Shifting Boundaries and Social Construction in the Early Electricity Industry, 1878-1915*

Patrick McGuire
Department of Sociology
University of Toledo
and
Mark Granovetter
Department of Sociology
Stanford University
August, 1998

To appear in Marc Ventresca and Joe Porac, Eds. "Constructing Industries and Markets", 1998, Elsevier.

* We acknowledge and appreciate the financial support of the National Science Foundation Grant SBR 96-01437, the Urban Affairs Center and Office of Research of the University of Toledo, and the Center for Research on Social Organizations of the University of Michigan, which provided other material resources enabling the collection and processing of the archival data used herein. We are grateful for the comments of Chi-nien Chung, Valery Yakubovich, and members of a seminar on the Electric Utility Industry that meets periodically in the Department of Sociology at Stanford, and appreciate the willingness of Richard Reinjer to share documents on the origin of co-generating equipment. We are also grateful to the Commonwealth Edison Corporation and its archivists Michael Duba and Roberta Goering for providing us access to their extraordinary archives.

Abstract

Drawing upon primary and secondary historical sources, and comparing actual development paths to plausible ones not followed, we analyze the U.S. electricity industry through 1915. Using the idea of "socially-embedded industries," we describe the origin and mobilization of the key social network among executives of leading firms and explain how and why they created institutionalized forms in their respective firms and industry. Illustrating how industry boundaries are drawn and re-drawn, organizational firms and technologies transferred and standardized, and strategic goals and

developmental paths selected and/or prevented through social network-based action, we challenge the claims of theories based on technical efficiency, economic rationalization, and reduction of transaction costs. We argue instead that the electricity industry took the technical and organizational form it did as the result of a coherent network of former Edison associates, who mobilized resources through their influence in industry trade associations, and thereby outflanked advocates of alternative, more decentralized forms of development.

SOCIAL CONSTRUCTION THEORY AND THE SOCIAL CONSTRUCTION OF INDUSTRY

We have reviewed the histories of 80 central station firms and the careers of over 200 one-time employees of Thomas Edison, analyzed the participation of 1,500 executives in for-profit firms in industry trade associations, and studied several hundred other secondary and archival sources. Building on the initial social network and social-construction arguments of Granovetter (1985, 1990) and McGuire's insights (1986) about socially-negotiated industry dynamics and boundaries, we will critique and challenge theories which claim that organizational forms and technologies result from economic or technical imperatives, the search for efficiency, or the activities of great men or women. Extending the arguments on path-dependence initially detailed by Paul David (1986, 1987) and Brian Arthur (1989), we find that the boundaries, composition, and dynamics of the U.S. electric utility industry were constructed by identifiable social networks. Those networks were connected by a small "hub" group of urban central station utility executives who shared a common experiential and social relationship as employees of Thomas Edison between 1882 and 1884. We will use the content of several industry contests to demonstrate how and why these networks acted to construct and shape industry development and boundaries in particular ways, and not in others of apparently equal viability.

This chapter, and the larger project from which it derives, construes "social construction" in the tradition of the sociology of knowledge (Berger and Luckmann, 1966). This tradition includes a recognition of the importance of discourse, shared experiences, common role constraints within a web of social relations, the emergence of control mechanisms that channel action. It encompasses institutional processes of legitimacy and collective, socially-shaped stability and change. But unlike Berger and Luckmann, we do not assume people necessarily seek order or psychological simplicity, especially since, as Schumpeter has noted, disorder and destruction can be the lifeblood of existence and the strategic goal of economic actors (1942: 81-87). In addition, we give social motivations, mechanisms, and groups attention equal to the focus on cognition, knowledge, and individuals that has been typical of recent social construction analysis (Granovetter, 1992).

Our narrative reflects our concern with grounding explanation in the material conditions under which the particular institution of the central station electric utility industry arose, as well as the processes that fostered in particular development. Starting from a social network approach to economic relations and activity (Granovetter 1985) and a political economy analysis of the electric utility industry in its period of formation (McGuire 1986), we began to "peel back" economic and technical explanations of event development predicated on assumed individual and system-level rationality, to reveal underlying social formations and processes. We have also integrated insights from the path-dependent analytic approach of Paul David (1986, 1987) and Brian Arthur (1989), which challenges fundamentally functionalist assumptions about the inevitability of certain technical and economic formations. One strength of this

method is that it allows the analyst to explain what did or did not occur, and to identify why particular outcomes were encouraged or constrained. In so doing, it provides insights into the relations of power and to the presence of chance, habit, accident, and unintended outcomes in industry development. Combining David and Arthur's method with Granovetter's recognition that much of what appears to be rational economic action depends on prior, actively created social networks and institutionally-mediated personal relationships, we re-examine the processes of industry formation.

What emerged from these efforts was a "grounded theory" (Glaser and Strauss 1967) of industry boundary contests based in detailed evidence on social relationships in the early electric industry. We identified the shared experiences, socially-networked relations, and deliberate formation of institutions to channel action that underlie the unfolding historical events and give a particular shape to the amorphous and informal socio-economic relationship of an "industry." Our account is not presented in the language of Berger and Luckmann's classic "social construction" thesis nor as an empirical proof of this thesis. Rather, we present a grounded theory explanation of how and why this economic relationship was actively constructed in particular ways and not according to other equally viable possibilities. As such, our analysis continues to pay attention to the "network" and "rational man" debates which were its genesis. Our path sequential approach results in our detailing a literal, deliberate, and often reactive "construction" process undertaken by an identifiable social group, not just an abstract knowledge-based similarity shared by individuals whose habits encouraged common institutions, as Berger and Luckmann emphasized.

This approach is an extension of the classic sociology of knowledge concerns, as applied to a specific social formation, in this case, an industry. Central technologies of the industry, after an early period characterized by multiple forms in the organization, production, and delivery of electricity, came to be viewed as one necessarily organized in a certain way – the way preferred by a group of associates of Thomas Edison and, later, Samuel Insull. This process of "objectivation," by which a contingent human production comes to be seen as given by the objective, non-human environment, is one of the main concepts in the German sociology of knowledge tradition (Berger and Luckmann 1967: Part II). However, the actual mobilization of personal and organizational resources by which important actors shape and re-shape social discourse in such a way as to produce such objectivation is typically unexamined in the classic sources. By linking concrete concerns with an analysis of ideas and conceptions, we hope to strengthen the analysis of social institutions.

THE ELECTRICITY INDUSTRY: VARIETY IN THE ORGANIZATION OF PRODUCTION AND STRUGGLES OVER INITIAL BOUNDARIES

In 1880, Thomas Edison had only begun to develop the incandescent electric light, and most homes and factories were lit by natural gas. On-site electric lighting systems were sold and installed as early as 1878, and by 1885 they were a booming business involving over 1500 arc and incandescent plants (American Electrical Directory 1886). Alongside these "isolated plants," a fledgling industry of privately-owned central electric stations blossomed from less than two dozen firms in 1882 to almost five hundred in 1885, and by 1891 almost two thousand independent local firms were using different technologies and organizational structures. These firms were hindered by local governments and large equipment manufacturers, and wracked by destructive competition. Yet by 1929, isolated generation was a historical footnote, and the industry was dominated by a few large holding companies overseeing central station firms using standardized methods of production, sales, and marketing, common organizational structures, and protected by government agencies (Bonbright and Means 1969, Rudolph and Ridley 1986, USFTC 1935, McGuire 1986: 526-9, American Electrical Directory 1892).

Central station electric systems were a major commitment for Thomas Edison, who mobilized his personal financial and patent-based resources and those of his subordinate co-workers and their families

to create and manage the Edison (later General Electric) electrical equipment manufacturing firms (McGuire, Granovetter, and Schwartz 1993). Unlike his chief financier J.P. Morgan (and most other inventors) who sought to create a manufacturing industry to produce mechanical devices (equipment) which would produce electricity, Edison strongly argued that electricity should be the primary commodity, and that electric equipment should be built for and sold to central stations, rather than to individual building owners. Edison mobilized long-standing associates to sell and/or invest in several central station firms. And by exchanging equipment for securities of local central station firms, he created shared ownership among the patent-owners, equipment manufacturing firms, and central station firms. They secured funding for several additional central station firms by exploiting antagonisms and fears among financiers (McGuire 1990).

This pattern of activity established the initial boundaries among electric industries. Edison drew on his holdings, those of his associates and their families, and on a production monopoly to separate electric light current business from the manufacture of electric devices, electric trolleys, electro-plating, and telephones, each of which had preceded the incandescent lighting system and involved millions in invested capital and in sales by 1881 (Bright 1972: 33). Edison also worked to retain the separation between his incandescent lighting systems (mostly indoor) and the well-established arc lighting systems (mostly street and public spaces), keeping them separate industries and markets. For example, despite numerous promises to his patent-dependent franchisees to create arc light systems, Edison refused to do so (McDonald 1962: 44, Passer 1953: 167). His goal was to use his exclusive contracts as inventor and supplier of equipment to keep arc lights (to which he did not have exclusive patents) from operating on his systems.

Through 1884, Edison also argued for the need to differentiate between firms selling electric light current and those supplying electric power (motor) current, based on his lack of personal financial interests in the latter (Conot 1979: 207, Ch. 18). Edison was unsuccessful in making this claim. He subsequently withdrew his objections after some of his friends and investors in his manufacturing and central station firms came to own crucial power patents, tailored them to operate on his central station system, and signed exclusive production contracts with the Edison manufacturing firms (Passer 1962, 1953: 238-9, McGuire 1990, McGuire, Granovetter, and Schwartz 1993). As a result, many local utilities began to serve both arc and incandescent lighting systems simultaneously, as well as power customers. Given the different but compatible applications of these technologies, and the ability to serve all customers from a common current (transformed into various frequencies and cycles via "gateway devices"), it became difficult for Edison to maintain his claim that arc and power customers were a different business from incandescent lighting, especially since other manufacturers had created devices to serve all three markets.

Moreover, Edison was preoccupied with struggles against his own financiers for the control of his firms, patents, and exclusive manufacturing rights. During this period, numerous factors shaped the inclusion and exclusion of various proto-industries within what would become the electric utility industry: friendships, family connections, personal fears, mobilized collective knowledge and resources, scarcity of capital, as well as vested interests, technical possibilities, and personal preoccupations.

Despite Edison's success in creating the infrastructure for central station firms, it was not inevitable that they would survive or become the dominant form of electric service. In most cities, isolated systems in homes, apartment buildings, and factories remained the most common suppliers of electricity to consumers through 1915 (cf. Platt 1991: 209, King 1950: 202, Duboff 179: 218-219). While economic efficiency arguments could be mounted on behalf of each type of service, it appears that isolated systems in factories or apartment buildings were at least as viable as other decentralized amenities, including home furnaces, water wells, and personal automobiles, each of which became the norm. Isolated systems had significant first mover advantages: hundreds had been sold before Edison ever

opened his first central station (Brush 1882, Stout 1909) and they were supported by major financial houses, such as that of J.P. Morgan. We even found examples of coordinated distribution systems involving the temporary integration of many isolated systems (Marvin 1988: 170). In fact, until the early twentieth century, it was not inevitable that electricity would displace natural gas as the dominant lighting medium for home use. Many homes in which electricity was installed through 1900 had dual systems, using gas for daily light and the more expensive option, electricity, only when entertaining guests (Platt 1991: 80, 154-5).

Two other technical sources of industry boundaries, the selection of the preferred form of current and the standardization of current frequency at 60 and 25 cycles (for light and power respectively), also resulted from personal insights, compound historical accidents, long-standing friendships, and corporate interlocks (McGuire 1990). AC and DC current each had technical advantages and disadvantages (Passer 1953: 164-6) but neither was intrinsically preferable or dominant. AC became the principal form of current in the U.S. because both major manufacturers had AC equipment and thus had no personal stake in promoting an exclusively DC system, and because J.P. Morgan had a lingering antagonism toward Edison, who could have reaped a handsome profit from continued use of his DC patents (David 1987).

