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Data Base Publishing for Business Intelligence
Richard J. Levine

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Electronic Publishing for Business Intelligence

Richard J. Levine

Mr. Levine became Dow Jones & Company's Editorial Director, Data Base Publishing, in 1980. He is responsible for the editorial output of Dow Jones's Interactive Information Services Division, which produces Dow Jones News/Retrieval, a videotex service, and DowPhone, an audiotex service. Before moving into electronic publishing, Mr. Levine spent more than 14 years with The Wall Street Journal, *serving as a general assignment reporter, labor editor, military correspondent, and chief economic writer and front-page columnist.*

When Tony asked me to participate in a seminar on command, control, communications, and intelligence (C^3I) in the business world, my initial reaction was one of skepticism. What could I offer? It seemed to me that most of the work in this seminar had been related to military and government affairs rather than the corporation. But when he explained his interest, I agreed that my perspective as editorial director of Dow Jones' interactive Information Services Division, the company's electronic publishing arm, could prove useful to the group. Given the nature of the business that we're in, my emphasis will be more on intelligence than on communications.

Perhaps it would be helpful if I gave you a little background on Dow Jones' electronic publishing efforts, so we have a common base for the discussion this afternoon. I apologize if any of this sounds like a commercial; it's simply intended as a bit of background.

Dow Jones is best known, of course, as publisher of *The Wall Street Journal*, which is the nation's largest paper. We have been engaged in electronic publishing, however, almost as long as we've been in business. The Dow Jones News Service, an electronically delivered business and financial news wire that ties together the economic community in this country, began operating in 1897. That was only eight years after the *Journal* itself came into existence. At various times in the history of the company, this electronically delivered news wire has provided much of our financial sustenance.

Indeed, there was an advertisement for the News Service that appeared in the *Journal* back in 1897 that spelled out the company's early commitment to electronic publishing very explicitly. The ad read, "Quick as a flash. We give quotations, telegrams, cables of all kinds, and all kinds of news affecting the markets. Page printers are the latest electronic device. News carried by electricity, printed by electricity. Arranged on a page easily read and filed. No banker or broker can well afford to be without our financial news service. Dow Jones & Co., 44 Broad Street." So in one sense we haven't really gone very far. That ad may explain how we have been able, primarily as a print publisher, to embrace the new technologies so vigorously: They've always been part of our culture. For much of our history, we've published both a newspaper and a wire service.

Our involvement in interactive electronic publishing — or data base publishing — really began in the mid-1970s. In 1974, we began offering the Dow Jones News/Retrieval Service to stockbrokers over dedicated phone lines as a computerized version of our basic business wire. The financial services industry really has been among the first in the country to embrace electronic information delivery systems. The first thing that stockbrokers needed was quotations. Very early on, they had display terminals sit-

ting on their desks that would offer them instant stock quotes. The problem that we faced when we wanted to deliver our news directly to their desk top was how to reach them. It really became a problem of real estate. The question that was debated at the time was, "Would a broker want a multitude of terminals sitting on his or her desk"? The answer that we arrived at was, "No." Therefore, we started delivering our computerized retrieval service to the quote terminal. Today, we reach the stockbrokers over dedicated terminals provided by such quotes vendors as Quotron and ADP.

This step got us involved in data base or interactive electronic publishing. In addition to stories from our news service, News/Retrieval also offered, at that time, selected stories from the *Journal* and from *Barron's*, the financial magazine we publish. Breaking news stories are inserted into this data base with appropriate retrieval codes within 90 seconds of their appearing on the news wire. It really is quite a feat. We are able to index the stories very quickly, insert them in a computerized data base, and allow them to be retrieved within a minute and a half after they appear on the news wire. Today, this remains the backbone of News/Retrieval.

Over the years, however, News/Retrieval has grown into a very broad-based electronic information service, aimed not just at the stockbroker but at the businessperson, regardless of the industry in which he or she is working. It combines news with data, analysis, and transactional capabilities, including brokerage services, electronic mail, and services that allow you to make airline reservations and actually buy and sell retail goods. It's delivered not only to dedicated terminals, but also to personal computers and communicating terminals over packet-switching networks.

Today we're offering 38 integrated data base services and reaching more than 200,000 terminals here and abroad, although I hasten to add that those are not necessarily the most meaningful measures of our growth. By the end of last year our customers included 70 percent of the country's 500 largest industrial corporations and 67 of the 100 largest banks. And those numbers are continuing to increase. Perhaps equally significant, the service is being distributed in major corporations, such as IBM, J. C. Penney, and ConAgra, through their internal computer networks.

Our central data base is located in Princeton, New Jersey. Most people get to the service through packet-switching networks, such as Tymnet, Telenet, or Uninet, over a dial-up telephone line from a personal computer. That personal computer may be in the office or it may be in the home. The heaviest users of the service, after the stockbrokers, are serious personal investors.

In the corporate area, a company like General Motors may be a subscriber to News/Retrieval. But that often means only a few terminals or employees within the company are regularly accessing the service through the packet-switching networks. In a sense, we haven't yet reached really large numbers of people in the corporate community.

But what's starting to happen as offices automate — and as computer networks within corporations start to proliferate — is that we're getting increasing requests to deliver the service on, in effect, a wholesale basis. If there's a computer system with multiple terminals in a corporation, we can provide a dedicated line or some other facility to connect their corporate computer network to our system. We thereby give access to News/Retrieval to hundreds — eventually thousands — of customers.

There's also going to be an increasing desire to integrate the kind of external information we provide with internally available information, in a blend that is uniquely suitable to that particular corporation. The growth of links to these corporate networks, we believe, is very important to widespread and intensive use of electronically delivered external information in the business community.

