of the bill of lading indicating proper delivery.\textsuperscript{21}

II. CHARACTERISTICS OF AN ELECTRONIC SYSTEM

As the discussion above suggests, bills of lading may be viewed as having two purposes: the transmission of information concerning goods and the formal embodiment of title in those goods. In fact, those two functions can be viewed as one, since "title" is itself information as to who owns the goods. Thus, so long as legal requirements are complied with, there is no reason why an electronic system cannot convey all of the information currently carried on paper. In order to be useful, such a system would have to be reliable, easy to use, inexpensive, and at least as resistant to fraud as the current system.

We envision a bill of lading exchange network using a central

\textsuperscript{20} The U.C.C. specifically embraces "such probabilities at teletype transmission of what may some day be regarded as 'Documents of Title.'" U.C.C. Section 1-201(15), comment 15.

The definition of "document" in Article 7 of the U.C.C. refers to the general definitions of Article 1, Section 1-201. See U.C.C. § 7-102(1)(e). Section 1-201(15) contains the definition of a document of title:

'Document of title' includes bill of lading, dock warrant, dock receipt, warehouse receipt or order for the delivery of goods, and also any other document which in the regular course of business or financing is treated as adequately evidencing that the person in possession of it is entitled to receive, hold and dispose of the document and the goods it covers. To be a document of title a document must purport to be issued by or addressed to a bailee and purport to cover goods in the bailee's possession which are either identified or are fungible portions of an identified mass.

U.C.C. § 1-201(15). Electronic documents appear to fall squarely within the foregoing definition, since they would be "treated as adequately evidencing that the person in possession of it is entitled to receive . . . and dispose of the document and the goods it covers." \textit{Id}. Such an interpretation would be entirely consistent with the pragmatic spirit of the Code.

Likewise, the Vienna Sales Convention does not appear to bar the use of electronic documents. Contracts of carriage and documents of title are covered by Article 58 of the Convention. Article 34 covers exchanges of goods "for the price," i.e., sales not on credit. It calls for seller to "hand over [the] documents relating to the goods" at the time and place called for in the delivery contract. Despite this reference to hand delivery, it should be clear that simplicity of drafting, and not literal requirements of hand delivery, was intended. See HONNOLD, supra note 7, at § 219, p. 247 (desire on part of draftsmen to make this provision "a simpler and less cluttered text"). Cf. Article 13 (definition of "writing" "includes telegram and telex").

\textsuperscript{21} See Farnsworth, \textit{Documentary Drafts Under the Uniform Commercial Code}, 22 \textit{Bus. Law.} 479 (1967); WHITE & SUMMERS at 704-11.
With adequate backups, of course, in the form of data archiving and redundant hardware.

23. It is not yet clear whether there would be any great advantage to having terminals aboard ships. However, the new maritime communications satellite system, INMARSAT, would make such a practice feasible if desired.

24. Since bills of lading normally incorporate by reference a variety of documents—generally including COGSA and insurance contracts—the same would be true of an electronic system. With an electronic system, however, system participants could actually call up the documents so incorporated, since those could be stored in the system along with the bill if desired.

25. The need for confidentiality with regard to certain bills of lading has always been recognized. McDowell and Gibbs, for example, state in the course of describing a typical company's bills of lading:

> On the delivery permit and dock receipt [essentially both copies of the bill of lading], the name of the consignee and his address are both blocked out; this information, because of its sensitive nature, could be of value to a competitor or his agent if he were to observe any of the papers in the carrier's office or on the pier.


26. These techniques have already been adopted, along with some unique new measures, to safeguard the computers used by Chase Manhattan's SeaDocs system, a centralized bill of lading...
rate, it is generally accepted that levels of fraud within an electronic system would be substantially lower than those existing within the current system.27

With the precautions described above, any participant in the system could view any bill of lading currently on the system, so long as the bill's holder did not want it kept confidential. Thus, those in search of a particular commodity would be able to search the system to find cargoes of that commodity en route to a particular area. They could then contact the owners of those cargoes (through the system, if desired, or by telephone) to negotiate a purchase. The deal having been arranged, the holder of the bill would make appropriate changes to the bill in the system, equivalent to the endorsement on a paper bill, in order to pass the title to the new purchaser. Upon proper execution of the transfer, the new purchaser would become the only system participant capable of making changes to the system original.

The commercial advantages of such a system should be obvious. The amount of information available in the marketplace would be greatly expanded, with an accompanying increase in the ability of firms to meet consumer needs quickly.28 In addition, the significant costs and delays associated with handling the current flow of paper documents would be reduced substantially.