There was no determining technical or economic imperative driving the selection of AC or of 25 and 60 cycles as industry norms. The "rotary converter" that transformed AC into DC current also worked in reverse. Systems in which current was generated and transmitted in AC and then converted to DC for distribution were feasible, and indeed were typical in most U.S. central city areas through the 1920s and in Europe through most of the twentieth century. Motors and appliances for each current type were manufactured and sold here, and so each current type could have had its own niche. Further, the initial selection of two frequencies of current as a norm, rather than one as in Germany and parts of Britain and California (Hughes 1983: 129), embedded a technical and economic inefficiency that lingered until 1950, when most of the remaining 25 cycle engines were re-wired at utility expense (McAfee 1947: 19, Bush 1973: 501).

STANDARDIZING BOUNDARIES AND PRACTICES IN PRIVATE CENTRAL STATION FIRMS

Through 1890, the electricity industry was made up of equipment manufacturing firms and local operating utilities. In 1885, the owners of non-Edison electric current sales firms met and formed the first "electricity" trade group: the National Electric Light Association (NELA). The NELA included firms that made, sold, operated, and repaired (especially arc) light and power systems. By 1888, the association was dominated by the leaders of the New York Electric Club, a group with a national roster (Nye 1990: 173, NELA 1888) whose leaders constituted a predominantly non-Edison social network. In response to the formation of the NELA, Samuel Insull, secretary to Thomas Edison and an executive who helped Edison open and sell central station firms, formed the Association of Edison Illuminating Companies (AEIC) in 1885. Most of the early AEIC members were personal friends of Edison and/or Insull and executives of small Edison central station incandescent lighting systems. These half-dozen firms were a distinct subset of the forty or so firms that used Edison equipment at the time. The AEIC remained a subset even as the number of Edison-supported firms tripled through 1891 and the Association's membership shifted to include larger urban firms (American Electrical Directory 1886, 1892).

Beginning in about 1890, both trade associations independently began to redefine the boundaries of the electricity industry by denouncing city-owned electric firms as "socialistic." City-owned utilities used the same equipment and sold the same commodity as privately-owned ones. City-owned firms had previously been members of and worked with other utility leaders; thus, this emerging industry

boundary is significant (NELA 1890: 164-179, 1898, 1900: 1: 412, Rudolph and Ridley 1986: 23-34, and Toledo Edison 2: 83 2/14/1897). The Associations tried to exclude city-owned utilities from their organizations and their meetings, proposed boycotts of manufacturers who supplied them, and mobilized to oppose and impede their creation. They also sought and secured state legislation that limited not-for-profit systems to street lights in some cities like Detroit and Grand Rapids (Wilcox 1908), and other types of procedural impediments were promoted and enacted in Connecticut and Massachusetts (Bemis 1899: 677, AEIC 1906: 371-7, Rudolph and Ridley 1986: 34). This industry boundary was being actively built based on the form of ownership rather than the process of production, similar technologies, and the final form of the commodity. These actions and distinctions are contrary to those used by the Bureau of Census and their SIC codes which officially define industries then and now, and by most mainstream economists who see these as intrinsic boundaries (McGuire 1986).

A second boundary was being constructed simultaneously during the early 1890s as local utilities sought to separate themselves from the electric equipment manufacturing firms. NELA members included firms that sold and operated a variety of electric devices encompassing several electricity-based proto-industries, including electric arc light, electroplating, telephone, electrical medicine, and electric motor devices. For example, Chicago Arc Light, the first major electric light company in Chicago, emerged from a combination of electric medicine and central station service (Platt 1991: 268). The NELA conceived of electric light service (and by extension the composition of the industry) as vertically integrated firm components that included manufacturers, operating utilities, contractors, and repairmen, similar to Bell Telephone in a later period.

AEIC members were drawn exclusively from the Edison-affiliated central station electric lighting firms and their associated Edison manufacturing firms (first Edison Manufacturing, then Edison General Electric, and finally General Electric). Through 1893, the AEIC promoted a two-level, vertically integrated industry of equipment manufacturers (GE) and Edison incandescent central station firms. The central stations had exclusive contracts with the manufacturing firms, and depended on them for financing, supplies, and innovations, factors that in effect made them subordinate cheerleaders in the AEIC. This situation changed in 1892, when J.P. Morgan and his allies wrested full control of Edison General Electric from Edison and his supporters. They created a leveraged buyout through competitor Thomson-Houston and the resulting firm was renamed General Electric.

During the early 1890's, there were numerous conflicts of interest between the equipment suppliers and the central stations. Exclusive contracts locked the central stations into purchase from one supplier. In return, the suppliers were supposed to refrain from selling isolated generation equipment within the franchised territory of the central station firm. Sharp exchanges during AEIC meetings highlighted the fact that this provision was often ignored. Rival central station firms still operated within the same areas, and expected their suppliers to pursue patent infringement suits against competing firms using different equipment, but enforcement of this policy was a low priority for Edison manufacturers and for General Electric. The exclusivity of contracts gave the manufacturers market power, which they used to keep prices higher than seemed reasonable to central stations. Service issues, such as delivery time, were also points of contention. Manufacturers, for their part, considered the central stations to be unreliable customers whose often troubled financial condition led them to delay equipment payment or issue new securities to meet their obligations.

These issues came to a head beginning in 1893, when the owners of small, early Edison firms were less prominent in the AEIC, and the organization was dominated by a tight group of former Edison employees. This group was informally led by Samuel Insull, who had left General Electric after the buyout to become a utility executive in Chicago. Insull and other urban executives mobilized to distinguish and counterpoise their central station firm interests against those of General Electric by redefining the electric utility industry boundary to exclude manufacturers. The large firms that

dominated the AEIC were in part motivated by economic self-interest. The product of this self-interest was the emergence of a core group of industry leaders that would strongly influence the industry for many years.

Almost all of the men who comprised this emerging "central committee" had worked in the drafting room of the Edison Electric Company's Goerck Street (Manhattan, New York) equipment manufacturing plant between 1882 and 1885. During these years, Samuel Insull had been Edison's most trusted confidant and head of manufacturing operations. While hundreds of men had worked for Edison during this era, this small subset had worked in the Goerck Street plant and attended special classes together. They had also been among those sent by Insull and Edison to set up central station light systems. This group, which probably never exceeded eight men, and which included Insull, John Lieb, Charles Edgar, and Louis Ferguson, constantly shaped industry development during the next 40 years. Early efforts of the "Insull circle" included distancing themselves from GE domination in the AEIC, and creating a certifying board, the Electrical Testing Laboratory (ETL), to assure GE quality and innovation to assert their control (and that of central stations in general) over the AEIC. The ETL Board consisted of Lieb, Edgar, Insull and William Barstow.

Obviously, we have dubbed this group the "Insull circle" because of its domination by Insull. In our ongoing research, we examine Insull's company, Chicago Edison, and explain how his knowledge of the industry, his connections to the European technical and financial community, and a group of very talented friends and associates gave autonomy and innovative opportunity to Chicago Edison. Insull brought European innovations (including the Wright rate system, load building and turbines) to the U.S., and actively promoted the adoption of these techniques and devices among the other principal firms within the AEIC (Hughes 1983: 217-233). The Insull circle mobilized to promote these and other technical and organizational changes among AEIC members and the central station utility industry as a whole. These efforts were undertaken in pursuit of what was eventually called a "growth dynamic" approach: scrap and replace old technology with new, create and expand a territorial monopoly, increase total and per capital load, and establish increased load balance. They used their personal and trade organization relationships to promote the adoption of techniques and devices, and to reframe the opportunities available to other central station utilities. As we will detail, alternatives that involved more decentralized and smaller-scale provision of electricity, separation of generation, transmission and distribution, provision combined with the production and sale of other products (such as heat in co-generation arrangements), or provision by not-for-profit companies, were effectively attacked and discouraged by the Insull circle.

Crucial to the embedding of their preferred template of industry development was the Insull circle's domination of the AEIC as a method of systematically and actively transferring technical and organizational norms among their circle, their subordinate or holding company associates, and to the industry at large. During the 1890's, members of the Insull circle held over 90% of the AEIC's officer and committee positions; along with technical experts from the Six Cities firms they led (New York, Philadelphia, Brooklyn, Detroit, Boston, and Chicago), they delivered almost all paper presentations at the association's annual meetings from 1892 to 1897. Significantly, leaders of firms in other large cities (such as St. Louis, Baltimore, and Pittsburgh) did not participate in AEIC leadership, despite their representation of large populations and loads (McGuire, Granovetter, and Schwartz 1999, NELA various years, AEIC various years). Regardless of firm or load size, we find that through 1910, firms generally joined or became active in the AEIC only after hiring former Goerck St. employees or family members of the inner circle's executives.

Examining the composition of AEIC committees from 1897 to 1910, we found that personal networks and firm domination of the AEIC became institutionalized as executives from Insull's circle were replaced. In twenty-three of the twenty-eight cases when one of these leaders left a committee position,

he was replaced by a subordinate executive from the same local firm, an 80% rate of "broken ties" re-constitution. Men from their firms occupied 275 of the 287 positions on AEIC committees and presented 71% of all papers between 1901 and 1910. Direct, almost monolithic control over the AEIC continued after the exit of the "Circle" members from leadership positions, albeit through firm subordinates.

Despite its influence, the AEIC did not dominate the industry because membership was limited to a highly self-selected group associated with large urban firms supplied by General Electric. The NELA, on the other hand, was broader, bringing together many smaller firms that were not dependent on General Electric equipment, as well as contractors, jobbers, engineers, and even professors. It had the potential for industry-wide consensus (and domination) that could not be assured from an AEIC base. An informal system of industry-wide self-governance emerged after several large urban firms became involved with the NELA. While several AEIC firms joined the NELA in the early 1890s, their executives were rarely involved in the NELA leadership. In 1897, however, the Insull circle, aided by leaders from a few other long-standing AEIC firms, also became involved in the NELA. They assumed a prominent role in guiding the NELA through the next three decades. Unlike the straightforward system of unilateral domination the Circle and their Six Cities firm executives had held in the AEIC, their *modus operandi* in this trade association was less direct; relying on an informal coalition with AEIC supporters to who were not part of the circle to help influence crucial debates via timely and strategic intervention.

Analysts including McMahon (1985) and McDonald (1962) have suggested that the AEIC acted as the directing and coordinating committee for the remainder of the industry. A brief examination of NELA committee assignments from 1901 to 1910 supports that insight. Insull's circle, their firm subordinates, and executives of other urban firms involved in the AEIC occupied a majority of seats in two-thirds of the 75 committees existing during the 1901-1910 period.

Yet, something much more significant and important was occurring beneath this process of AEIC domination. Samuel Insull (President of both the AEIC and NELA in 1898) and his circle held a minority (13 of 40 positions 1901-1910) in the NELA officerships and executive committees. However, in concert with their firm subordinates, and several long-standing AEIC supporters, they together occupied thirty-two of the forty seats. In effect they established an important system of strategic influence over the NELA, rather than overt domination.

Examining the other NELA committees, we find even this loose coalition--circle, subordinates, plus AEIC supporters--were a majority in only nineteen of the seventy-five committees (six to ten per year) operating between 1901 and 1910. This seems to imply they lacked control over much of the NELA committee agenda and activities. However, while rare, those majorities were important. They occurred mostly when a committee was new or when policy was initially being established. After policy was initially set, the inner circle would exit the committee, leaving behind a significant minority presence of their subordinate executives and supportive AEIC members. The circle created precedent and agenda for the NELA committees, and then used their subordinates to monitor committee deliberations for continued compliance with their initial policies (consistent with the "business scan" theory of interlocking directorates of Useem 1984). When the standing NELA committees did stray from the original policy decisions, Circle members and AEIC associates would return to those committees and re-establish the earlier policy. In another complementary effort to exercise indirect influence, this group also twice reorganized the NELA, each time making it more financially dependent on their large urban firms. Thus, the circle augmented by AEIC supporters and acting at important historical junctures, created mechanisms of strategic influence of the NELA and the broad industry.