We're also delivering the service to subscribers through such value-added communications networks as MCI Mail, Citibank's Direct Access, electronic banking service, ITT DialCom, and the IBM Information Network. In fact, in their advertising, the value-added networks are selling not only their communications capacity to American corporations, but also the availability of such services as News/Retrieval. Services such as ours become something substantive that communications networks can use to increase the attractiveness of the network itself.

Those two approaches, internal corporate networks and value-added networks, become very large factors, we think, in the eventual growth of News/Retrieval and other information services. We're one of many players in a very rapidly growing industry. According to a leading directory of on-line data bases, there are currently some 2,900 commercial data bases available from 1,379 data base producers, and they are offered over 450 different on-line services. Back in 1980,

when we first established the Information Services Division with the aim of expanding our electronic publishing efforts, there were some 600 data bases available from 340 producers over 93 on-line services.

Another measure of the growth of the electronic information industry comes from Link Resources, a market research firm. They estimate that the business market for electronic information amounted to almost $2 billion in 1985 and will grow to almost $2.4 billion in 1986, and to $3.6 billion by 1989. The financial services industry, of which obviously the brokerage industry is a major part, is still the primary customer for electronically delivered information. But the market for on-line services is growing rapidly in other industries, as automated offices and corporate computer networks become realities.

Late last year I was struck by some figures put out by John Roach, the chairman of Tandy Corporation. He predicted that the number of office workers using personal computers would increase from 11 out of every 100 in 1984 to 44 of every 100 by 1989. All that, in a sense, creates targets of opportunity for our kind of service. While the stockbroker in the office and the serious personal investor at home have been the heaviest users of these kinds of services in the past, nowadays we're focusing product development and marketing on the business customer outside of the financial services industry. Stated very broadly, our admittedly ambitious goal is to put Dow Jones News/Retrieval on every office desk. At the very least, it seems to me, we should aim to match the success of the *Journal*, which has a circulation of two million and a readership several times larger.

Given that background, let me offer some more philosophical thoughts on the role of information in business. The main questions at this point are: What information is being used? How is the information being used? And by whom is it being used?

There was a study done last year by Trinet, a subsidiary of Control Data Corporation that produces on-line data bases and is interested in penetrating the corporate marketplace. They surveyed 200 middle managers in the 1,500 largest companies and 100 top executives in the Fortune 500, and they found some interesting things. Eighty-six percent of the middle managers need or have an interest in information about their own company, 64 percent want information about their customers, and 54 percent want information about their competitors. Among top executives, 96 percent were interested in information about their own company, 50 percent about their customers, and 44 percent about their competitors. Those findings are really confirmed in the usage patterns and statistics that we are seeing.

As I mentioned, the backbone of News/Retrieval remains our own proprietary Dow Jones News. By using a stock symbol or the name of a corporation, you can get news on 6,500 public companies. In one way we store it for 90 days, and in another way we store it back to 1979. This information enables people to keep track of their own company as well as customers and competitors.

There is also a growing demand for such data as basic corporate filings with the federal Securities and Exchange Commission, and stock analyst reports and statistical and analytical information from companies such as Standard & Poor's. All of this information — which we currently offer — responds to the needs of businesspeople for information about their own companies, customers, and competitors.

Unfortunately, it's not always clear how this information is being used. I recall a conversation several years ago with a space salesman for a business magazine. We had just started to offer a data base that contained earnings estimates on thousands of companies; I frankly thought it was of greatest value to investors. But to my surprise he said, "That thing is just making my life wondrously easier and it's contributing to my salary." I said, "What are you talking about"? He said, "Look, what I'm selling is corporate advertising to companies. I check this data base, and if the stock analysts believe that the earnings are about to soar, I go in and I tell the executives of the company that they're hot right now on the street and they might as well ride that wave. They ought to buy advertising and get out their corporate message in my publication." Likewise, if the Wall Street analysts are turning bearish on the company, he turned that to his advantage too. He'd say, "Look, you're in trouble. These guys are going against you. They think your earnings are going to plummet. You're stock price is going to go to hell if you don't act now. You need corporate advertising."

That's just a small example of one of the tactical or strategic uses that can be made of information. I think it also illustrates the infancy of this whole industry; we thought we were doing one thing, and we ended up doing another. Similarly we thought that the full text of thousands of analyst reports on companies would be of primary interest to investors.

It's turning out to be a potent tool in corporations for merger and acquisition work.

The uses to which this kind of information are being put are many and varied. The same is true of some of the transactional services that I mentioned. Through a gateway arrangement with Dun & Bradstreet's Official Airline Guide (OAG) subsidiary, we provide not only schedules and fare information for hundreds of airlines around the world, but we also enable you to make reservations from your terminal. OAG allows you to rationalize the often anarchistic pricing arrangements within the airline industry, and, as a result, to control travel costs. When you go in and say, "I want Flight 273 on this carrier," it lists the various ways you can make that flight, from the lowest price to the highest price. The variations on that same flight can be enormous. In a disinflationary environment, this capability becomes an important tool for cost control.

To be successful in the long run, we must learn how to include our externally provided news, information, data, and transactional services in the internal corporate information systems. Any of you who have worked in an institutional environment realize that your day is often paced not by outside events, though that can be true in some instances, but by internal events, by memos, by phone calls. We have got to be part of that information distribution system. I think you touched on this, Ben, in your recently revised paper* with John McLaughlin on management information, which has been helpful to us in understanding some of the uses of information within the corporate world. That paper talks about inside sources of information, outside sources, and then decision makers' own knowledge.

If you try to place News/Retrieval or similar services in that matrix, we fall into one spot: I guess the closest we come would be media, as an outside source of information and a formal process of obtaining it. There are a lot of ways that information gets moved about in a corporate environment. Our sense is that, somehow, we have got to include our services in the same system that provides internally produced information. There are ways to do it; we're starting to experiment.