A computerized system would also enhance traditional payment
arrangements. Letters of credit, perhaps the most widely used system of maritime cargo payment, could be sent from bank to bank using the system. Each letter of credit could refer to a specific bill of lading in the system (identified by number or code). More significantly, the accelerated pace of transactions involving bills of lading would be welcomed by banks, since they would immediately be apprised of any changes in a bill's status. The system is thus a logical step in the transition to completely electronic banking.\(^{29}\)

The system we envision would be similar to the several electronic funds transfer systems currently in operation. These systems are comprised of networks of banks and other financial institutions who pay either a flat rate or a per-transaction fee to use the system's facilities.\(^{30}\) Central computers are purchased and maintained with monies paid in by members. In many cases, the computer terminals used by participants are owned by the system and leased to individual participants.\(^{31}\)

The need to pay dues, and the assorted risks and start-up costs involved,\(^{32}\) would probably limit the system's participants to large and financially secure concerns during the early phases. Initially, at least, the implicit size requirements for membership in the system would be beneficial. That is because smaller firms necessarily tend to depend more heavily on each purchase or sale they make. Leaving them out of the system during the startup phase ensures that any problems will be discovered by large firms which depend less on any particular transaction. This will help build confidence in the system, making it more likely that smaller firms will eventually reap its benefits too. Indeed, without the participation of small concerns, the system will never be as useful as it should be.

### III. CENTRALIZED ELECTRONIC MARKETS

Contemporary transactions in securities, commodities, and a host of other exchangeable goods are carried out through the use of vast computer networks linking individual buyers and sellers with a centralized market. The current BOL exchange system, although charmingly archaic, is inefficient by comparison.

\(^{29}\) See generally Scott, Corporate Wire Transfers and the Uniform New Payments Code, 83 Colum. L. Rev. 1664 (1983).
\(^{30}\) Id. at 1707.
\(^{31}\) Id.
\(^{32}\) E.g., the costs of acquiring and leasing equipment and training employees on a new system.
Centralized stock trading systems provide an excellent contrast to the BOL exchange system. In the organized stock exchanges with physical trading locations, such as the New York Stock Exchange (NYSE), trading volume is remarkable; an average of 84.3 million shares change hands on the NYSE each day. This staggering volume is made possible by an electronic exchange system that both tracks transactions and constantly updates current price information. Even more dependent on electronic systems is the Over the Counter (OTC) Market, which has no physical location. This market is simply a computer network linking buyers and sellers with “market makers”—self-selected middlemen who arrange trades for small commissions.

Currently, trades within a given stock exchange are carried out on computer terminals. The sale price for each transaction is instantaneously incorporated into the electronic ticker tape that reports current prices. In addition, many securities are now traded on more than one exchange by means of an electronic intermarket price reporting system. Finally, a pilot system that actually carries out intermarket trades is now also in place.

34. Id. at 16. The NYSE calls the computerized transaction verification system "DOTS", for Display Order Turnaround System. The price tracking function produces the familiar electronic ticker tape. Also, the recording of transaction information allows the Securities and Exchange Commission (SEC) to monitor stock transactions in an attempt to detect unfair manipulation. Id. at 15. On the impact of electronic systems on the operations of the securities industry in general, see J. SELIGMAN, THE TRANSFORMATION OF WALL STREET 353 et seq. (1982).
36. See note 34, supra.
38. SECURITIES EXCHANGE COMMISSION, A MONITORING REPORT ON THE OPERATION OF THE INTERMARKET TRADING SYSTEM (1981) (describing system that actually effectuates intermarket trades). The SEC believes that one day a "national market system" will emerge to tie all securities trading together in one central market:

The SEC envisages the term "national market system" "as a comprehensive reference to those regulatory and technological steps which the Commission and the securities industry must take in order to integrate the mechanisms for trading qualified securities and behavior of investors and securities professionals in order to achieve a nationwide interactive market system."

In the commodities futures exchanges, where contracts for the future delivery of commodities are bought and sold, electronic systems serve much the same purpose.\textsuperscript{39} Commodities futures trading between markets is also being pioneered by the INTEX (International Futures Exchange of Bermuda), which is the first step toward a centralized market for international futures trading.\textsuperscript{40}

In addition to stocks and commodities, money is also transferred around the world on a regular basis. Banks long ago discovered the benefits of Electronic Funds Transfer (EFT), and now even the Federal Reserve System has its own transfer network, FedWire, which is used to transfer a variety of funds and government obligations.\textsuperscript{41}

One might argue that the BOL exchange system envisioned here and the stock and commodities trading networks differ as to the nature of the obligations being exchanged. After all, BOLs represent physical cargoes rather than abstract claims on corporate earnings or contracts for the delivery of a commodity. However, there is one electronically-traded instrument that is similar in some important respects to a BOL: the mortgage pool security. These securities are backed up by a pool of individual mortgages. Each security represents a claim on mortgage payments by property owners, usually individual homeowners.\textsuperscript{42} They are administered by both the federal government, under programs such as the Government National Mortgage Association ("Ginnie Mae"),\textsuperscript{43} and by private issuers (usually


\textsuperscript{40} See What 60 Leaders Predict for the Last Half of the 1980's, FUTURES, THE MAGAZINE OF COMMODITIES AND OPTIONS, Jan., 1985, 46-50, at 50 (discussion of INTEX, the International Futures Exchange of Bermuda, a computerized international futures exchange). The same article also discusses the possibility of "freight rate futures." \textit{Id.} at 47.