As a result of these maneuvers, preferred technologies, organizational forms and structures, interorganizational relations, strategic goals, and even dirty tricks (Gilchrist 1940: 14-16, 50, 32) were

identified, promoted, and transferred uniformly throughout the industry. Acting through their informal/formal governance structures, the Insull circle mobilized their own firms to adopt similar technologies, organizational formats, and goals (Gilchrist 1940: 472-473). The circle, their Six Cities executives, or sometimes their firm's technical experts, then promoted these innovations before the AEIC (Gilchrist 1940:18, AEIC 1901: 197-209), and in turn they (and/or other AEIC members) did the same before the NELA (NELA 1905: 116-135). They also invited executives from other cities to their facilities and taught them about new technologies (Flynn 1932: 36). They even loaned their firm executives (NELA 1900: 412-413, Seymour 1935: 126-127) and consultants to smaller firms to enable them to reproduce policies and install new technologies. These efforts were then trumpeted in trade association papers as trends, rational necessities, or system imperatives, required by the "demands" of technology, competition, and commerce. They were subsequently adopted by other central station firms, thus dramatically shaping discourse about innovations in the industry. Yet, the patterns of shared forms, common models, and standard practices coincided with a decline in industry earnings through 1907 (USDCL 1910: 50). This decline is not surprising, as Insull and other industry leaders acknowledged that their expansion created some diseconomies (Platt 1991: 178, 342 n37).

The Insull circle's pattern of indirect influence within the NELA was necessary if they were to retain the support of the various interests of electrical firms and to shape the future of the industry. Retaining the appearance of the industry-wide inclusion and common problems during NELA discussions and resolutions was crucial to ensuring the participation of diverse economic interests and actors, even if that input was systematically shaped and constrained. Participation minimized potential resentment and distracted attention from the overt pursuit of limited sectoral interests, which often occurred to the detriment of the suppliers and small competitors of the large, urban, central station, privately-owned utilities.

This system of industry self-governance was actively built upon friendships, family relations, and social network participation, which were subsequently augmented by the actions of formal organizations. Such relations and decisions reverberated throughout the industry via existing formal organizations that came to be dominated by the Circle's social network, supported by their firm subordinates and Goerck Street associates. Elements of the preferred template of industry relations became institutionally-embedded through replacement on trade association committees by firm subordinates and/or leaders of other AEIC firms. These constituents supported both the organizational and technical policies of the leaders and the system of industry self-governance. Alternative models became more difficult to articulate, as platforms from which they could be spread were systematically dominated by the Insull group.

DEFLECTING ALTERNATIVES TO THE PREFERRED TEMPLATE OF INDUSTRY DEVELOPMENT

The success of the Insull circle is most apparent in its containment of alternative forms of industry and strategies of industry development. During the 1890-1910 era, there were several viable alternatives to the dominance of urban central station systems and the "growth dynamic" strategy; these persisted and provided demonstrable benefits. So-called "isolated systems" in individual apartment buildings and/or factories continued to grow in size and in number until, in 1902, they produced half of all the horsepower from electricity in the U.S. (USDCL 1905:3, 1910: 14). They were so successful that through 1918, more U.S. customers (homes and factories) were served by isolated than by central station systems (Gould 1946: 21). As late as 1912, more than half of all electricity produced and distributed in the United States was attributable to industry rather than to electric utilities (DuBoff 1979: 41, 219). Even in an urban center such as Chicago, central stations only produced 70% of the electricity consumed in 1922 (Platt 1991: 213). In much of rural America, isolated generation was the only form of electric service available before 1930 (Nye 1990: 296-7).

Neighborhood systems serving small geographic territories were another form of competition. Some of these were dedicated co-generation systems supplying a neighborhood with both electricity and steam. The entrepreneur Homer Yaryan, for example, built and operated dedicated steam and electric neighborhood plants in thirty-five cities stretching from Cleveland to LaCrosse, Wisconsin, including Chicago, Detroit, Toledo, and Fremont Ohio. There were other combined systems as well, since Ohio listed twenty-five such steam-electric combination systems in 1902, only 8 of which were Yaryan systems (Ohio Secretary of State 1903: 516, 555). Electricity magnate Henry Doherty argued that these multi-use steam systems were the hardest to displace because of their efficiency. Investor-owned utilities were so determined to dispose of this competition that they often built steam plants to meet their customers' needs, and ran the plants as a loss, just to eliminate the competition for electricity (Doherty 1923: 125, 140).

Other neighborhood systems would serve a "base" factory, hotel, or trolley firm, and then sell "surplus" current to nearby customers (cf. Greer 1952: 14). Some of these were dedicated electric systems while others were co-generation systems--simultaneously producing and selling electricity in combination with ice, irrigation, pneumatic air, water pumping, or trolleys. For example, 47.4% of all electricity sold to the U.S. public in 1902, and 44.9% in 1907, was sold by 251 and 330 street railroads respectively (USDCL 1910: 14). Such multi-purpose decentralized systems were common in the U.S. through 1910. They became the norm in Scandinavia, much of northern Europe and Russia, and in parts of Canada (cf. Nye 1990: 384, Armstrong and Nelles 1986: 101-4, USDCL 1910: 13-27).

While some systems co-generated continuously, while others simply sold surplus current after working hours or during off-peak periods to better balance their loads and more fully utilize their fixed capital. The later type of firm was especially common in areas with hydro-electric potential and/or geographically diffused, energy-intensive factories, such as the Carolinas, Georgia, the Rocky Mountains, New York, Minnesota, and Michigan (cf. Riley 1958: 40-54, Wright 1957: 83-4). Often they sold to dedicated transmission and distribution utilities. This practice, revived in the late twentieth century under the rubric of wholesale "wheeling," and buying from non-utility generators (NUGs) promoted efficient capital utilization and load balance.

Another common decentralized schema during this era involved separating the functions of the typical vertically-integrated central station firms. Generation, transmission, and distribution activity could each (or in combinations of two) be performed by distinct firms and by extension could become distinct industries. For example, the Niagara, Lockport and Ontario Electric Company in New York State limited itself exclusively to transmission (USDCL 1910: 103). Similarly, the factory-based generation systems noted above sold to a separate (but often co-owned) electric firm that sold current during the evening (Horn 1973). There are even examples of city-owned generating and transmitting firms that sold current only to street railroads and factories during this early period (USBOC 1912: 198). Bulk sales (i.e., of current from one utility to another, either among integrated firms or between non-integrated firms) became so common that by 1907 they were described as "a special branch of the electric industry" (USDCL 1910: 84). Similar separations between generating, transmitting, and distribution firms (in various combinations) have existed among U.S. Rural Electric Authority coops from 1930 to the present, as well as in Canada and Britain (Doyle and Reinemer 1979: 253-263, Armstrong and Nelles 1986, Hannah 1979). Most equipment sales to these "alternative" neighborhood, railroad, and city-owned firms between 1895 and 1906 were promulgated by Westinghouse, Ft. Wayne, and Northern Electric Companies rather than by General Electric.

The technical merits and limitations of such alternative constructs are variable, locally-specific, and debatable. In context, some were more technically and energy-efficient (especially if combined with new investments in technology generation) than central systems; given sunk capital costs they were often cost-effective both then (and now).

By 1915, most of these decentralized and multi-purpose firms were subsumed or undermined by technical licenses and patent monopolies (Passer 1953: 56-7, 158-168, Bright 1972: 82-9), and these alternative boundaries for the electric-current industries had begun to wither. A cross-licensing agreement between General Electric and Westinghouse, for example, severely limited competition in electric equipment and led to their being prosecuted in 1911 for antitrust violations (Bright 1972: 103). Moreover, regulatory bodies weighed in against these alternatives with prejudicial rulings. The Massachusetts Gas and Electric Commission, for example, prohibited firms from sending current across streets or alleys unless they were regulated utilities, thus preventing neighborhood or surplus sales.

If technology and organizational form actually followed from efficiency considerations, we should have seen considerable variation by area, since efficiency varied dramatically according to local circumstances. One key puzzle we seek to solve is how such variation was suppressed in favor of a uniform set of technologies and organizational forms. According to its usual mode of suppression and homogenization, the inner circle mobilized its own firms as exemplars, discussed a "problem" at the AEIC, and after reaching a consensus, presented their framing of the issue and their preferred response to the NELA. As evidence, 72% of NELA papers presented between 1901 and 1910 came from six large urban firms connected to the Insull circle, and 4% by other AEIC central station firms. The leaders used their control of the NELA conference paper topics and committees to suppress information about decentralized energy systems.

After dominating NELA presentations from 1890-1896, Westinghouse Electric and other decentralized advocates occupied only two officer and three executive committee positions (of 40 and 80 respectively) between 1901 and 1910, presented only 15% of all papers, and only once for one year had two of their advocates on a committee. Even in this latter case they did not hold a majority: they were joined by three men whose firms were AEIC members--one from a large urban firm and the other two long-time supporters of Insull's policies.

Insull's circle, their firm associates, and their AEIC supporters consistently presented papers advocating the elimination of isolated systems and the integration and centralization of production. They influenced the content, agenda, and goals of both sets of trade association committees toward load building, balancing, and other "growth dynamic" attributes. They also actively promoted the reconfiguration of suppliers and dependent downstream constituencies to match those "emerging trends."

Our research signals that friendships, shared travel, co-authorship, and site visits among the executives of this circle affected the timing and selection of the various elements of this preferred template of industry development. It might be argued that the lack of outsiders at trade association committees and paper presentations simply points to "clique-like" behavior on the part of the dominant group. However, our analysis demonstrates that their omission correlates with a conspicuous absence of voices advocating alternative (decentralized) paths of firm and industry development, despite the continued and increasing material success of such alternative systems (USDCL 1910: 13, Gould 1946: 21, Bergman 1982: 67 table #7, 68 table #9).

This is an excellent example of how, to broach an over-used terminology, a "hegemonic discourse" was imposed as decentralized systems came to be seen as anachronistic in comparison to the modern, scientific alternatives of centralization and long-distance transmission. This perception was reinforced by the growing consensus within the profession of electrical engineering that problems of large-scale generation and transmission were intellectually exciting and constituted challenges to be overcome; the problem of making small-scale operations efficient hardly entered the realm of discussion (cf. Hughes, 1983).

Nevertheless, many of the more energy and cost-efficient technologies introduced in the 1890-1910 era

by central station firms could have rendered comparable advantages to non-central station systems, as did, for example, the installation of turbines in neighborhood and rail-based systems. (Indeed, the average size of an isolated generator quadrupled between 1904-1914 as they sought and gained economy of scale advantages, USDCL 1915: 36). Yet discussions of alternative path opportunities and outcomes were essentially absent from trade association discussions, deliberations, and publications. Also omitted in the same manner by this privately-owned central station electric utility industry were the equally dynamic municipal-owned firms (USDCL 1910, 1915).

Critics could argue that the dominant market position of the Insull circle as leaders of six large urban firms was the key factor motivating the spread of common models of industry organization, standard technology, and shared conceptions of growth strategies. But in fact, isolated systems purchased from 35% to 50% of all electric equipment, and were thus hardly a negligible market factor. Of the remaining electric production for public sale, railroad firms produced over 45% of all electric current in the U.S. and thus were major purchasers of generating equipment roughly equal to the combined purchases of all investor-owned electric firms (USDCL 1910: 14). The six largest urban central station electric firms in the U.S.(two of which were not among Insull circle-dominated firms) constituted only 20% of the central station equipment purchases (itself less than half of public sales--a category involving barely more than half of all electric sales) and generating 25% of all central station profits (USDCL 1905: 10-1). In fact, the largest 73 central station firms held only 56% of installed capacity (USDCL 1910: 67-8). Thus, while the market position of the Insull circle's firms was important, it certainly did not comprise so overwhelming a portion of customer demand for equipment that it would automatically give them leverage with manufacturers.