At this point these services are not, despite all that you're reading about the growth of personal computing in corporations, being used heavily by the decision makers themselves. Like others in this business, we are reaching large numbers of information specialists, intermediaries between us and the decision maker. They may be called librarians, or information specialists, or information researchers. They have become very deft in the use of on-line services; they use a multitude of them in responding to management requests for information. We think that will change — it is changing rapidly, as more and more business people become familiar with the technology through hands-on use.

Student: What would have been the corporate title of people who were doing equivalent jobs in the past before wires and such?

Levine: Probably much the same. Corporate librarian, I would think, or research assistant. Corporate libraries and hard copy have been around for years. They may not be all that different. I think what's changing is that the proliferation and complexity of these services have increased the number of these people in the corporations and probably, to some extent, their power. They are the guardians of access to these on-line services, because many managers and executives haven't been willing to take the time to learn how to use these systems themselves. There are exceptions to that rule. There are any number of top CEOs who have an IBM PC on their desk, and one of the uses of that PC is to access on-line services. But I think that's still the exception rather than the rule.

Compaine: If I could just add to that, judging from our own experience, what access to Dow Jones or some of the other services has meant is that you can ask questions that you probably wouldn't have asked before, because it would have been too difficult. If one of us wants to know the latest on certain newspaper companies or telephone companies, we can ask our librarian or research assistants who have learned how to use these systems, and they can come back in half an hour with sheets of reports on the latest filings of this company, or the latest profit statements, or earnings, or mergers and acquisitions.

Levine: Which is one of the problems, of course. You get too much. Our research indicates that the questions that the executives ask aren't very precise. As they get passed down the chain they get fuzzier and fuzzier. The real reason for the search is unclear, and the real interest of the originator of the search is

*Benjamin M. Compaine and John F. McLaughlin, *Management Information: Back to Basics.* Cambridge, MA: Program on Information Resources Policy, Harvard University, 1986.

unclear, and as a result, the maximum effectiveness of these systems isn't evident. And they're spending considerable amounts of money to get this information. It is much better where the end user does the retrieval himself or herself.

Student: That might become more likely if you had a more user-friendly interface.

Levine: There's no question about that. I'd be the first to concede that the first generation of these systems could be horribly difficult to use. There's no uniformity in the language, in the navigational structure between systems, and even within systems in some cases. Those are all problems that are being addressed. Resolving them should accelerate the pace at which people do the work themselves. You get no argument from me on that.

Student: Going back to that matrix of information sources for a moment, it seems to me that the whole question of who the user is — the researcher for the corporation or the ultimate decision maker — really hinges on the question of where the boundary lies between the decision maker's own knowledge and the more formal information-gathering networks. It seems as if that boundary is going to be shifting. The impact of more user-friendly data bases is that, to the extent that they can actually be used by the decision maker, his own knowledge becomes wider. It's not in his head, but it's accessible enough that he doesn't have to worry about formulating the questions according to the corporate method of asking for information. When someone asks for the relationship between two companies, it often turns out that what he really wants is to have something in his own mind verified, a suspicion or a lingering impression. That is a way of using a data base to solidify one's own prior knowlege.

Levine: We did some focus groups recently, at considerable effort and expense, in Manhattan with several dozen of these "information specialists" in major corporations, trying to understand how they're using the system and what kind of problems they're having. We were not looking for the information specialist. We were looking for the end user. But in many cases the end user was the information specialist rather than the decision maker. Information specialists are not always troubled by the fact that the questions lack precision, because it allows them to exercise judgment and discretion. As the computer literacy of the executive becomes greater, and as the systems become easier to use, as they become more responsive to the real needs of the business person, the barriers will break down, and more decision makers will use information systems directly. I think, though, there will always be a role for the information specialist. I don't envision all the chairmen of the board of the Fortune 500 companies sitting there banging away on their IBM PC trying to get data. They have assistants to do that.

Student: When I used Nexis indirectly, through the librarian downstairs, it took her an hour to find out exactly what I wanted, and then it took her five minutes to give me all the information.

Levine: I think that's the problem we're talking about.

Compaine: Because of the on-line costs, the specialists try to plot a search, especially in the library where funds are very restricted. The clock is running when you have connect charges, which on something like Nexis/Lexis could average $90 or $100 an hour. So you spend some time at first trying to get down on paper exactly what you want to ask.

Some data bases like Nexis/Lexis are relatively user-friendly to the point where you can use them once every couple of weeks and remember how to use them. In the case of some law firms, a lot of the junior attorneys are using them routinely. When they have some questions they go into the corporate library and do a Lexis search. The older partners farm it out.

Levine: Lexis was built by Mead Data Central, which is a subsidiary of a forest products company. They certainly were not considered publishers or information specialists, but they saw an opportunity and went into this business. They assembled large law libraries in computerized form.

One way they have penetrated the legal market is by training thousands of law students for free over the years. They're very comfortable with these search procedures that they've mastered, and they take those business habits with them into the law firms.

Compaine: It was more than that. They went to great expense to design their own terminal, because they were not satisfied with the typical computer terminal that would force people to learn all sorts of codes like control, exit, etc.

Levine: But they've gotten away from that now. Now their system is getting a little more complex.

Compaine: It is, but their basic terminal had keys that said, "Next Case" and "Next Page." It was a dedicated terminal; when you pushed the button, it logged on to the computer system and automatically dialed it up. Unlike some of the other data bases, it didn't require that you learn arcane search terminology. If you wanted to find out about First Amendment rights with regard to freedom of the press or fair trial, you could just type in "First Amendment and fair trial" and you'd get a listing of anything that was about that topic. Your Dow Jones search, for example, is somewhat more intricate.