\textsuperscript{41} On EFT systems in general, and the legal regime that has arisen to regulate them, see Scott, Corporate Wire Transfers and the Uniform New Payments Code, supra note 31. On the FedWire system, see Maerowitz, Federal Funds, in INSTRUMENTS OF THE MONEY MARKET (T. Cook and B. Summers, eds., 5th ed. 1981) at 42-51. For a discussion of electronic systems generally and their use in international trade, see Computing for Cash or Credit, EXPORT TIMES, Jan. 1984, at 10.


\textsuperscript{43} See THE FIRST BOSTON CORPORATION, supra note 42, at 92. For a good description of the

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shares in these pools are traded in much the same way other securities are. They are considered quite safe, because they are guaranteed by the U.S. Government, or, in the case of private issuers, by private insurance companies.

There are a number of similarities between mortgage pool securities and freely transferable bills of lading. First, mortgage pool securities represent amalgamations of individual mortgage obligations; there are tangible assets (houses) behind the security. Second, the securities are administered, in the case of private issuers, by a trustee bank holding the mortgages and acting as the agent of the issuing bank; the trustee simply redirects mortgage payments to holders of the securities. This centralized agency relationship bears some resemblance to the BOL registry proposed by Chase Manhattan Bank, discussed in section IV below. Lastly, trading in mortgage pool securities provides a large amount of immediately available capital to the housing industry. In the maritime context, an electronic BOL exchange network would bring added liquidity to sellers of goods. Sellers would be paid when their goods were shipped—i.e., when the BOL covering a cargo entered the active secondary market—rather than upon delivery, as is the current practice. Sellers would have their cash sooner, allowing them to finance larger inventories, much in the same way that banks free up mortgage financing capital through the use of mortgage-backed securities.

While mortgage pool securities represent claims on a stream of income, in the form of mortgage payments by homeowners, BOLs represent actual cargoes. Thus, although mortgage pool securities are in some sense less abstract obligations than other securities, BOLs are an even more concrete instrument.

The active market in mortgage pool securities demonstrates that trading in BOLs has so far been prevented not by conceptual difficulties, but by outdated and shortsighted legal rules. If collections of individual homeowners' mortgage obligations can be sent flying across the wires, why not a simple document covering one boatload of soybeans?

regulatory scheme surrounding mortgage pool securities, see Miller, Regulation of Trading in Ginnie Maes, 21 DUQ. L. REV. 39 (1982).


45. See Strine, supra note 44, at 1031-1032.

46. See THE FIRST BOSTON CORPORATION, supra note 42, at 93.
The Creation of a Secondary Market

The preceding discussion of the advantages of an electronic trading system for BOLs emphasizes the efficiencies such a system would engender in the primary market, i.e., among producers of goods shipped by sea and the consumers of those goods, or their respective agents or brokers. These are not the only improvements that would likely result from such a system. The increase in the number of market participants that would attend the creation of a secondary market in BOLs would undoubtedly benefit both producers and consumers, since cargo prices would be disciplined by a much more active market than at present.\(^47\) The shipping industry as a whole might conceivably benefit, in the form of additional traffic, from the resultant efficiencies. In addition, the added liquidity resulting from a secondary market might well reduce the effective cost of transporting goods.

A good example of the benefits stemming from a robust secondary market can be found in the commodities futures exchanges. The speculation of commodities traders insures that a large, well-functioning market for all commodities will be maintained. The large number of transactions enhances price stability and makes price movements more orderly. Of course, commodities trading in the secondary market is motivated by competing bets on price direction, with correct assessments of price trends providing the profits that motivate traders.\(^48\) But, from a larger perspective, the profits derived from risk-

\(^{47}\) Increased price discipline is a direct result of the increased information available to market participants. Because buyers have a more complete and up-to-date version of the "going rate" for a particular cargo, they will know not to pay more, assuming it is available from another supplier. There is a large literature in the field of Bayesian statistics devoted to assessing the value of additional information such as this. See, e.g., H. RAFFA, DECISION ANALYSIS: INTRODUCTORY LECTURES ON CHOICES UNDER UNCERTAINTY (1968). See also note 28, supra.