RESTRUCTURING THE MARKET ENVIRONMENT

Insull's circle often had to mobilize and re-organize the environment external to the industry to help lock-in their preferred template. They altered the internal dynamics, standards and content of the trade press, unions, college officials, and professional associations. We find substantial evidence that several of them were also officers in these groups, and that individuals from the larger Goerck Street group or AEIC committees were the principal advocates of a growth dynamic strategy or sat on committees charged with formulating or refining various technical and policy issues which could advantage (or potentially impede) that strategy. These extra-industry groups and others, including suppliers and organized customer groups, typically established legal/contractual obligations and created vested interests that influenced firms involved in sales of electric current.

Groups also emerged that promoted organizational and occupation-related changes among relatively autonomous and diffused industry firms. These groups included parts of NELA, occupational/fraternal clubs (that included initiations, parades, and picnics), corporate welfare and employee clubs (that promoted loyalty through ritual social activity), and/or professional associations (with annual conferences emphasizing social and professional obligation). Here again we note the participation and leadership of Insull's circle and of AEIC-associated firms.

In one instance, four key figures (Lieb, Edgar, Insull, and Barstow) constituted the board of a collectively owned lab that created the technical criteria and standards for production of bulbs and other end-use devices (Cf. McMahon 1985: 17-20). This gave them the power to monitor, license, and discipline major manufacturers, including GE. It also allowed them to physically create the basis for technical continuity and integration among the central station firms of the industry. Their friendships with GE manufacturing executives and important consulting firms (several members of whom had also been at Goerck St.), their personal and/or firm's subsequent ownership of smaller investor-owned firms after 1905, and their long-established and institutionalized policy of loaning executives to other firms

(often under the aegis of the NELA), helped to promote the transfer of preferred policies that rendered disproportionate benefit to their capital-rich, integrated, urban central station firms.

The most important external factor was the passage of state regulation as a method for diffusing the growing challenge of public takeover and ownership of central station urban electric firms. Unable to mobilize enough support among industry firms for state regulation, or to impose it through informal governance or social peer pressure, Insull's circle turned to friends outside of the industry with whom they shared membership in men's clubs, business groups, and/or corporate interlocks.

Several members of the circle, board members from their firms, and GE executives all encouraged the National Civic Federation to study this issue. Subsequently, Samuel Insull, Charles Edgar, and other executives from the firms of the Insull circle became members of the study committee. After the introduction of multiple anti-public ownership biases into the study process, and despite mixed findings generally more favorable to public- than privately owned firms, the NCF adopted the specific provisions that had been proposed by Insull and promoted by his circle for almost a decade. These provisions favored state regulation that protected investors, trade unions, and (to a limited extent) the public, specifically by rewarding the pursuit of a "growth dynamic" strategy rather than decentralized alternatives, and which rewarded firms with the greatest access to investment capital. These provisions transformed bankers (dependent upon the knowledge of and often sharing interlocks with Insull's circle) and holding company executives (which included members of the circle and former Goerck St. employees) into agents of industry standardization. The bankers and the NELA Policy Committee (dominated by Insull's circle) then secured support from other investor-owned electric firms for state regulation that had previously been resisted (McGuire 1989, McGuire and Granovetter 1998).

The NCF promoted "its" plan to state governments, several of which were directly lobbied by Insull's circle. Analyses then and now uniformly show that the regulations that were adopted promoted merger and rewarded urban, capital-rich IOUs, while disadvantaging publicly owned firms by exploiting their territorial limitations and prohibiting their operating rules. As a result, the Wisconsin utility commission approved 50 of 52 IOU rate increases, while denying 28 of 39 rate reductions sought by public firms between 1908 and 1914 (Jones 1914). These criteria also impinged upon the operations of decentralized systems by creating bureaucratic and other hindrances to profitability.

Critics of our argument might perceive Insull's group as Chandler-esque (1977) characters: uniformly insightful, pro-actively exercising initiative, pursuing efficiency, and achieving rational outcomes. In fact, technical, organizational, and/or economic inefficiencies were created and often locked in due to their efforts (cf.- Ripley 1916; xx, xxii, xxxiii, Bauer, Gold, and Shaw 1939; 27-56). Members of the group were overwhelmingly reactive toward potential alternative systems, public ownership, and challenges to specific elements of their growth dynamic strategy. Rather than striding into the future, they backed into it.

Acting through their informal governance processes, for example, the Insull group pressured firms to select inefficient paths (such as boycotting Nernst and fluorescent bulbs, over-extending their territories, ignoring street light service, investing in DC equipment, entering the steam heating business, and so on) and to select the less efficient of two alternative paths of potential development. For example, because of the threat of electric railroads as sellers of surplus current -- a threat multiplied by the possibility that the railroads might be "municipalized" or taken over by city governments -- industry firms sought contracts or mergers with trolleys, which were in decline and would force many IOUs into bankruptcy between 1915 and 1935. Correspondingly, after 1902 they essentially ignored electric cars (then 60% of all cars--Volti 1990) that drew almost all their current at night and could have drastically improved the IOUs load balance. The making of policy through defensive reaction was so pervasive that several of Insull's circle even ignored their personal investments in electric car companies while pursuing trolley loads, hurting

their industry, their firms, and themselves.

SUMMARY: THE SOCIAL CONSTRUCTION OF THE ELECTRIC UTILITY INDUSTRY

The electric utility industry was born not of Benthamite Equations or optimized rationality, but long-standing friendships, shared experiences, mutual dependence, corporate interlocks, and the active creation of new social relations where none previously existed. Insull and his circle drew upon the shared understandings and logic they established in their early work experience to socially-construct their firms in similar ways, and then built a system of industry governance that fostered template diffusion. They drew upon their local and national contacts to re-frame the market in ways that pressured individual central station electric utilities toward technical, organizational, economic, and legal conformity.

An important part of the circle's ability to achieve these goals was their power to shape the discourse within which the industry's alternatives were imagined. By controlling the agenda and the presentation of papers within trade associations, the Insull group marginalized advocates of decentralized options, and made the march of progress appear synonymous with their expansive view of the industry – large firms, integrated vertically and horizontally, transmitting electricity over vast distances was viewed as an important challenge to overcome. This group's ability to shape the public and private view of the industry was greatly enhanced by their activities and mobilization outside the industry itself, by influencing electrical engineers, manufacturers and such general purpose business/labor groups as the National Civic Federation. In a masterful effort resulting in NCF endorsement of private investor-owned utilities regulated by states, the Insull group maintained for many years an image of this outcome as inevitable for technical and economic reasons. One of the master strokes of this campaign was to bring into common usage the term "natural monopoly" to imply that the outcome would result inevitably from forces beyond human control – a perfect example of what Berger and Luckmann refer to as "objectivation" (1967: Part II).

Our study directly examines only one industry, and one with an unusual combination of highly diffused production and intensive capitalization. The largest firms did not directly compete, and there were no international market or trade concerns. Further, we have only examined industry development from 1878 to 1915. These attributes limit the generalization of our findings to other industries. Nevertheless, most major industries also have important trade associations, interact with government and regulatory bodies, and seek capital from bankers and the public through debt and equity markets. The products of other important industries – telecommunications, transportation and computing firms, for example – face comparable issues of peak-load pricing, load balancing, and issues of expansion in relation to optimal utilization of capital. Communications, transportation and entertainment industries also having highly decentralized consumers, and are currently undergoing consolidations reminiscent of those in the early period of electricity.

More generally, we believe our approach allows us to identify industries whose outcomes are typically attributed to economic and technical rationality, individual achievement and omniscience. When the case is carefully examined within its historical context, all these factors may turn out to be socially constructed by the mobilization of resources and influence through social networks. Industries are constantly renegotiated, re-framed, and re-mobilized in response to their environment.

Finally, our work is empirically and theoretically incomplete. Although the shaping and control of discourse is of paramount importance in an industry, it cannot be understood at the symbolic level alone. A serious analysis of how leading actors mobilize resources through social, political, economic and organizational networks in order to achieve their influence is required. However, drawing attention to the fact that such mobilization is difficult and hardly automatic leads us to note that isomorphism among

firms was never fully achieved, and could not produce results of indefinite duration.

A fuller theory of industry would specify the conditions under which this shifting of industry boundaries would solidify, and where its points of vulnerability lie. Were we to follow the electricity industry past the formative years chronicled here, we would find that processes and relationships once shaped by individuals became institutionalized into more formal organizations, institutional alliances, standardized practices, and industry norms. We argue that such patterns become embedded as norms promoting standard solutions to recurring problems of organization, technology, and strategy, but that these norms must be continuously reproduced. Combinations of external and internal pressures and changing socio-economic conditions may make this reproduction increasingly tenuous, leading to what is finally perceived as an industry-wide crisis. Such a crisis occurred for electricity beginning in the 1960s. Ironically, from this juncture on, paths systematically excluded from the consciousness of the public and industry members during the period we have chronicled have returned in the guise of "radical" new restructuring. Through this process, a new social network of firm leaders has the potential to redefine and reconstruct a new industry based upon elements of the old.

References

American Electrical Directory. 1886. *American Electrical Directory.* Ft. Wayne: Star Iron Tower Company.

American Electrical Directory. 1892. *American Electrical Directory.* Ft. Wayne: Star Iron Tower Company.

American Society of Mechanical Engineers. 1937. *George Westinghouse Commemoration*. New York: American Society of Mechanical Engineers.

Association of Edison Illuminating Companies. Various years. *Proceedings of the Annual Meeting of the Association of Edison Electric Illuminating Companies.*

Armstrong Christopher and J.V. Nelles. 1986. *Monopoly's Moment: The Organization and Regulation of Canadian Utilities, 1830-1930.* Philadelphia: Temple University Press.

Arthur, W. Brian. 1989. "Competing Technologies, Increasing Returns, and Lock-in by Historical Events," *The Economics Journal*, 99: 116-131.

Bauer, John, Nathan Gold, and Alfred Shaw. 1939. *The Electric Power Industry Development, Organization, And Public Policies*. New York: Harper and Brothers.

Bemis, Edward. 1899. *Municipal Monopolies,* New York: Thomas Y. Crowell and Company.

Berger, Peter and Thomas Luckmann. 1966. *The Social Construction of Reality*. New York: Anchor Books.

Bergman, Michael. 1982. "Electric Utility Statistics: 1882-1982." *Public Power* 40:5:65-68.

Bright, Arthur Jr. 1972. [1949] The Electric-Lamp Industry. New York: Arno Press.

Bonbright, James and Gardiner Means. 1969. [1932] *The Holding Company.* New York: August Kelley Publishing.

Brush Electric Company. 1882. *Brush Electric Company Catalog,* Cleveland: Brush Electric Company. In Vertical File "Power--Electric Companies--Brush Electric Company of Henry Ford Museum Archives.

Bush, George. 1973. *The Future Builders: The Story of Michigan's Consumers Power Company.* New York: McGraw-Hill.

Chandler, Alfred. 1977. *The Visible Hand: The Managerial Revolution in American Business.* Cambridge: Harvard University Press.

Chung, Chi-nien. 1997. "Networks and Governance in Trade Associations: AEIC and NELA in the Development of the American Electricity Industry 1885-1910". International Journal of Sociology and Social Policy 17 (7/8): 57-110.

Coffin. Charles. 1909. Letter to Samuel Insull in Insull Papers Box 19, folder #4, 5/24/09, in Cudahy Library, Loyola University, Insull Archive. Chicago, Illinois.

Conot, Robert. 1979. *A Streak of Luck.* New York: Seaview Press.

David, Paul. 1986. "Understanding the Economics of QWERTY: The Necessity of History," in W. N. Parker, *Economic History and the Modern Economist,* Oxford, U.K.: Basil Blackwell. p. 30-45.