Levine: Yes, we're all using versions of basic Boolean logic search software that are relatively complex to use.

Compaine: Unless you use it regularly, which is why the information specialists — the high priesthood — are still in demand.

Student: MIT is working on an interface to the systems that asks you questions in natural language.

Levine: In fact there was an article today that talked about an IBM PC with voice recognition capability and a vocabulary of 5,000 words. That's still very limited, but eventually, the easiest way to do a search would not be to type on a keyboard or to touch a screen, but simply to be able to talk to the device and say, "I'm doing some work on Soviet submarine warfare and the Baltic Sea, and would you please search the following publications since January of 1982," and it will give me the citations. That's how human beings format searches.

Compaine: You can do that over the telephone.

Levine: That's right. But not on computers. We're simply not at that point. We have been building this business by going on the assumption that the software and the hardware would get better, and the communications would get cheaper. Our attitude has always been that even if we might not, at this juncture, be able to do exactly what we would like to do, or exactly what the customer would like us to do, we should continue to take small steps forward, assemble the knowledge base, and start to understand what it is that people really want out of these systems. I would be less than candid if I sat before you today and argued that we really have a basic grasp of how these systems are going to be used 10, or 20, or 30 years from now. We don't. We're still at a very, very early stage in the emergence of this kind of information technology. It's very crude.

In that study that I mentioned earlier, Trinet also asked those 200 middle managers in the 1500 largest companies and 100 top executives in the Fortune 500 which information sources they used on a daily basis. According to this study, 35 percent of the top executives have actually used computers in the office. Of that 35 percent, 93 percent were constantly using people inside the company to get information, 71 percent were using internal corporate memos, and 82 percent were using conventional mail on a daily basis. Nine percent were using internal electronic mail on a daily basis, eight percent were using internal corporate data bases, and seven percent were using external data bases.

The figures for the middle managers, actually marketing and advertising directors, were not too different: On a daily basis, 80 percent seek information from people inside the company, 71 percent from conventional mail, 54 percent from memos, and 10 percent from external data bases. I assume that if you took that survey today that last figure might be a percentage point or two higher, but we're still at the very beginning. Twenty-eight percent were using external data bases at least several times a week, but they are still listed on the bottom, not in the middle, and certainly not at the top.

Compaine: Do you expect that to change?

Levine: Oh, yes. I think what's unknown is the pace of change. We have a great deal of evidence to support our conviction that the use of these services within businesses is growing at a very rapid pace. For example, excluding the brokerage industry, a year or so ago, about 35 percent of our usage occurred during regular business hours, while about 65 percent was in the evening hours when the rates were reduced. Today, 44 percent of our usage is coming during the business hours.

We're starting to see interesting patterns of usage. Two recent examples are the reaction of users to the shuttle disaster in late January and the Libya raid last week. We have a service that is derived from the Associated Press wires, but we rewrite the report so that it is customized for on-line delivery, rather than using material that is primarily intended for newspaper publication. We have a number of journalists working on that, and it's done on a second-by-second basis. In the case of the shuttle we were monitoring Cable News Network (CNN) during the liftoff, which seemed to be routine. In fact, the Associated Press

moved a bulletin saying that the shuttle had lifted off safely; as a former journalist, I can tell you it was a canned bulletin that they had already written, and as soon as they saw the rocket rise from its launch pad they put the report on the wire. We were watching liftoff on CNN, which we monitor 20 hours a day, saw the disaster in the making, never moved the bulletin, but immediately entered into the data base, within seconds, the news that there had been an explosion of some type during the launch. We had record usage that day, not of business services, such as stock quotes or company news, but of this general news report.

Similarly, a couple of days ago, news of the U.S. military action in the Mediterranean against the Libyans first broke around 4:30 eastern time, about half an hour before most Americans start drifting from their offices. Users could barely get into the system because the demand for these 38 data bases was so heavy. By six o'clock things had returned to normal. They were out of the office and on their way home.

When we started producing that service a few years ago, we put more hours into the creation of it each day than we were generating in usage. But we were positioning ourselves as an important source of major national and international news events. That's all happened within the last year or two. I ask myself, "But why, when people are getting live television coverage of that"? I think one reason is simply that television sets are not as accessible in corporate offices as terminals.

There is also a desire, which we want to learn more about through focus group research, to supplement the information that is being distributed on television with something that's not print but goes beyond the ephemeral nature of television. By any number of measures, this service is growing. 1200 baud usage is one indication. The primary way to access the service in the business community is with a personal computer equipped with a 1200 or a 2400 baud modem. The amount of usage that's coming from 1200 baud modems is just shooting up. Another indication of the growing penetration of the business market is the revenue growth of News/Retrieval itself. Dow Jones' electronically delivered services now generate about 10 percent of the corporation's revenues, and the fastest growing sector of the company is information services.

Student: How far do you think this service has gone in providing information on economic events in other countries, such as the Norway oil strike, or other economic information that also has a bearing on corporations here?

Levine: Are you asking how much information about foreign companies is being distributed in the United States, or rather to what extent systems such as this are starting to crop up overseas?

Student: Well, both.

Levine: In the beginning we concentrated primarily on domestic economic and corporate events. But as financial markets become global, and they're rapidly becoming so, we are broadening our coverage of international business and finance. We're doing it in a number of ways. But to show you how far we still have to go, I'll point out that we currently offer by 6:00 in the morning the full text of *The Wall Street Journal* on-line. The *Journal* that you see here in the United States is but one of three editions. We publish a newspaper in Hong Kong and Singapore every morning called *The Asian Wall Street Journal*. About 50 percent of its editorial content is unique to that edition; in other words, it doesn't appear in the U.S. edition. The other half is the same news and information that you get here in the United States. We have a separate, though integrated, reporting and editing staff providing very intensive coverage of Asian economies and businesses. We're not yet offering that material electronically.