\(^{48}\) See T. HIERONYMUS, ECONOMICS OF FUTURES TRADING (1971). Hieronymus includes a useful discussion of the mechanics and uses of "hedging," the process by which producers and consumers with fixed commodity purchase or sale contracts minimize their vulnerability to price changes during the life of their contracts by buying futures contracts at differing prices. Id. at 107. Holders of BOLs covering cargoes of commodities traded on the futures exchanges hedge by purchasing futures contracts at prices above and below the contract price on the BOLs. See note 81, infra, and accompanying text. It is important to recognize, however, that this hedging activity does not render insignificant the advantages of an electronic BOL exchange system. The primary reason is that futures contracts are for very particular commodities, of a specific grade, to be delivered at a specific warehouse. See CHICAGO MERCANTILE EXCHANGE, CME HANDBOOK 1982 at 9 (1982). BOLs, on the other hand, concern specific cargoes of varying grades, bound for diverse ports. The uniformity that allows commodities markets to function smoothly isolates the types of risks that can be hedged against in those markets. Since each BOL is a unique package of risk and return, however, trading in them represents a distinctly different activity. See generally note 81, infra, and accompanying discussion in the text.
taking are simply the cost of the efficiencies provided by the secondary market.

Undoubtedly, there is today a small secondary market for cargoes covered by BOLs. The volume of trading in BOLs covering crude oil cargoes, for instance, is too large to be attributed solely to transactions among principals.\textsuperscript{49} Also, the existence of private cargo locating services indicates that there is substantial interest in trading BOLs.\textsuperscript{50}

A centralized secondary market in BOLs would make these transactions much simpler and cheaper. The success of such markets in other industries, such as securities and commodities trading, argues strongly for the creation of an analogue in the BOL field.

IV. THE CHASE MANHATTAN SEADOCs SYSTEM: A FIRST STEP?

The Chase Manhattan Bank is currently developing a bill of lading registry, called SeaDocs, which will possess some of the characteristics of the system described above. There are also some very important differences. Despite these differences, SeaDocs represents a serious effort—by a very major concern—to create a system for expediting the transfer of ocean bills of lading. It remains essentially a paper system, although one whose capabilities are substantially enhanced by the use of agency law and modern telecommunications.

SeaDocs, as currently conceived, would be a central registry for bills of lading. Traditional paper bills would be sent by courier to a central facility instead of being exchanged by the parties. Cargoes would be bought and sold as at present. The only difference would be that at the conclusion of negotiations, SeaDocs would be instructed to endorse the bill (as agent for the seller) over to the buyer. It would then accept delivery of the bill on the buyer's behalf. SeaDocs would record the buyer's interests and those of any financing parties under a sales agreement preserving possessory security over the goods through SeaDocs' agency. All participants in the "shipping chain" would appoint SeaDocs as agent.\textsuperscript{51}

The similarities between the SeaDocs concept and the computer-

\textsuperscript{49} See Protecting Against Theft from Centralized Data Systems, 2 INT'L CARGO CRIME PREV. (June 1984), at 1 (stating that BOLs covering oil cargoes are often traded 60 or more times before final delivery of the cargo).

\textsuperscript{50} See note 6, supra.

\textsuperscript{51} The whole system is reminiscent of that used by stock transfer agents. See, e.g., Kenter v.
ized system discussed earlier should be apparent. Like the computerized system, the SeaDocs system would provide fast transfers of title without the necessity for physical endorsement of the bill. Also like the computerized system, it would reduce considerably the expense and bother of dealing with mountains of paperwork, although paper documents would still have to be produced and moved around to some degree. However, it would not be nearly as fast as a computerized system.\textsuperscript{52}

The SeaDocs system as currently conceived has at least one other deficiency vis-a-vis the all-electronic system we have envisioned:\textsuperscript{53} Seadocs is deliberately designed to preclude parties from finding and

\begin{quote}


52. Why is Chase doing it this way? Partly because of perceived problems with the entire elimination of paper documents, and partly as a transitional step—the SeaDocs system is likely to have much smaller start up costs than a fully computerized system, although its dependence on couriers makes it likely that its operating costs will be higher. The most important transition is legal and not financial, however—a partially automated system will allow judges, lawyers and (to a somewhat lesser degree) shippers to get used to the whole idea. Once that has occurred, a fully automated system can be implemented without running head-on into the maritime system’s glacial attitude toward change:

The Registry system is actually a two-phase concept. Phase 1 is a pure paper system with central storage and physical endorsements of documents both to the user which will appear to be an electronic system in that most people deal with it on an electronic basis. If the Registry is successful in the first phase, the second phase anticipates doing away with physical documents and going 100% electronic. Interestingly, the support of many companies and individuals for the Registry system has been based on their desire to see a purely electronic system. All of them agree that the only thing stopping us is ‘the law.’ . . . If the Registry works successfully over ‘x’ number of years, then I assume that lawyers and judges will be prepared to go electronic.