David, Paul A. 1987. *Hero and the Herd in Technological History: Reflections on Thomas Edison and the Battle of the System.* Stanford, Ca.: Center for Economic Policy Research, LEFR Pub. #100.

Doherty, Henry 1923. *Principles and Ideas for Doherty Men: Papers, Addresses and Letters by Henry L. Doherty.* Compiled by Glenn Marston, six volumes. No Publisher: No City.

Doyle, Jack and Vic Reinemer. 1979. *Lines Across the Land: Rural Electric Cooperatives.* Washington: Environmental Policy Institute.

DuBoff, Richard. 1979. *Electric Power in American Manufacturing, 1889-1958.* New York: Arno Press.

Durkheim, Emile. 1965 (1912). *Elementary Forms of Religious Life,* New York: Free Press.

Flynn, John T. 1932. "Up and Down with Sam Insull." *Collier's Magazine,* 12/10/32. pg. 18-19, 35-36.

Gilchrist, John. 1927. *A Course in Departmental Organization and Function.* Chicago: Commonwealth Electric. Commonwealth Edison Corporate Library. Chicago Illinois.

Gilchrist, John. 1940. *Public Utility Subjects, 1901-1926,* Chicago: Privately Published.

Glaser, Barry and Anselm Strauss. 1967. *The Discovery of Grounded Theory.* New York: Aldine De Gruyter.

Gould, Jacob Martin. 1946. *Output And Productivity In The Electric And Gas Utilities.* National

Bureau Of Economic Research, Boston: Harvard University Press.

Granovetter, Mark. 1985. "Economic Action and Social Structure: The Problem of Embeddedness, *American Journal of Sociology* 91:481-510.

Granovetter, Mark. 1990. "The Old and New Economic Sociology: A History and an Agenda," in *Beyond the Marketplace: Rethinking Economy and Society.* Ed. Roger Friedland and A.F. Robertson, New York: Aldine de Gruyter.

Greer, R.C.L. 1952. *Electric Power and History In South Eastern New Hampshire.* New York: Newcomen Society.

Hammond, John. Various Years. Bound Papers of John Hammond. General Electric Collection. Hall of Electrical History. Schenectady Museum. Schenectady, N.Y.

Hannah, Leslie. 1979. *Electricity Before Nationalization.* London: Macmillan.

Hellman, Richard. 1972. *Government Competition in the Electric Utility Industry,* New Press.

Henry Ford Museum. n.d. "William Barstow," in Edison Pioneer Papers, Obituary File. Greenfield Village, Dearfield, Michigan.

Hirsh, Richard. 1989. *Technology and Transformation in the American Electric Utility Industry.* New York: Cambridge University Press.

Hoffman, Matthew. 1994. "How You Can Get Cheaper Power," *Consumer Research.* 10/94.

Hook, Sidney. 1943. *The Hero In History.* Boston: Beacon Press.

Horn, Carl. 1973. "The Duke Power Story; 1904-1973." N.Y.; Newcomen Society.

Hughes, Thomas. 1983. *Networks Of Power: Electrification In Western Society 1880-1930.* Baltimore: Johns Hopkins University Press.

Hunt. Edward. 1944. *The Power Industry and the Public Interest: A Summary of the Results of a Survey of the Relations Between the Government and the Electric Power Industry*, New York: The Twentieth Century Fund.

Insull, Samuel. 1934. *Memoirs of Samuel Insull*, Chicago: Privately Published. Commonwealth Edison Corporate Library, Chicago Illinois, and Insull Papers, Cudahy Library, Loyola University, Chicago, Illinois.

Jones, Stiles. 1914. "State Versus Local Regulation." *Annals* 53:94-110.

Kaarsberg, Tina and R. Neal Elliot. 1998. "Combined Heat and Power; Saving Energy and the Environment," Northeast Midwest Economic Review, March/April. Pgs. 4-11.

King, Thomson. 1950. *Consolidated of Baltimore, 1816-1950.* Baltimore: Consolidated Gas and Electric.

McAfee, J.W. 1947. *St. Louis and the Union Electric Company*. New York: Newcomen Society.

McDonald, Forrest. 1962. *Insull*. Chicago: University Chicago Press.

McGuire, Patrick. 1986. "The Control of Power: the Political Economy of Electric Utility Development in the United States 1870-1930." Unpublished Ph.D. dissertation, Department of Sociology, SUNY-Stony Brook, Stony Brook, NY.

McGuire, Patrick. 1989. "Instrumental Class Power and the Origin of Class-Based State Regulation in the U.S. Electric Utility Industry," *Critical Sociology* 16:2-3: 181-204.

McGuire, Patrick. 1990. "Money and Power: Variance in Support by Financiers and the Electrical Manufacturing Industry 1878-1896." *Social Science Quarterly*, 71:3: 510-530.

McGuire, Patrick and Mark Granovetter. 1998. "Business and Bias in Public Policy Formation: The National Civic Federation Study of Electrical Utilities, 1905-1907," Unpublished ASA Conference paper. San Francisco, California.

McGuire, Patrick, Mark Granovetter, and Michael Schwartz. 1993. "Thomas Edison and the Social Construction of the Early Electricity Industry in America," in *Explorations in Economic Sociology*, Ed. Richard Swedberg, New York: Russell Sage Foundation.

McGuire, Patrick, Mark Granovetter, and Michael Schwartz. 1999. *The Social Construction of Industry; Human Agency in the Development, Diffusion, and Institutionalization of the Electric Utility Industry.* New York; Cambridge University Press.

McMahon, A. Michael. 1985. *Reflections: A Centennial Essay on the Association of Edison Illuminating Companies*. New York: Association of Edison Illuminating Companies.

Marsh, Charles. 1928. *Trade Unions in the Electric Light and Power Industry*, Urbana: University of Illinois Press.

Martin, Thomas Commerford. 1906. "Municipal Ownership Always a Failure, " "*Moody's*, #2, 10/06; 527-9.

Marvin, Carolyn. 1988. *When Old Technologies Were New: Thinking About Electrical Communication in the Late Nineteenth Century*, New York: Oxford University Press.

Meyer, Herbert. 1972. *Builders of Northern States Power Company*. Minneapolis: Northern States Power.

National Electric Light Association. Various years. *Proceedings of the National Electric Light Association.* New York: NELA.

Noble, David. 1977. *American By Design: Science, Technology, and the Rise of Corporate Capitalism.* New York: Alfred A. Knopf.

Nye, David E. 1990. *Electrifying America: Social Meanings of a New Technology*. Cambridge: MIT Press.

Ohio Secretary of State. 1903. *Annual Report of the Secretary of State to the Governor of the State of Ohio for the Year Ending November 15, 1902.* Columbus: State Printing Office.

Passer, Harold. 1953. *The Electrical Manufacturers, 1875-1900: A Study of Competition, Entrepreneurship, Technical Change, and Economic Growth*. Cambridge: Harvard University Press.

Passer, Harold. 1962. "Frank Julian Sprague: Father of Electric Traction, 1857-1934," in William Miller, ed., *Men In Business: Essays on the Historical Role of the Entrepreneur*. New York: Harper Torch Books. pg. 211-237.

Patton, Phil. 1994. "Agents of Change," *American Heritage*, 45:8: 88-109.

Platt, Harold. 1991. *The Electric City: Energy and the Growth of the Chicago Area 1880-1930.* Chicago: University of Chicago Press.

Porter, Tana M. 1986. "Steam Heat in the Old West End." *Toledo Metropolitan Magazine.* June 2:16-8, 22.

Riley, Jack. 1958. *Carolina Light and Power Company: 1908-1955.* Raleigh, NC: Carolina Light and Power.

Ripley, William. 1905. 1916. *Trusts, Pools, and Corporations*, Boston: Ginn and Co.

Rudolph, Richard and Scott Ridley. 1986. *The Hundred Year War Over Electricity*. New York: Harper and Row.

Sargent and Lundy. 1961. *The Sargent & Lundy Story*, Chicago: Sargent & Lundy.

Sartre, Jean-Paul. 1961. *Search for a Method.* Ed. Hazel Barnes. New York: Vintage Books.

Saxenian, Annalee. 1994. *Regional Advantage: Culture and Competition in Silicon Valley and Route 128.* Cambridge, MA: Harvard University Press.

Schumpeter, Joseph. 1942. *Capitalism, Socialism, and Democracy*, New York: Harper.

Scribner, Harvey. 1910. *Memoirs of Lucas County and the City of Toledo*. Volume 2. Madison, Wi: Western Historical Association.

Seymour, H.A. 1935. *History of Commonwealth Edison Company.* Chicago: Commonwealth Edison.

Sharp, Lou Ann. 1995. 11/13/95 Telephone Interview between Lou Ann Sharp--Spokesperson for Toledo Edison--and Patrick McGuire.

Smith, George D. 1985. *The Anatomy of a Business Strategy: Bell, Western Electric, and the Origins of the American Telephone Industry*. Baltimore: Johns Hopkins University Press.

Stout, George. 1909. *Bulletins of Edison Electric Light Company of New York 1882-1884: A Memento of the Early Days in the Electric Service Business.* Edited by George H. Stout. Chicago

Privately Published. Samuel Insull Collection, E.M. Cudahy Library, Loyola University at Chicago. Box 98.

Toledo Edison. Various Years. "Scrapbook Collection," Toledo Edison Papers. Ward Canaday Center, University of Toledo, Toledo Ohio.

U.S. Bureau of Corporations. 1912. *Water Power Development in the United States.* Washington, D.C.: Government Printing Office.

U. S. Department of Commerce and Labor. 1905. *Special Census of the Electric Light Industries, 1902.* Washington: Government Printing Office.

U. S. Department of Commerce and Labor. 1910. *Special Report on Central Electric Light and Power Stations, 1907.* Washington: Government Printing Office.

U. S. Department of Commerce. 1915. *Special Report on Central Electric Light and Power Stations and Street and Electric Railways, 1912.* Washington: Government Printing Office.

U.S. Federal Trade Commission. 1934. "Efforts by Associations and Agencies of Electric and Gas Utilities to Influence Public Opinion," Summary Report to Senate regarding Resolution #83, 70th Congress, 1st session.

U. S. Federal Trade Commission. 1935. Investigations of Utility Companies--Laws and Regulation, Part 73a, 70th Congress, Senate Document. Volume #12. Washington: Government Printing Office.

Useem. Michael. 1984. *The Inner Circle: Large Corporations and Business Politics in the U.S. and U.K.* New York: Oxford University Press.

Volti, Rudi. 1990. "Why Internal Combustion?: Invention Technology," *Invention and Technology,* Fall. Pg. 42-47.

Westinghouse Electric and Manufacturing Company. 1898. *A Quarter Million Horse Power of Polyphase Electric Transmission Apparatus.* Pittsburgh: Westinghouse Electric and Manufacturing Company.

Wilcox. Delos. 1908. "The Control of Public Service Corporations in Detroit," *Annals* 31:576-592.

Wright, Wade. 1957. *History of the Georgia Power Company, 1885-1956.* Atlanta, Ga.: Georgia Power Company.