We started a paper called *The Wall Street Journal/ Europe* about three years ago. The editorial headquarters is in Brussels. Through the magic of technology, it's actually printed in Heerlen, a small town in the Netherlands about 100 miles from Brussels. Once again, there is a lot of unique and regional coverage in that edition that we are capturing but not yet offering electronically through News/Retrieval.

One of our goals is to create a global electronic edition of *The Wall Street Journal* that includes the unique content of the Asian and European editions. One of our major projects in the next few years will be to assemble this global edition of the *Journal* because of the growing interest in international coverage.

We are also finding increased demand overseas for News/Retrieval. We've been very busy expanding the service in the United States. But we are starting to take steps that will enable us to distribute News/ Retrieval broadly overseas. Parts of it are already available on a delayed basis in Europe. I expect our international distribution to grow rather rapidly.

When I attended an electronic publishing conference in Europe last summer I was approached by several companies that would like to redistribute us overseas. Today, you can access the service from foreign countries, but you've got to make a very, very expensive phone call.

Student: What about working with the French? Given the Minitel network, isn't that a logical place to forge a relationship?

Levine: You would think so. In fact, that electronic publishing conference was held last June in Paris, and we were heavily briefed on the Minitel system. At that point the system was down because the software was being overwhelmed by the demand of users.

From what I've read and heard, Minitel has been primarily an interpersonal communications vehicle rather than a serious business service. There is interest in News/Retrieval in France. There is interest in Germany. There's a great deal of interest in Britain. We are fortunate in the sense that we are one of the major business publishers and that the international language of business tends to be English, so we don't face tremendous problems of translation. I guess you could argue that in order to be of maximum value in Japan you would have to translate that service. We haven't seriously considered that. I would expect the heaviest usage in the beginning would probably be in countries with which we have major trade, such as in Germany, Britain, and Japan.

Student: But with Minitel wouldn't you have a problem of commonizing your key structure?

Levine: I'm sure you would. We haven't even begun to address that.

Compaine: Well, Minitel is basically a pay-as-you-go system, where you pay so many francs per minute or whatever. I think people are getting used to doing that. There are some problems to be addressed, but I mentioned it because there are all those terminals being distributed free.

Levine: The French have solved the chicken and egg problem, which, as defined in this country, has always been that there are not enough terminals to justify the cost of putting up services, and yet without services that people find attractive, you'll never get the terminals. The French, for reasons of their own (which I think were largely related to their interests in promoting that technology), have chosen to subsidize heavily the growth of the terminal population in the home. As a result, they seem to have found a real role for this technology, at least in terms of interpersonal communications. Maybe it's a fad in France.

Here in the United States the experience has been quite different. Without any subsidies those services that have targeted the mass home audience have found little but financial exposure and failure. In the last month and a half, two major newspaper publishers that had invested tens of millions of dollars in the growth of these kinds of businesses have abandoned their efforts. There was a service called Gateway, based in Los Angeles and offered by Times Mirror, the publisher of the *Los Angeles Times*. And after an investment of $30 to $50 million, according to varying estimates, Knight-Ridder has abandoned the service, commercially known as Viewtron, that they had based in south Florida but were trying to market on a national scale. I don't think one should read into those experiences the lesson that there is no future in the delivery of such services to the mass market, but it's certainly a setback for that whole concept.

Student: How much use of your services do you get by federal or state governments?

Levine: We'd do a lot better if it weren't for Gramm-Rudman, I think. I attended a sales meeting a couple of weeks ago and was listening to comments of the sales people before I talked to them. They were saying that, given Gramm-Rudman, government agencies right now are not in a position to sign any contracts. It's been difficult. In direct answer to your question, I don't think the usage is significant at this point. I think right now the major revenue sources are still private corporations.

However, it's interesting that you asked. You can start to see the future in this article that I brought along. It appeared in the Boston Globe on October 16, 1983, when we were a lot smaller than we are today. The headline read, "Shultz Has Fun With Computer," and it was written by Bill Beecher, who's the diplomatic correspondent for the Globe. It said: "At the end of the interview, as the reporter was putting away his tape recorder, Secretary of State Shultz asked if the reporter had a personal computer on his desk, 'as I do.' Turned out each had the same brand. 'You know what I do with mine'? Shultz asked. 'I subscribe to the *Dow Jones World News Service*. From time to time I scroll over reports from one part of the world or another, and then I phone

the appropriate official to ask what he makes of this development or that.' Obviously, in many cases he would be asking questions on late-breaking developments they had not even heard of yet. 'It drives them wild'! he said with impish glee." At that time, in October of '83, Shultz was in a very select group of subscribers, because I think we were spending more time writing it than people were spending reading it.

So these services clearly have tremendous capability for uses that we have not yet begun to dream of, much less understand. I can't imagine that the integrated blend of services that I was describing for corporations won't also be appealing to government agencies.

Up to now we have been selling data bases, by and large, as discrete buckets of information — statistics here, and earnings estimates there, and annual reports here, and news about a company there. We've required the user to know in which data base we've secreted this information. It's getting tough for me and my editors and other designers of the system to remember. So why should we expect that the user would be able to do so or would even care? Why should we put that burden on the reader or the user? To give you a sense of the second generation of these services, a concept that we are trying to develop is one of offering business solutions to business information problems. The first step will be the introduction of a service that plucks corporate information from six data bases. All you have to do is enter the name of the company, and up will pop an index saying, would you like earnings estimates, would you like the latest news, would you like the latest stock quote, would you like the annual report? You don't have to know how to search a data base or where the information is secreted. All you have to know is what you're interested in.