Letter of Alan Urbach, Director, SeaDocs Registry Limited, to authors, October, 1984. This approach seems entirely sensible. Chase contends that SeaDocs would be legal under the current statutes and case law governing bills of lading transfers:

Since the Registry ‘mirrors’ current business practices, the legal effect of transactions conducted through it should not vary from that of conventional transactions . . . . Because they have the documents [i.e., they retain legal ownership of them], the positions of disputing parties would not be affected under the law.

Chase Booklet at 8. This argument is echoed in recent communications between SeaDocs and the authors. Letter of Alan Urbach, supra.

53. Other problems include the fact that the system provides little “value added” for large firms, which must endorse it if it is to thrive.
dealing with one another through the system. The computerized system we have described, by contrast, has as one of its primary attributes the ability to bring interested parties together quickly and cheaply. This will, we believe, make the market for maritime bills of lading substantially more efficient.

V. LEGAL PROBLEMS

The current legal regime surrounding bills of lading and their transfer does not seem on its face to preclude a computerized system. However, there are a number of potentially knotty legal problems that are implied by such a system. We attempt in the following section to deal with the major problems that have occurred to us.

A. Merger

Under the Uniform Commercial Code, a document of title over tangible goods merges with the goods themselves, making possession of the actual document extremely important. As outlined above, the creation of an electronic original would not seem to create difficulties under the Code, especially in light of the fact that the framers of the Code apparently envisioned the era of electronic documents, since the Code’s definition of “documents of title” specifically embraces “such probabilities as teletype transmission of what may some day be regarded as ‘Documents of Title.’”

The problem is that the U.C.C.’s definition of “Documents of Title” is applicable only to the extent that the U.C.C. governs transactions. While it is true that bills for cargoes coming to the United States are currently governed by Article 7 of the U.C.C. or by the law of the foreign nation where they originate (a difference that matters little, as the law of negotiability is a sort of jus gentium), all cargoes originating in the United States are governed by the Pomerene Act, and are thus not subject to the Code. To complicate matters, it seems likely that the U.C.C. will soon largely be replaced as the law of international goods sales by the Vienna Sales Convention. Although this convention, which governs transactions between signatory nations,

54. Chase booklet at 7.
56. U.C.C. section 1-201(15), comment 15.
57. GILMORE & BLACK at 95-96.
58. Id.
59. The Vienna Sales Convention is also referred to as the Conference on the International Sales of Goods (CISG). It is described and partially set out in Symposium, 18 INT’L LAW. 3-56 (1984). Many of the Convention’s provisions are modeled after similar provisions of the U.C.C. See
has been ratified by only six nations to date, the American Bar Association has recommended that it be adopted by the United States.\textsuperscript{60}

The title problem may be less acute than the above suggests, even under a non-Code sales regime. Many areas of the law already recognize that electronically stored data may qualify as a writing.\textsuperscript{61} If provisions of the Vienna Convention or the Uniform Commercial Code conflict, they may be avoided by contract. Problems with an electronic system under the Pomerene Act appear less likely, since that Act does not explicitly require paper documents of title. Even in the worst case, however, where the Act is interpreted to require a paper bill of lading, the problem could be avoided through the formalistic step of printing out a copy of the bill at a central location for inclusion in a paper file. Such a ritual is unlikely to be required, though, in light of the generally practical-minded approach taken by courts in commercial areas.\textsuperscript{62} This is especially true in light of the increasing pace and importance of electronic communications in commerce.\textsuperscript{63} And, as an ultimate solution, the law can be changed. The enhanced efficiency of an electronic system should make a powerful argument for

\textsuperscript{60}Honnold, The New Uniform Law for International Sales and the U.C.C.: A Comparison, id. at 21-28. See also note 7, supra.

Article 11 of the Convention provides that international sales contracts do not have to be evidenced by a writing. \textit{Id.} at 43. Also, like the U.C.C., the Convention allows any party to contract out of its provisions, and it expressly states that discordant terms of a contract implicitly displace the terms of the Convention. Thus, it is apparent that this new regime is quite compatible with the type of computerized system we have envisioned. The same, of course, can be said of the Uniform Commercial Code. \textit{See generally} WHITE \& SUMMERS at 7.

\textsuperscript{61}See, e.g., Federal Rules of Evidence, Rule 1001(1), which says that writings may consist of letters, numbers, etc., set down in a variety of forms including magnetic impulses, mechanical or electronic recording, or other forms of data compilation. The Court of Appeals for the Fourth Circuit has recently analogized to this provision in holding that records on magnetic tape are "records" for search-and-seizure purposes. The Court's language suggests that the analogy should apply to all advanced technologies for information storage and retrieval. United States v. Truglio, 731 F.2d 1123, 1128 (4th Cir. 1984) ("Standards of pragmatism and common sense must necessarily be adaptable to changing times and technological advances. While decades ago it might have been difficult reasonably to infer that records existed in some form other than written, in the mid-1980s common sense demands that we refrain from remaining so inflexible."). It is also generally recognized that routine banking documents covered by U.C.C. Article 4 may be either paper or electronic in form. \textit{See} H. SCOTT, NEW PAYMENTS SYSTEMS: A REPORT BEFORE THE 3-4-8 COMMITTEE OF THE PERMANENT EDITORIAL BOARD OF THE U.C.C. 5-30 (1978).