INCOME

	1987	1988	1989	1990
Revenue	1560	1638	1720	1806
Expenses	1346	1413	1484	1558
Depreciation	80	72	65	58
Interest	0	0	0	0
Pre-tax income	134	153	171	189
Taxes	47	53	60	66
Net income	87	99	111	123
Cash flow	167	171	176	181
Cum cash	167	338	514	696
New debt	0	0	0	0
Cum debt	0	0	0	0
Capital expend.	0	0	0	0

BALANCE SHEET

	1987	1988	1989	1990
CURRENT ASSETS				
Americom	53	119	185	251
Geisco	127	174	216	259
Computer Services	66	84	100	116
Consulting Services	30	37	44	50
Federal Field Services	149	170	185	200
Land Mobile Radio	91	122	150	179
Total	515	708	879	1055
PLANT				
Americom	400	360	324	292
Geisco	200	180	162	146
Computer Services	40	36	32	29
Consulting Services	30	27	24	22
Federal Field Services	30	27	24	22
Land Mobile Radio	100	90	81	73
Total	800	720	648	583
TOTAL ASSETS	1315	1428	1527	1638
CURRENT LIABILITIES				
Americom	40	42	44	46
Geisco	96	101	106	111
Computer Services	50	53	55	58
Consulting Services	23	24	25	26
Federal Field Services	113	118	124	130
Land Mobile Radio	69	72	76	80
Total	390	410	430	451
EQUITY				
Americom	413	437	465	496
Geisco	231	253	272	293
Computer Services	56	68	77	87
Consulting Services	37	41	43	46
Federal Field Services	66	79	85	91
Land Mobile Radio	122	140	155	172
Total	925	1018	1097	1187
TOTAL LIABILITIES & EQUITY	1315	1428	1527	1638

		Est. Results ($ Millions)			Parameters (%)		
		1986	1987	1988	1986	1987	1988
REVENUE	GEISCO	385.00	425.00	470.00	Growth	10.00	10.00
	Americom	160.00	170.00	180.00		5.00	5.00
	Computer Svc	200.00	230.00	265.00		15.00	15.00
	Consulting	100.00	110.00	120.00		10.00	10.00
	Federal Svc	450.00	495.00	545.00		10.00	10.00
	Mobile Comm	275.00	290.00	305.00		5.00	5.00
	TOTAL	1570.00	1720.00	1885.00		9.55	9.59
					Percent of Sales		
EXPENSES (Cash)	GEISCO	325.01	361.25	399.50	84.42	85.00	85.00
	Americom	92.44	96.90	99.00	57.78	57.00	55.00
	Computer Svc	176.70	200.10	225.25	88.35	87.00	85.00
	Consulting	92.06	100.10	108.00	92.06	91.00	90.00
	Federal Svc	397.70	435.60	479.60	88.38	88.00	88.00
	Mobile Comm	237.44	252.30	268.40	86.34	87.00	88.00
					Percent of Sales		
DEPREC.	GEISCO	28.88	31.88	35.25	7.50	7.50	7.50
	Americom	32.00	34.00	36.00	20.00	20.00	20.00
	Computer Svc	7.00	8.05	9.28	3.50	3.50	3.50
	Consulting	3.50	3.85	4.20	3.50	3.50	3.50
	Federal Svc	36.00	39.60	43.60	8.00	8.00	8.00
	Mobile Comm	12.38	13.05	13.73	4.50	4.50	4.50
TOTAL OPERATING EXPENSES		1441.11	1576.68	1721.80	91.79	91.67	91.34
					Operating Margins		
OPERATING INCOME	GEISCO	31.11	31.88	35.25	8.08	7.50	7.50
	Americom	35.56	39.10	45.00	22.22	23.00	25.00
	Computer Svc	16.30	21.85	30.48	8.15	9.50	11.50
	Consulting	4.44	6.05	7.80	4.44	5.50	6.50
	Federal Svc	16.30	19.80	21.80	3.62	4.00	4.00
	Mobile Comm	25.19	24.65	22.88	9.16	8.50	7.50
	TOTAL	128.89	143.33	163.20	8.21	8.33	8.66
OPERATING CASH FLOW		248.64	273.75	305.25			

		Est. Results ($ Millions)			Parameters (%)		
		1986	1987	1988	1986	1987	1988
INTEREST	GEISCO	0.00	0.00	0.00			
	Americom	0.00	0.00	0.00			
	Computer Svc	0.00	0.00	0.00			
	Consulting	0.00	0.00	0.00			
	Federal Svc	0.00	0.00	0.00			
	Mobile Comm	0.00	0.00	0.00			
	TOTAL	0.00	0.00	0.00			
					Margins		
PRE-TAX	GEISCO	31.11	31.88	35.25	8.08	7.50	7.50
	Americom	35.56	39.10	45.00	22.22	23.00	25.00
	Computer Svc	16.30	21.85	30.48	8.15	9.50	11.50
	Consulting	4.44	6.05	7.80	4.44	5.50	6.50
	Federal Svc	16.30	19.80	27.25	3.62	4.00	5.00
	Mobile Comm	25.19	24.65	22.88	9.16	8.50	7.50
	TOTAL	128.89	143.33	168.65	8.21	8.33	8.95
					Tax Rate		
TAXES		41.89	43.00	50.60	32.50	30.00	30.00
					Margins		
NET INCOME	GEISCO	21.00	22.31	24.68	5.45	5.25	5.25
	Americom	24.00	27.37	31.50	15.00	16.10	17.50
	Computer Svc	11.00	15.30	21.33	5.50	6.65	8.05
	Consulting	3.00	4.24	5.46	3.00	3.85	4.55
	Federal Svc	11.00	13.86	19.08	2.44	2.80	3.50
	Mobile Comm	17.00	17.26	16.01	6.18	5.95	5.25
	TOTAL	87.00	100.33	118.06	5.54	5.83	6.26

		Est. Balance Sheet ($ Millions)			Parameters (%)		
		1986	1987	1988	1986	1987	1988
ASSEST							
Current Assets	GEISCO	115.00	125.00	140.00	Growth:	10.00	10.00
	Americom	50.00	55.00	60.00	Same	5.00	5.00
	Computer Svc	60.00	70.00	80.00	as	15.00	15.00
	Consulting	30.00	35.00	40.00	Rev.	10.00	10.00
	Federal Svc	125.00	140.00	155.00		10.00	10.00
	Mobile Comm	120.00	125.00	130.00		5.00	5.00
	TOTAL	500.00	550.00	605.00		10.00	10.00
P.P.& E. (Net)	GEISCO	155.00	165.00	175.00	Growth: Half of Current Assets		
	Americom	350.00	360.00	370.00			
	Computer Svc	50.00	55.00	60.00			
	Consulting	20.00	20.00	20.00			
	Federal Svc	150.00	160.00	170.00			
	Mobile Comm	80.00	80.00	80.00			
	TOTAL	805.00	840.00	875.00			
TOTAL ASSETS		1305.00	1390.00	1480.00			
LIABILITIES							
Current Liab.	GEISCO	70.00	75.00	85.00	Growth: Same as Current Assets		
	Americom	30.00	30.00	30.00			
	Computer Svc	30.00	35.00	40.00			
	Consulting	15.00	15.00	15.00			
	Federal Svc	110.00	120.00	130.00			
	Mobile Comm	30.00	30.00	30.00			
	TOTAL	285.00	305.00	330.00			
Equity	GEISCO	200.00	215.00	230.00			
	Americom	370.00	385.00	400.00			
	Computer Svc	80.00	90.00	100.00			
	Consulting	35.00	40.00	45.00			
	Federal Svc	165.00	180.00	195.00			
	Mobile Comm	170.00	175.00	180.00			
	TOTAL	1020.00	1085.00	1150.00			
TOTAL LIABILITIES		1305.00	1390.00	1480.00			

EDS
ADP
McAuto
Boeing Comp Svcs
IBM/Info Net
RHC's (?)
Reuters
Telenet, Tymnet, Compuserve
sell F3/F4 → cable K-3?

? Feeney D&B
Win Hinsworth

1) VA ~~[illegible]~~ svcs: EDI, ~~[illegible]~~ money xfr, health
3) ~~1)~~ tech integr ~~[illegible]~~ dp & tcm + → jv's
2) data networking svcs
~~[illegible]~~ network design & mgt assistance
~~5) int'l strength [illegible]~~
4) ~~[illegible]~~ poss sat-based data networking opp'ty (~~[illegible]~~

} leadership up for grabs

not owned by IBM
IBM expertise + broader
not ~~owned by~~ arm of parent DP

~~would be only pure play in info networking~~
intl ~~[illegible]~~ strength
Fortune 500 strength

more active in ties to LAN's
Geosis net → add VSAT, local mobile, SCA,
develop fleet automation products
remote diagnostics: elevators, HVAC, vending, trucks
big tickets: aircraft, generators, complex equip
liaison BOC's? iNET? BCE more broadly?
subsequent sale to BOC? BCE, BT, (?)

mgt?
involve strategic partner early? BT? BCE? Reuters? Citi?

a strong position in ~~a broad on several aspects~~
integrated information processing & telecommunication
services. Revenues ...

ACQUISITION OF GE'S COMMUNICATIONS SUBSIDIARIES

Background:

Following the RCA acquisition, GE combined its information services companies and RCA's communications companies into a new Communications and Services division. After some restructuring, the division now is made up of six companies that are described in Attachment 1.

This is one of the smallest divisions in GE, with about $1.5 billion in revenues and $85 million in after-tax income. The companies in the division tend to have several elements in common: 1) a reputation for strong, almost utility-like, reliability, 2) a focus on sales to industry rather than consumers, 3) a record of uninspired top management direction, and 4) lackluster marketing and low growth. The division does not seem to meet GE's size or growth objectives very well, and GE reportedly is reluctant to give it significant capital.

The division is headed by Gene Murphy, who headed the RCA communications companies before the acquisition. Murphy reports to Larry Bossidy, one of two Vice Chairmen of GE.

Murphy told me that Bossidy has refused to entertain recent inquiries by companies about buying individual subsidiaries. This may be because GE doesn't need the cash and further shrinking the division would make it even less of a fit in GE. On the other hand, Murphy felt GE probably would not be averse to selling the whole division, although there is no obvious buyer.

Strategy:

Since GE apparently has no interest in breaking up the division, an approach is needed for dealing with all six companies. However, there is no strong reason other than history for keeping all six companies together. Therefore, the obvious strategy is to keep those companies that have the strongest market potential and fit best together and to sell the others.

The most valuable feature of the division is the experience and market position of some of the companies in the integration of data processing and telecommunications and their established marketing presence in selling value added services to corporate MIS and telecommunications

managers. The second most valuable feature is the satellite networking capability.

Following is a preliminary outline of a strategy for dealing with each of the six companies:

GEISCO would be the most attractive of the six companies to acquire. It has a well-established global data processing and data telecommunications network. It also has strong capabilities for integrating telecommunications and information systems and a strong position in electronic data interchange for financial services.

Computer Services and Consulting Services both have potential marketing synergy with GEISCO. It probably makes sense to combine Computer Services with GEISCO and to sell Consulting Services.

GE Americom is one of the largest U.S. domestic satellite operating companies, but one of the least well-managed. It has too many employees and will require considerable capital in the 1989-1992 time frame to replace aging satellites. There are several strategies for improving performance and reducing capital needs, including selling pieces of the business to other satellite companies.

GE Federal Field Services performs telecommunications installation and maintenance services at several large government installations. This is a solid business, but does not particularly fit here and probably should be sold.

GE Mobile Communications is the second largest manufacturer of mobile radio equipment in the U.S. This is a business of rapidly declining margins, and the company should be sold to Motorola or one of the Japanese manufacturers.

The resulting company would have strong prospects in both telecommunications and information processing. Revenues would be about $700 million and net after-tax income about $50 million as follows:

GEISCO/Computer Services	585	32
Americom	160	24
Total	745	56
Less: Americom adjustments	(45)	(6)
Total:	700	50

Attachment 1

GE COMMUNICATIONS SUBSIDIARIES

- GEISCO: provides on-line information processing and telecommunications services in the U.S., Europe, and Japan.

- GE Computer Services: Leases and maintains computer equipment.

- GE Consulting Services: Develops and maintains custom software.

- GE Americom: Provides satellite services to industry with six satellites in orbit. (formerly RCA)

- GE Federal Field Services: Provides telecommunications field services for Federal agencies. (formerly RCA)

- GE Mobile Communications: Manufactures and sells two-way radio equipment.

Unofficial 1986 financial estimates:

	Revenues	After-tax Income
GEISCO	385	21
Americom	160	24
Computer Services	200	11
Consulting Services	100	3
Federal Field Services	450	11
Mobile Communications	275	17
Total	1570	87

Note: These figures exclude Globcom which is being sold to MCI.