That's an important first step, but when you listen to customers who are using the systems you realize how far we still have to go. For example, at one focus group there was an information specialist who was saying, "Look, I love this system dearly, and it's good as far as it goes, but why can't it answer questions that are posed to me by my boss? For example, the other day he wanted to know whether a certain company, in which we had an interest, had any investments in Libya." (I guess they were worried about the risk factor.) "I would like to be able to go to the system and simply ask that question in natural language, in English, and get an answer. That's what I want. I want a solution to that problem."

As I heard this problem described I kept thinking about how we could respond. What was in this huge knowledge base that we've assembled over the last half decade that would be responsive? And we do have a lot. That's a major challenge that no system, up to now, has really addressed. I think it's this kind of leap forward that, combined with lower rates and greater computer literacy, will make these services a presence on literally every desk in the corporate world.

One of the consequences in terms of organizational structure within a corporation is that people who have access to these services and know how to use them can bypass formal channels. The Shultz anecdote is a perfect example. He's not waiting for formal reporting channels. He's bypassing them. You read about this process from time to time in the computer magazines. An article last year on personal computing among the top executives in a number of Fortune 500 companies* revealed that they were often reaching down into the bureaucracy with very specific questions. With the use of internal and external data bases, they were accessing information that they'd never had before. They were able to exercise much greater firsthand, direct control over operations, in some cases leaping past three or four levels of managers, by going through the data bases themselves and taking their questions straight to the originating manager. In the more traditional process of passing information through the hierarchy, that stuff gets reduced to a page or so. The higher you go in a corporation, in a sense, maybe the broader the range of the information you get, but also the shallower the information, because it tends to be filtered as it rises. These systems allow that senior level of management to retain tremendous control over access to very detailed information.

Student: If you do see the government agency as a potential market, how would you reorganize the data bases or the News/Retrieval system to make it more useful to them?

Levine: I'm not sure that we would do that. But the final customization of the presentation might be done by the agency itself, by the end user who has the best sense of how that data could be presented or

*Henry Fersko-Weiss, "Personal Computing at the Top." *Personal Computing*, March 1985, p. 68.

organized. It seems to me that the final access scheme is likely to be customized by the end user, whether it's a government agency or a corporation. Otherwise, we end up in a situation where we, sitting at a distance from the end user, have to pretend that we have an intimate knowledge of his business.

It's tough to overemphasize how rudimentary a stage we're in, despite the fact that there's two billion dollars' worth of information being sold to American industry at this point. Right now we're continuing to do some very basic market research, and trying to understand the needs of that corporate customer. I think we're going to find they vary from industry to industry to some extent. There's no question in my mind, at least, that there is a greater propensity for high tech industries to seize on systems like this.

Yet, while there are differences, there may also be sort of generic needs that become evident. I found it very interesting that in the Trinet study, managers at all levels were saying, "My greatest interest is in what's going on in my own company, then my customers, and then my competitors." It doesn't take genius to figure that out, but I suspect that's going to be very prevalent regardless of what industry or company you're talking about. You find that when you put in systems like this they become instruments of education about your own environment. In many instances, when salespeople call on a corporation to try to convince them to buy this kind of information service, one of the things they will demonstrate, sometimes to very senior executives, is whatever news about their company that moved within the last 90 seconds, or the latest news stored in the data base that got added from that morning's *Journal*. In some instances, the executive hasn't even learned about it! We're not talking about a competitor, we're not talking about a customer, we're talking about news about his or her own corporation, which the external information delivery system is providing — as it was in this case with the State Department — more efficiently and more quickly, maybe in some cases with more credibility, than the internal system.

Student: That's been true for some time; we've always relied on news tickers more than embassy reporting, because news tickers are more timely and more accurate.

Levine: This just extends that concept onto many more desks. I think that's absolutely true.

Compaine: In that Trinet study, do they break down the responses by size of company or type of industry or anything like that?

Levine: No. It gives you a taste but it makes you hungry for more.

Compaine: It could be dangerous to make too many leaps from that. Our sense is that entrepreneurial individuals and entrepreneurial companies are much more interested in their competitors and what's happening in the outside world than they are in the inside, whereas a large organization like General Motors is more worried about the inside. The same thing would be true for the type of industry; a high tech, fast moving industry like biotechnology might be much more interested in what's happening out there, whereas in steel production or clothing it might be the other way around. So you probably have at least a bimodal, or perhaps even more varied, pattern.

Levine: There's been very little research done in this area. Aside from some of the work that you've done, there really is not a huge body of literature.

Compaine: They're starting to recognize what questions they have to ask.

Levine: Exactly; that's what we're doing through our own market research.

Student: When you talk about improving the interface, are you talking about improving the interface that you yourselves provide, or is there a market for some sort of integrated software that the user himself could provide?

Levine: The answer's probably both. Let me explain the problem as we see it. It's always easier to explain why you're in difficulty than to see a solution. I referred earlier to the chicken and egg problem, which was the lack of terminals and, therefore, the unwillingness of many people to make the investment in the development of expensive services for which there isn't a delivery vehicle.

Dow Jones took a different course. In the mid-1970s, having already started in this business with the stockbrokers, we were approached by Apple Computer when no one had heard of Apple Computer. In 1977, a fellow by the name of Mike Markkula, who was the initial chairman of Apple and is still a significant investor, called one of the executives at Dow Jones, introduced himself over the phone, said he was with a company called Apple, and he had a terminal that he would like to show Dow Jones, and could he come in and show it to us.