\textsuperscript{62}At any rate, courts interpreting the Pomerene Act tend to draw on other sources of law, especially the U.C.C., because of the scarcity of Pomerene Act cases. Such practices probably encourage a functional, rather than a formal, approach. \textit{See} GILMORE \& BLACK at 96.

\textsuperscript{63}\textit{See generally} Scott, supra note 61.
clearing away any statutory deadwood that threatens its implementation.

B. Regulation of BOL Trading Under Commodities Laws

An electronic BOL exchange system would involve the buying and selling of actual cargoes by producers, consumers, and speculators. To the extent that the latter group participates in the BOL market, and to the extent that the cargoes traded fit the definition of commodities under the federal commodities regulation law,64 BOLs would take on some of the superficial characteristics of commodities futures contracts: (1) they would be agreements by carriers to deliver goods (2) to a specified place (3) within certain time limits.65 The question that these similarities raise is, would BOL trading fall under the definition of commodities futures trading for purposes of the federal commodities law?

The answer is clearly no.

Commodities contracts are highly specific as to the number of units in a lot, the grade of commodities that will satisfy the contract, specific delivery sites, etc.66 The key, in short, to the smooth functioning of the commodities futures exchanges is the uniformity of the contracts that are traded. This requirement is clearly embodied in the federal commodities statute, which specifically calls for a hearing by the Commodities Futures Trading Commission to determine whether a proposed new contract meets the statute's uniformity requirements.67 Bills of lading, however, are far from uniform. They cover

64. Commodities futures trading in the United States is regulated under the terms of the Commodity Exchange Act of 1936, 7 U.S.C. secs. 1-24, as amended, reprinted in (CCH) COMM. FUT. L. REP. ¶¶ 1001-1461.

65. On commodity grades and delivery site requirements, see CHICAGO MERCANTILE EXCHANGE, supra note 39.

66. See, e.g., CHICAGO MERCANTILE EXCHANGE, supra note 39, at 18-51 (describing specifications for a standard contract in Beef Cattle Futures, including volume (40,000 pounds, plus or minus five percent), grade (USGA "choice" 1, 2, 3 or 4), and average cattle weight (between 1050 and 1200 pounds, with no steer to weigh more than 1300 pounds or less than 950 pounds)). For the judicial test that has been developed to determine when trading in a particular delivery contract falls under the regulatory ambit of the Commodities Futures Trading Commission (CFTC), see In re Stovall, (CCH) COM. FUT. L. REP. par. 20,772, at p. 23,775 (member of Chicago Board of Trade held in violation of registration requirements of Commodities Exchange Act of 1936, since he was operating a market in instruments that were (1) standardized agreements, (2) providing for future delivery of a commodity that was (3) offered to the general public and (4) secured by margin accounts). For a discussion of the case and the general standard it represents, see 1 P. JOHNSON, COMMODITIES REGULATION, at § 1.21 (1982).

67. See 1 P. JOHNSON, supra note 66, at § 1.21 (describing Commodities Futures Trading
all manner of items, in an almost infinite variety of cargo sizes, for
delivery to every seaport in the world. Since it is unrealistic to expect
the Commission to hold a hearing for each individual BOL, the fed-
eral commodities laws cannot reasonably be said to apply to BOL
trading, particularly as bills are already traded, though in much more
awkward fashion, under the current paper-based system, without any
suggestion that such trading falls under the commodities statutes.

C. Protection Against Market Manipulation

Precisely because electronic systems encompass a vast amount of
information, they have the potential to serve as instruments of market
manipulation. For example, just as a desperate buyer might search
the system for news of cargoes of a desired commodity headed her
way, a crafty market manipulator could buy up all cargoes headed for
a particular destination in the hopes of deriving monopoly profits, at
least for a limited time. This is a fairly plausible scenario. Accordingly, the bill of lading transfer system would have to be designed to
minimize the risk of such market manipulation.

There are several ways in which this could be done. First, it
should be recognized that the antitrust laws of the United States have
been applied so liberally as to be almost transnational in scope. Parties
could be made to contract for United States antitrust law, or some
mutually-acceptable substitute, to govern all transactions arising
under the system. Second, the system could be made to check period-
ically the identities of buyers and sellers to detect patterns of manipu-
ation. Third, a set of private rules, similar to those of major stock
and commodity exchanges, could be drawn up and applied to every
member of the system. Liability would arise under these rules in ad-

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Commission hearing process for approval of trading in new contracts). See also id. at § 2.07 (describing CFTC's dual "economic purpose" and "in the public interest" standards for evaluating new contract proposals). The CFTC has adopted an elaborate series of regulations in connection with the statute's uniformity requirement. Id. at § 1.24 (describing detailed regulations concerning warehouse storage standards for delivery of commodities traded under proposed contracts).