DRAFT

GENERAL ELECTRIC INFORMATION SERVICES COMPANY (GEISCO)

(Wholly Owned Subsidiary Of General Electric since 1982)

Principal Telecommunications-Related Business:

GEISCO operates a global network providing enhanced communications including microcomputer integration, value added services, intelligent systems, and electronic data interchange. GEISCO also provides consulting, design and support services, but stops short of offering facilities management.

Overall Strategy:

In keeping with GE's stated corporate strategy of being first or second in market share of any market it enters, GEISCO's goal is to be number one or number two in the integration between data processing and telecommunications. GEISCO is building its strategy around the realization that "on-site data processing is becoming easier for users, but communications is not."

GEISCO selects and sells those value added telecommunications services that it as a third party vendor can provide more economically or efficiently than the customer can. GEISCO places emphasis on five "focus markets" it has defined: Electronic Data Interchange (EDI), Office Automation (OA) and Electronic Mail (E-MAIL), computer leasing, computer maintenance, and remote diagnostics.

With international monetary transactions increasing, GEISCO's international objective is to leverage its U.S. experience in EDI financial services to become the market leader in international treasury management and financial custody services.

Strategic Advantage:

Unlike EDS, Boeing Computer Services, McDonnell Douglas McAuto, and other computer service companies owned by non-computer companies, GEISCO does not exist primarily to be its parent company's data processing arm that happens to have spare capacity for sale. (GE subsidiaries only account for approximately 12% of GEISCO's business). GEISCO has the luxury of developing marketplace-specific products rather than being tied to the singular data processing needs of the parent company.

GENERAL ELECTRIC INFORMATION SERVICES COMPANY (GEISCO)

Former Business:

GEISCO operated a computer time-sharing service as its key business in the 1960s and 1970s, which was spun off from General Electric's computer manufacturing operation. General Electric sold its mainframe-building interests to Honeywell in the mid 1960s, but retained a portion of the GEISCO remote computing service. By 1982 General Electric had bought back from Honeywell the remainder of the time-sharing company, and GEISCO became a wholly owned subsidiary of GE.

When declining computer hardware prices caused the time-sharing market to constrict in the late 1970's, GEISCO began to reposition its business from "a data processing service sold through a telecommunications network to a telecommunications service which could provide data processing." As corporations began taking their data processing in-house, GEISCO's approach was to become "the partner of the MIS manager, rather than a competitor". Notably, GEISCO's new strategy was not nearly as dependent on the cost of computer hardware and storage as the old time-sharing strategy.

Telecommunications Network:

GEISCO's backbone network is accessible in 750 cities in 25 countries and is tied to 32 additional countries through gateway connections to other networks. The network supports a wide variety of protocols: asynchronous, 3270 bisynchronous, 2780 and 3780 bisynchronous, SNA and X.25. Interfaces allow virtually every mainframe, mini and microcomputer to connect transparently. GEISCO's network currently services approximately 500,000 terminals representing 6,000 customer accounts

GENERAL ELECTRIC INFORMATION SERVICES COMPANY (GEISCO)

Business Approach:

GEISCO is tacitly relinquishing the market for generic telecommunications services (such as packet switching and basic electronic mail) to its lower-cost competitors, including Telenet, Tymnet and McDonnel Douglas Network Systems. GEISCO's strength lies in building intelligent systems for value added applications such as cash management (i.e., automated clearinghouse), order-entry (i.e., vertical integration of suppliers and distributors) or point-of-sale (i.e., credit card authorizations)

Primary Data Processing Centers:		
	Amstelveen, Netherlands Cleveland, Ohio	Interactive services running on Honeywell and HIS compatible systems.
	Rockville, Maryland	Handles IBM compatible service exclusively (Site of GEISCO's headquarters)
	Schenectady, New York	Serves GE internal needs, but can be used for disaster recovery if one of the other three centers goes down

GENERAL ELECTRIC INFORMATION SERVICES COMPANY (GEISCO)

1986 Financial Indicators

Sales ($ millions)	$800	Marketing, G&A/sales	N/A
Operating income ($ millions)*	$ 48	Number of employees	4,200
Operating income/sales	6%	Sales per employee	$190,476
Cost of sales/sales	N/A	Net income per employee	$ 11,429

Principal Customers/Industries	Percent Of Revenues (in 1986)	Examples of Services Provided
General Electric subsidiaries	12% (in 1985)	Basic transport/packet switching services, enhanced services and intelligent systems
Manufacturing	N/A	Electronic Data Interchange (EDI) order/entry and invoice; Electronic Mail
Retail Chains and Outlets	N/A	Point-of-Sale (POS) Systems
Banking and Finance Institutions	N/A	Cash management; Electronic Funds Transfer (EFT)
Healthcare Providers and Insurance	N/A	EDI*EXPRESS service disseminates medical claims to 45 major insurance carriers from more than 300 hospitals
International Operations	N/A	EDI service called MOTORNET for U.K. automotive industry

*Before interest and taxes

GENERAL ELECTRIC INFORMATION SERVICES COMPANY (GEISCO)

Recent U.S. Activity

Key Venture in the U.S.	Market Addressed	Business Strategy
Alliance with ISI-Dentsu of Japan	ISI-Denstu will market GEISCO order-entry, EDI, electronic mail, as well as its own software to 150 Japanese companies in U.S. financial, automotive, electrical, machinery, and trade industries	ISI-Denstu will act as a "distributor" of GEISCO products in the U.S.--building on its experience distributing GEISCO teleprocessing services in Japan since 1971

GENERAL ELECTRIC INFORMATION SERVICES COMPANY (GEISCO)

Recent European Activity

Key Venture in Europe	Market Addressed	Business Strategy
Establishment of Software Development Center in Ireland, July, 1986		
Joint venture with ICL, the largest British-owned computer company, called International Network Services Ltd., U.K., in January 1987 owned 60% by ICL and 40% by GEISCO	Provides EDI services to U.K. companies	ICL to benefit through access to GEISCO network; GEISCO to benefit through ICL's strength in the U.K. market, particulaly in the manufacturing, retailing and distribution sectors
Cooperative marketing agreement with Racal-Guardata of the U.K. in March, 1987	GEISCO's Money Transfer System offers capabilities to prevent technology-based crime in electronic funds transfer	Through "automotive clearing house," MOTORNET members can achieve industry-wide communication
Establishment of EDI service, MOTORNET, for U.K. automotive industry. Endorsed by ODETTE UK (Organization for Data Interchange and Tele-Transmissions in Europe)	Vertical integration of automotive suppliers and manufacturers in U.K.	
Long term contract with four Scandinavian shipping companies	Logistics management and worldwide container-freight tracking system	

GENERAL ELECTRIC INFORMATION SERVICES COMPANY (GEISCO)

Recent Far East Activity

Japan Participation	Market Addressed	Business Strategy
GEISCO participation with NEC of Japan	Value-added reseller arrangement, NEC to offer GEISCO servies on its network	Participation in venture involved sale of GEISCO technology, but did not include equity position
GEISCO participation with C&C International	Value-added reseller arrangement	Participation in venture involves use of GEISCO technology and proportional equity position
GEISCO participation with Dentsu Kokusai Joho Service	Value-added reseller arrangement	Participation in venture involved sale of GEISCO technology, but did not include equity position

GENERAL ELECTRIC INFORMATION SERVICES COMPANY (GEISCO)

MARKETS ADDRESSED: GEISCO FOCUSES ON FIVE PRIMARY MARKETS THAT ITS NETWORK AND DATA PROCESSING COMBINATION SEEMS IDEALLY SUITED FOR:

MARKET	GEISCO'S OFFERING	MARKET GROWTH AND GEISCO SHARE
Electronic Data Interchange (EDI)	EDI*EXPRESS allows companies to replace paper-based billing and order entry with electronic linking of suppliers and distributors. Purchase orders, invoices and related transaction documents are processed, automatically translated to an industry-standard format, stored for retrieval, and dispersed to multiple recipients. TRADE*EXPRESS is GEISCO's specialized EDI service which creates, processes and distributes international trade and shipping documents. Can also be used to track cargo shipments	EDI market overall growing 40% annually with $27 million in sales in 1986 (market expected to top $100 million in sales by 1989); GEISCO's current share 29% or $7.8 million. See note (1)
Office Automation (OA)	QUICK-COMM is a global electronic mail service which combines word processor links, translation software and protocol conversion enabling multivendor systems to communicate via automated clearinghouse. QUICK-COMM provides message transfer between PC's and LAN's in the same building or city, or outside the city of country.	Electronic Mail (E-Mail) market growing 40% annually with $175 million in sales in 1986; GEISCO'S current share is 10% or $17.5 million. See note (2)

Notes: (1) Source of market estimates: International Resource Development/BA&H Analysis

(2) Source of market estimates: EMMS Magazine/BA&H Analysis

GENERAL ELECTRIC INFORMATION SERVICES COMPANY (GEISCO)

MARKET	GEISCO'S OFFERING	MARKET GROWTH AND GEISCO SHARE
Rental and leasing of computing equipment.	GEISCO's ICSO (Integrated Communications Services Operation) leases PC's, terminals and communications equipment providing "one-stop shopping" for customers	ICSO is the third largest communications and computer leasing and maintenance organization in the U.S.
Service and maintenance of computing equipment	GEISCO provides contract maintenance services specializing in multi-vendor computer systems	Total maintenance service market growing 10-15 annually with estimated $14.5 billion in sales in 1986. GEISCO's share is between 1% and .5%, or $145 million and $73 million
Remote diagnostics and service	Equipment malfunctions and software failures are remotely detected, isolated, identified, and in the case of software, corrected	Total remote diagnostics market estimated at $800 million by 1989

CTW

CONFIDENTIAL

ACQUISITION OF GE'S COMMUNICATIONS SUBSIDIARIES

Background:

Following the RCA acquisition, GE combined its information services companies and RCA's communications companies into a new Communications and Services division. After some restructuring, the division now is made up of six companies that are described in Attachment 1.

This is one of the smallest divisions in GE, with about $1.5 billion in revenues and $85 million in after-tax income. The companies in the division tend to have several elements in common: 1) a reputation for strong, almost utility-like, reliability, 2) a focus on sales to industry rather than consumers, 3) a record of uninspired top management direction, and 4) lackluster marketing and low growth. The division does not seem to meet GE's size or growth objectives very well, and GE reportedly is reluctant to give it significant capital.

The division is headed by Gene Murphy, who headed the RCA communications companies before the acquisition. Murphy reports to Larry Bossidy, one of two Vice Chairmen of GE.

Murphy told me that Bossidy has refused to entertain recent inquiries by companies about buying individual subsidiaries. This may be because GE doesn't need the cash and further shrinking the division would make it even less of a fit in GE. On the other hand, Murphy felt GE probably would not be averse to selling the whole division, although there is no obvious buyer.

Strategy:

Since GE ~~has~~ apparently has no interest in breaking up the division, ~~a strategy~~ is needed for dealing with all six companies. However, there is no strong reason other than history for keeping all six companies together, ~~so~~ the obvious strategy is to keep those companies that have the strongest market potential and fit best together and to sell the others.

The most valuable feature of the division is the experience and market position of some of the companies in the integration of data processing and telecommunications and their established marketing presence in selling value added services to corporate MIS and telecommunications

managers. The second most valuable feature is the satellite networking capability.

Following is a ~~brief discussion of a~~ preliminary strategy for dealing with each of the six companies:

GEISCO would be the most attractive of the six companies to acquire. It has a well-established global data processing and data telecommunications network. It also has strong capabilities for integrating telecommunications and information systems and a strong position in electronic data interchange for financial services.

Computer Services and Consulting Services both have potential marketing synergy with GEISCO. It probably makes sense to combine Computer Services with GEISCO and to sell Consulting Services.