Carl Valenti, the vice president of the information services division said: "Sure, why don't you come in tomorrow at nine o'clock. I have some time on my calendar." The next morning he came in at nine o'clock lugging a piece of hardware. And that's when we found out he was calling from California, and that he had flown all night on a red eye because he was anxious to keep the appointment — which may say something about the entrepreneurial spirit needed to build a billion dollar corporation quickly.

Our engineers tore that thing apart, and very quickly realized that you could use this personal computer as a data terminal to deliver news and information such as we had. Within a couple of months, on a handshake arrangement, Dow Jones and Apple had developed a piece of software to make it easy to access stock quotes from Dow Jones. I don't even think it was a disk at the time. I think it was done on tape. It was really the first use of a personal computer to access remote data bases. I tell this story only to illustrate the point that we decided there wasn't a chicken and egg problem, that there were indeed terminals out there. They were called personal computers. So we would address this growing population of personal computers. And we would address the entire population.

In one sense it was a very wise decision, and in another it created tremendous problems, because every computer worked a little differently. There were no standards in the early days. There still aren't many, though it's getting easier as people fall by the wayside. In one of the early business arrangements we made, one of our fellows went down to Fort Worth to see Tandy. They came back and said, "Dick, can you put the data base in 32 characters"? In other words, I had to make sure that the lines were no wider than 32 characters. I kind of grumbled. It meant reformatting a lot of material. We had to drop some statistical material. We decided, yeah, by hook or by crook we could do it. Tandy at that time, in 1980, was convinced that something called the color computer, which had sold for, I think, $299, was the wave of the future, and that it was going to have a 32-character display, because that's what they could offer at that very low price. We were anxious to address those terminals; we still deliver some services in the 32-character-wide format.

We built our customer base very quickly, but in the process we created ease-of-use problems, because we always had to design to the least common denominator. We made difficulties for ourselves. In the end I think the solutions will come primarily through improvements in the mainframe at our end. We want to know exactly who you are, and how you're talking to us — what kind of terminal; what display characteristics — and how you would like that information to be presented. Then we will be able to respond with a customized package or format of the information. As the shakedown of the personal computer industry continues and the number and variety of terminals decrease, de facto standards are emerging, and it's going to get easier for us. That's going to allow us to make choices that we couldn't make in the early stages.

I don't think we were wrong in doing what we did. It's just that in solving one problem we created another. The solutions will also come with software packages on the user end, and there are a number of them out there. We ourselves publish four different packages of software. They do solve, to a great extent, some of the more difficult access problems for certain classes of information. But as personal computer software improves and becomes easier to use, the demands of customers on us increase, because they become less and less tolerant of the idiosyncrasies of our own system. So I think the answer is twofold. It's going to lie primarily in the mainframe, but it will also lie, to some extent, in software at the user end. We are planning to devote more effort in the next two or three years to rebuilding central systems than to expanding the data base. We really feel that we've developed a core of basic information here. Judging from what we're hearing from customers now, probably the most effective thing we can do, before we give them more, is make what we already have more useful. That's going to require the investment of a lot of time, effort, and money. In some ways it's not as glamorous work as what we've done in the past, where we could report on a quarterly basis a very rapid expansion in our electronic compendium of information. But in the end it may be just as important as, or even more important than, that other building process.

Student: I think you partly answered a question I was going to ask you. How are you planning to take advantage of the increasing use of intelligence at the user end? Starting from the old days when we had dumb terminals as the main vehicle of access, they've been getting increasingly intelligent, and now we're up to AT-type computers that can do all sorts of

wonderful things. What are the features you can take advantage of at the user end, besides formatting things in the software?

Levine: I'm not sure that we've devoted as much time to worrying about those things as we should have. Perhaps the most important work to be done involves simplifying the access to some of the systems. There are all kinds of manipulation and graphics capabilities in these terminals, but I'd be misleading if I said I had a clearly defined view of how we take advantage of that kind of power, other than what I said earlier, which is to make ourselves a lot more responsive to the kind of terminal that we're talking to.

One of the things we'd like to exploit, for instance, is usage patterns, although we would guard the privacy of the customer very carefully. We could start addressing customers differently. For example, if I know that every day at four o'clock you want to download a few stock quotes, the news of a particular company, and the New York Mets baseball scores, and you do that three days out of five, I could conceivably structure a presentation of just that information to your terminal. I think that could be very appealing.

Another aspect of it takes us back to print, which is kind of interesting because we're making a full circle. There are a number of people within Dow Jones who are convinced that one way to do what you suggest, to take full advantage of the greater power of these new boxes that are going to be out there, is to be able to deliver information in hard copy with enhanced graphics — in other words, to be able to produce a kind of personalized newsletter. The service would be what I just described, but would be delivered on an 8½ by 11 sheet of paper. It might have your stockholdings in one place and all the news about electronic publishing in the center, and then the Red Sox scores or the Phillies at the bottom. That's to some extent what the Apple Macintosh holds out as a possibility.

Compaine: Electronic desktop publishing.

Levine: Yes. We're working in that area, but I don't know how quickly it's going to develop. There is increasing interest in it. Maybe people really don't want to stare at a terminal. I don't think they do. We're the ones who are forcing them to go to terminals and type commands. What they really want is solutions; they want information and data. This is a real handy, useful way in which to get it, to distribute it, to be able to mark it up, to photocopy it, to float it around the office or the home, or to mail it, either in hard copy or electronically. So that might be one area in which the power of the terminal might be exploited.

Student: As mass storage decreases in cost and increases in availability, is it a plus or a minus that you might have customers who will download vast chunks of your data base that aren't all that timely and then be able to use them internally?