68. See, e.g., Nash, Large Fine Levied on Donaldson, New York Times, March 12, 1985, at D1, col. 6 (enforcement of CFTC reporting and anti-manipulation rules).


70. Stock transfers are currently monitored to detect manipulation. See NEW YORK STOCK EXCHANGE, COMPANY MANUAL § A2-1 (1975), reproduced in PRACTICING LAW INSTITUTE, 1 INTRODUCTION TO SECURITIES LAW DISCLOSURE 297 (1976).
dition to any other liability imposed by law. Some combination of
these safeguards should serve as an adequate incentive to prevent
abuse of the system. With regard to technical means for preventing
fraud (e.g. dedicated terminals, revolving passwords, etc.), the tech-
niques used in modern electronic funds transfer systems should be
equally effective in this context.\textsuperscript{71}

\textbf{D. Integration of the Electronic System with Other Aspects of
Shipping Practice}

How will an electronic system for bill of lading transactions inte-
grate into a system of shipping practice that has grown up around
paper bills? A couple of important areas of change come to mind.

\textit{Letter of Credit Transactions}

The letter of credit is the most important vehicle for financing
international goods transactions.\textsuperscript{72} The proposed electronic system
should thus be closely scrutinized in order to see what effects it might
have on letter of credit transactions.

The letter of credit has two major functions in sale of goods
transactions. First, it is an instrument of payment that serves to re-
duce significantly the risks involved in commercial transactions across
international lines.\textsuperscript{73} Second, it is often an instrument of financing.\textsuperscript{74}
In both cases, the letter is presented to the issuing bank (or to a corre-
spondent bank in a more convenient location which “confirms” the

\begin{footnotes}
71. \textsc{National Commission on Electronic Funds Transfer, Electronic Funds
Transfer in the United States: Policy Recommendations and the Public Interest 55-
66 (1977)} (discussion of security measures in final report of the National Commission on Electronic
Funds Transfer). \textit{See also} note 26, supra.

72. \textit{See, e.g.}, GILMORE \textsc{&} BLACK at 114 \textit{et seq}; WHITE \textsc{&} SUMMERS at 704 \textit{et seq.} \textit{For a more}
comprehensive treatment of letters of credit in general see H. HARFIELD, BANK CREDITS AND
ACCEPTANCES (5th ed. 1974). \textit{For a lucid and interestingly done early examination of the use of
letters of credit in non-sales transactions see Llewellyn, Some Advantages of Letters of Credit, 2 U.
Chi. J. Bus. 1 (1929).}

73. \textit{See} WHITE \textsc{&} SUMMERS at 705-708; GILMORE \textsc{&} BLACK at 115-117.

74. \textit{See} Harfield, Secondary Uses of Commercial Credits, 44 COLUM. L. REV. 899 (1944). \textit{The
letter of credit can serve as an instrument of financing in the following manner: upon obtaining a
contract of sale under a letter of credit, the seller may obtain liquidity through assignment of
the letter, through assignment of the proceeds of the letter, or through obtaining another letter of credit,
secured by the first letter, naming someone else (generally, though not always, a supplier) as benefici-
ary. For a typically lucid exposition of the mechanics of such transactions see WHITE \textsc{&} SUMMERS
at pp. 707-708, 747-752.}
\end{footnotes}
letter of credit)\textsuperscript{75} which matches the terms of the credit against the bill and, assuming that the documents "match,"\textsuperscript{76} pays the seller. When, as is usually the case, the credit and bill are presented to a bank other than the issuing bank, the "confirming" bank later presents the letter, along with the documents called for in the credit, to the issuing bank for payment.\textsuperscript{77}

It may occur to many readers that an electronic system for negotiating bills of lading will be less useful than might be hoped if the bills—available instantaneously with an electronic system—then have to be held while the bank or the seller waits around for the letter of credit to arrive by mail. This would indeed be an unfortunate drawback, were it not for the fact that letters of credit may now be transmitted in electronic form, thanks to a recent change in the International Chamber of Commerce's Uniform Customs and Practice for Commercial Documentary Credits.\textsuperscript{78} As a result of this change, letters of credit are now instantaneously available; consequently, all delays stem from the need to physically move bills of lading.

Waiting around for bills of lading can at times lead to serious problems, for it sometimes happens that when the credit expires the presenter (usually a bank) does not have all of the original bills, but only one.\textsuperscript{79} When the credit calls for the full set of bills, this may

\textsuperscript{75} By "confirming" a letter of credit, a bank becomes liable in the same manner as the issuing bank and is bound to honor drafts. See U.C.C. § 5-107(2). See also U.C.P. Article 3.

\textsuperscript{76} The question of when documents "match" is a thorny one. As Gilmore and Black put it:

At this point the interests of shipper and carrier are opposed: the shipper wants a clean bill, with which he can compel the bank to honor his drafts; the carrier, to protect itself from claims, insists on noting on the bill all possible reservations as to the "apparent good order and condition" of the goods received. Since the carrier controls the form in which the bills are issued, a technically clean bill is as common as a white blackbird, a blue moon, or a pink elephant.


\textsuperscript{78} See GILMORE & BLACK 126-28. See also WARD & HARFIELD, BANK CREDITS AND ACCEPTANCES 25 (4th ed. 1958).

\textsuperscript{79} Yet another result of the practice of making more than one original.
result in nonpayment. Since with the electronic system we envision the bills would be available immediately, this problem would be eliminated.

**Interaction with Hedging Practices**

Currently, manufacturers and others who use seaborne goods protect themselves against price changes during transit through the commodities futures exchanges. For example, a chocolate maker who is committed to buy cocoa beans at a given price will buy futures contracts obligating him to sell cocoa beans. If the market price for cocoa beans goes down during shipment, the futures contract will appreciate in price. When it is sold, the profit will compensate the chocolate maker for the loss he incurred by buying cocoa beans in advance at a higher price than the delivery-time market price.

In this way, the market for commodities futures allows manufacturers to hedge against the risk of price changes. The nature of the futures exchanges, however, limits the types of risk that can be protected against. As mentioned earlier, commodities futures contracts must describe uniform lots of particular commodities to be delivered only at specified warehouses. Thus, by design, commodities futures trading permits market participants to limit the risk of price changes only. A bill of lading exchange, by contrast, would permit commodities purchasers to limit an additional class of risks: those associated with specific cargoes destined for specific and widely dispersed ports.

For example, consider our chocolate maker again. He can hedge against changes in the standard New York delivery price, to be sure,

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80. *See, e.g.*, Dixon Irmaos & Cia. v. Chase Nat. Bank, 144 F.2d 759 (2d Cir. 1944) (Chase refused tender of credit plus indemnity agreement; other parts of bill were unavailable due to confusion attending invasion of Belgium by Germany at start of World War II.). In ordinary cases, where the presenter is a major bank, issuers will accept the tender of the available part(s) of the bill when accompanied by indemnities against fraud, etc. Gilmore & Black at 127. *See also* Backus and Harfield, *Customs and Letters of Credit: The Dixon, Irmaos Case*, 52 Colum. L. Rev. 589 (1952); Honnold, *Letters of Credit, Custom, Missing Documents and the Dixon Case: A Reply to Backus and Harfield*, 53 Colum. L. Rev. 504 (1953).


82. Our use of cocoa beans as an illustration suggests another virtue of an electronic system: it would significantly benefit many "third world" nations. That is because it would free up capital (see note 47, *supra* and accompanying text), which is perennially in short supply in such nations. This effect is likely to be most pronounced with regard to those nations (predominantly poor and third-world, though the United States falls into this class as well) for whom bulk commodities, like cocoa beans, are principal exports.

83. *See* note 66, *supra* and accompanying text.
by buying and selling cocoa futures contracts. But if his manufacturing plant is in Eureka, California, he can protect against the risk of loss or damage to a particular cargo by becoming a member of the BOL trading network. That way, if a particular cargo is lost at sea, or damaged, or if the shipper who contracted to carry it declares bankruptcy, the chocolate manufacturer can identify cocoa bean cargoes destined for Eureka or nearby ports—Portland, Seattle, and San Francisco, for example—and contact the current owners of those cargoes to make a deal. Since the conduct of many businesses is contingent on the existence of reliable supplies of necessary commodities, ordinary cargo insurance may not provide sufficient protection to cover all of the losses that may result from the nondelivery of cargoes. A BOL exchange system would thus allow manufacturers to hedge against such noninsurable or hard-to-insure-against losses.

CONCLUSION

We have argued that a computerized system for the negotiation of bills of lading would lead to reduced costs and improved information in the maritime shipping world. The benefits of such a system would not stop there, however. By reducing the cost of shipping and improving the efficiency of markets for goods shipped by sea, such a system would increase the efficiency of the world market as a whole, a result that is surely desirable. We have also argued that the legal barriers that must be surmounted to effect such a change are much less formidable than is widely believed. The biggest obstacle is the hypnotizing effect of the status quo. In light of the benefits that would flow from a computerized system for bill of lading exchange, that hypnosis should—and undoubtedly will—be overcome.