Levine: You probably can control that to some extent through price. On the other hand, there's an interest — I don't know if it's a concern — in the use of optical disks. We are doing a lot of work in that area. The oldest portions of files of information may be delivered on disk. Where we think we have to be effective is in combining disk and on-line information in a kind of seamless service, to use an old phrase. Take for instance the Dow Jones News Service: We store that electronically back to 1979, and we have in historical files on the mainframe every story that has moved, from eight in the morning to six o'clock at night, for seven years. It's not inconceivable that all of that can be put on disk. What you then would do is come on-line for the most recent three months, but everything earlier than that would be sold on disk. What's important, however, is that you are able to do one search, and not have to jump from the disk and say, "Okay, I've checked everything through January of '86, now I've got to go on-line and start the whole process over again." That's just going to annoy people. Merging those two is a lot more difficult, I've been led to believe, than it would appear.

Compaine: I don't know if you folks are aware of the capacity of compact disk read-only memory, or CD ROM, like the CDs that are being used in the music industry.

Student: There was an article in the *Times* today on that, saying that the new disks can store up to 200,000 pages of information, or 400,000 if they're double-sided.*

Levine: It's incredible.

A company that we're working with, Grolier, is one of the leading reference publishers in the United States. They publish the *Academic American Ency-*

*Erik Sandberg-Diment, "Personal Computers; Compact Disk Players." *The New York Times*, April 8, 1986, p. C4.

clopedia. It's in 22 volumes, and it occupies the better part of a yard of space on my library shelf. It was written in the early 1980s; it was the first encyclopedia to be written and edited from the outset for distribution in both hard copy and electronic form. We worked with them from the very start to distribute it electronically, primarily to the home market.

In the last year, Grolier has also begun putting that encyclopedia on disk and selling it that way. I think their primary market has been school libraries, which makes sense because you eliminate the on-line charges. Anytime you can store that large a volume of information effectively and cheaply, you've got to believe that there is real value.

We are moving to take advantage of optical disk storage, because we have large historical files that lend themselves to that technique.

On the other hand, we also offer a large amount of extremely current information. We can put a 64-page *Journal* into the News/Retrieval computer by midnight or one o'clock in the morning. We have, in effect, another production plant, except its output is an electronic *Journal* rather than a printed one. We take the production tapes used for the printed version of the *Journal*, and make stylistic and typographical changes; for example, we have to affix retrieval codes to the stories. We release it at 6:00 in the morning simultaneously with the paper edition of the *Journal*.

You start to see the synergies between electronic and print publishing when you realize that as soon as those keystrokes are captured, the paper is ready both for print and for electronic delivery. There are no other retrieval systems for full text of newspapers that are doing it as quickly. I think the *New York Times* has a 24-hour delay. Anyone who wants to put the energy and effort into it can do it, but that kind of currency on proprietary material makes us a valuable addition to any kind of business-oriented service. We have retained control of that capability very, very tightly, for obvious reasons.

Student: What do you charge your customer to have access to the *Journal* at 6:00 in the morning?

Levine: Well, it's $1.20 a minute, $72 an hour. So no one's going to use that system just to read that day's *Journal*.

Compaine: You can buy the whole paper for 50 cents.

Student: What's the point in doing it?

Levine: The point in doing it is that no one's coming in just to search that day's *Journal*, but they are coming in to search the historical files with the knowledge that the search is encyclopedic as of the moment they make it. It encompasses all known knowledge, or at least all knowledge known to Dow Jones. What we are offering is the protection that the search covers not only the historical information, but also all our information right up to that point.

Student: It seems to me that the real advantage of CD ROM is that a person can sit at his PC and spend an hour reading through this information, drinking coffee and doing other things and coming back to it, rather than having the pressure of ticking off the minutes.

Levine: This is sometimes described as "selling information with a taxi meter running," and it is a very unnatural way to sell information. It's one with which Americans especially have relatively little experience, because in our society information tends to be viewed as relatively inexpensive. Broadcast TV offers a lot of information. Ultimately we're all paying for it through the prices of goods that incorporate the cost of advertising, but that information is widely perceived to be available for free. Our newspapers, unlike European newspapers, are very, very heavily supported by advertising. If the *Journal* had to be priced according to the revenue produced by circulation, we wouldn't be selling it for 50 cents a copy.

Compaine: The pound of newsprint for the Sunday *Times* costs more than the cover price. Just the blank paper.

Levine: Now along come these systems in which the user is bearing the full cost of the information. The objective of any serious-minded businessperson or publisher would be to get an arrangement whereby, at the very least, you could price information on a flat-rate, unit basis. The struggle then becomes, what is that appropriate unit of information? There are other possibilities. Up to now, there has been no advertising to support any of this. Advertising in these systems may look a lot different from the way it does in print. Until recently, I think a lot of people thought of on-line advertising, especially for those services that were aimed at the home, much as they thought of display and classified advertising in print publications. What these services really enable you to do is to deliver customers to a seller and complete the transaction.

Consider the Official Airline Guide reservation capability that we have added in the past year. We, Dow Jones, are certainly in a new business; we're helping airlines fill seats. The only compensation we're getting for that now is simply a percentage of the usage fee that the customer pays for going on-line. If we're bringing the buyer and the seller together, if we're actually putting people in airline seats, is it illogical to suggest that we're entitled to some modest portion of that ticket price?

Student: Then you'd be a travel agent.

Levine: Well, in a sense we already are acting as one. It's not a role that we chose. It's an inherent byproduct of the kind of system that we built.

Compaine: And the benefit to the consumer, by the way, as in any other advertising-supported thing, is that it becomes free to the user. The charges for looking at a page of flight information or fare information on OAG are fairly steep, but if you then go ahead and book a flight through that service there's no charge.

Levine: There's a usage charge on News/Retrieval, because currently that's our only source of revenue. But if you can find other sources of revenue, then eventually you ought to be able to lower the usage charges for all data base services substantially.