GE Americom is one of the largest U.S. domestic satellite operating companies, but one of the least well-managed. It has too many employees and will require considerable capital in the 1989-1992 time frame to replace aging satellites. There are several strategies for improving performance and reducing capital needs, including selling pieces of the business, ~~to other satellite companies.~~

GE Federal Field Services performs telecommunications installation and maintenance services at several large government installations. This is a solid business, but does not particularly fit here and probably should be sold.

GE Mobile Communications is the second largest manufacturer of mobile radio equipment in the U.S. This is a business of rapidly declining margins, and the company should be sold to Motorola or one of the Japanese manufacturers.

~~Prospects:~~ a strong market position would be

The resulting company would have revenues ~~of~~ about $700 million and net after-tax income ~~of~~ about $50 million as follows: ~~(illegible)~~

GEISCO/Computer Services	585	32
Americom	160	24
Total	745	56
Less: Americom adjustments	(45)	(6)
Total:	700	50

The resulting company would have a strong competitive position. ~~(To be completed)~~

With the limited information available at this point, it is difficult to estimate what price would be acceptable to GE or what price might be gotten for the pieces to be sold. The best approach probably would be to identify potential buyers for selected pieces and then to approach Jack Welch personally to open up the idea.

CONFIDENTIAL

Attachment 1

GE COMMUNICATIONS SUBSIDIARIES

- GEISCO: provides on-line information processing and telecommunications services in the U.S., Europe, and Japan.

- GE Computer Services: Leases and maintains computer equipment.

- GE Consulting Services: Develops and maintains custom software.

- GE Americom: Provides satellite services to industry with six satellites in orbit. ~~(formerly RCA)~~

- GE Federal Field Services: Provides telecommunications field services for Federal agencies. ~~(formerly RCA)~~

- GE Mobile Communications: Builds and sells two-way radio equipment with national sales force and local dealers.

Unofficial 1986 financial estimates:

	Revenues	After-tax Income
GEISCO	385	21
Americom	160	24
Computer Services	200	11
Consulting Services	100	3
Federal Field Services	450	11
Mobile Communications	275	17
Total	1570	87

Note: ~~This~~ These figures excludes ~~RCA~~ Globcom which is being sold to MCI.

CONFIDENTIAL

Notes on individual G.E. companies:

GEISCO:

GEISCO operates a global network providing enhanced communications services including microcomputer integration, value added services, and electronic data interchange (EDI) and provides consulting, design, and support services. It has about 6,000 customer accounts, including many large corporate MIS departments.

GEISCO's revenues have been falling as the decline in computer hardware prices has reduced the market for its time-sharing services. However, GEISCO is well positioned for growth in both revenues and profits. It has more expertise and experience in the integration of communications and data processing than perhaps any company other than IBM, making it an ideal partner for many suppliers and corporate users of information services. It is probably the leading supplier in the rapidly growing field of electronic financial services such as money transfer, order entry, and point-of-sale. Finally, it has a presence and solid reputation in many corporate MIS departments.

GE Americom:

Americom provides leased transponder services, primarily for video distribution, and provides end-to-end satellite data circuits for business and government private line networks. The C-band cable video business should be consolidated on two or three new satellites. An effort should be made to get an option to control the Crimson K-band venture with HBO or the Americom interest should be sold to HBO. The end-to-end circuit business should be sold to Contel ASC or GTE Spacenet.

GE Consulting Services Company:

Consulting Services develops and modifies custom software. It apparently is pretty much a software job-shop, with about a third of its business is supporting other GE divisions. While it might be attractive for GEISCO to be able to offer such services to its customers, it would not need anywhere near this large an increment to its existing capabilities. Consulting Services probably should be sold.

GE Computer Services Company:

Computer Services leases, installs, and maintains

computer equipment for its customers. This company sells to much the same target market as GEISCO. The computer leasing

GE Federal Field Services Company:

Federal Field Services performs telecommunications installation and maintenance services at several large government installations. It is unlikely that there is much overlap with the Computer Services Company in customer base or types of services provided, although it might be desirable to give GEISCO/Computer Services some of the telecommunications service capability. The field services business can be a stable and profitable business, especially for the Federal government. This business should be evaluated for retention, but it probably should be sold.

GE Mobile Communications Company:

Mobile Communications is the second largest manufacturer of mobile radio equipment in the U.S. This is a business of rapidly declining margins, and the company should be sold to Motorola or one of the Japanese manufacturers.

Resulting Company (GECOM):

CIRCULATE TO:

_____

_____

_____

_____

September 1987

International Resource Development Inc.

21 Locust Avenue, #1C,
P.O. Box 1716
New Canaan, CT 06840 U.S.A.
(203) 966-2525
WU Telex 64 3452

ANNOUNCING A NEW IN-DEPTH STUDY AND ANALYSIS OF

PACKET SWITCHING SERVICES & EQUIPMENT

An upheaval is in progress in U.S. data communications markets. Largely as a result of IBM's recent fundamental change in policy on network architecture, the barriers separating the three traditional cozy segments of the U.S. data communications market are being dismantled. At the same time, users are rushing to lease T1 circuits -- not because they particularly want or need "integrated" voice and data networks, but because it is simple and cost-effective to use the same T1 channels for both voice and data network backbones. Meanwhile the computer timesharing business, which formed the original mainstay of packet switching, is rapidly fragmenting; some fragments are growing, some are not. Moreover, the astonishing breakthroughs in technology for enhancing in-the-ground fiber networks are already resulting in four-fold increases in transmission capacities with minimal additional investment. One-hundred-fold capacity increases are on the horizon, foreboding a collapse in transmission prices.

The market for packet switching services and equipment has never before been under the influence of so many fast-changing, yet fundamental, changes. It is not surprising that some vendors perceive the packet switching business as full of opportunities; others see it as full of threats. International Resource Development Inc. has just completed a new 187-page research report which traces the probable course of the U.S. packet services and equipment market over the next ten years. The report (#743) costs $2,300.00 and is available immediately "off the shelf". It was completed in September 1987 and contains the following ten sections:

1. Executive Summary
2. Introduction
3. Packet Switching Technology
4. Domestic Packet Switching Networks
5. Packet Switching Hardware & Software
6. International Packet Markets
7. Packet Switching Market Estimates
8. Packet Switching Trends
9. Ten Year Market Projections
10. Supplier Industry Structure

Section 2 of the report looks at the key events taking place in the packet switching industry today, including the probable resolution of the access rate issue. The lackluster response to local telco packet networks is examined, along with AT&T's enigmatic role as a service vendor.

In Section 3 the economic and technological basis of packet switching is briefly presented; the current CCITT and non-CCITT standards, protocols and practices are discussed. Section 4 explores the strategies, service offerings and relative successes of the service suppliers active in the U.S. market today. The continued dominance of Telenet and Tymnet are examined, and their respective tariffs are compared. The other market participants are arranged in segments according to what their dominant service posture is (full network suppliers, semi-public network vendors, value-added application providers, etc.) and market shares are provided for each. The entry into packet switching services of the ex-Bell telephone operating companies is explored in some detail, together with specifics as to their level of investment, services offered, and customers gained (or not).

Section 5 reviews the packet hardware business, with particular emphasis on the suppliers of full network offerings (nodes, PADs, etc.). The market focus of each of the leading vendors is examined, and recent significant orders are traced. There is a discussion of the business of providing "add-on" products (gateways, PADs, etc.) for existing networks. Section 6 very briefly traces the scope, dimensions and recent developments in overseas packet service and equipment markets.

In Section 7 current (1987) estimates are presented for the packet services and equipment markets in the U.S. The services market is segmented by private versus public, and also by application (i.e. the type of traffic actually being carried by the public networks). There is a discussion of current trends in each of the applications segments.

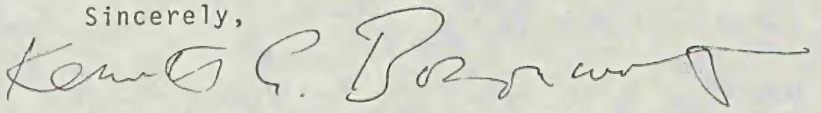
Section 8 provides a broad-ranging and (we hope) ground-breaking analysis of the likely market environment for packet switching over the next ten years. Particular attention is given to the structural changes taking place in the data communications market as a result of the major change in IBM architectural approach to teleprocessing networks (of which Systems Application Architecture is just one part of the story). There is a lengthy discussion of pricing trends in the transmission marketplace, with special focus on the technological developments which are revolutionizing the cost structure of fiber optic transmission and which may be threatening the long-term health of products and services (such as packet switching) designed to reduce transmission costs.

The CCAR situation is examined carefully, and specific CCAR impacts on each packet transmission market segment are estimated. Major trends in the market which affect the requirement for packetized traffic are examined; there is particular attention on the impact of database services and EDI on the future growth in packet transmission requirements.

In Section 9 the trends are translated in quantitative market forecasts for the next ten years for each of the segments discussed. Some alternative scenarios are examined, and the likely size of overseas markets open to U.S. vendors is explored. Section 10 reviews the significance of recent entries into the packet market, and departures from it.

International Resource Development Inc. is an independent consulting and publishing company which has been tracking the development of packet switching markets for more than ten years. In addition to a series of reports on data communications markets, of which this is the latest, IRD has undertaken custom consulting assignments (mostly market research and product planning) for most of the leading telecom vendors, including AT&T, GTE, NEC, C&W, IBM and Rockwell International. The report is available "off the shelf", and can be shipped for next-day delivery by Federal Express to most parts of North America. To obtain more information about the report, and to order it, please call (203) 966-2525 or mail in the attached order form.

Sincerely,



Kenneth G. Bosomworth
President

PACKET SWITCHING SERVICES & EQUIPMENT

Table of Contents

Tables & Figures

RELATED REPORTS AVAILABLE FROM IRD

Private Telecommunications Networks -- Equipment & Services Markets

195 Pages: Examines the stampede towards T1, as major corporate users multiplex together backbone digital streams of voice and data from their hitherto separate networks. Explores likely growth path for services markets, including transmission services derived from satellite and fiber optic transmission. Ten-year projections of service revenues from private networks, and of equipment requirements, including VSATs, T1 multiplexers, packet switching equipment and bridges, and network management systems. Opportunities and strategies are highlighted.
JUNE 1987.... ....$1,850.00

T1 Products & Services

180 Pages: Assesses the markets for T1 products and services. T1 networks, which are high-capacity communications links offering 1.544 Mbps transmission rates, offer the customer dynamic bandwidth allocation as well as many other features that CO services have yet to, and may never, duplicate, making them so attractive that many buyers often wait six months to a year to have their networks installed. The report forecasts markets for most T1-related equipment, including multiplexers, test equipment, voice codecs, PBX interfaces, DSUs and CSUs, through 1996.
FEBRUARY 1987.... ....$1,850.00

International Resource Development Inc.
21 Locust Avenue #1C
P.O. Box 1716
New Canaan, CT 06840

Phone: (203) 966-2525
Telex: 64 3452

Gentlemen:

( ) Please send me _____copies of report #743 entitled PACKET SWITCHING SERVICES & EQUIPMENT at $2,300.00 each.

( ) Please send me the study via Federal Express overnight delivery service for an additional charge of $30.00. (U.S. Only)

( ) Enclosed is my check for $_____. (No postage or handling.)

( ) Please BILL me for $_____. (Plus postage and handling.)
(Connecticut residents add 7.5% sales tax.)

( ) Please send me _____copies of report #740 entitled PRIVATE TELECOMMUNICATIONS NETWORKS -- Equipment & Services Markets at $1850.00 each.

( ) Please send me _____copies of report $726 entitled T1 PRODUCTS & SERVICES at $1,850.00 each.

( ) Please send me a complete description of the following:
( ) PRIVATE TELECOMMUNICATIONS NETWORKS -- Equipment & Services Markets
( ) T1 PRODUCTS & SERVICES

Signature_____

NAME_____ TITLE_____

COMPANY_____ MAIL STOP/SUITE/FLOOR_____

STREET ADDRESS_____

CITY_____ STATE_____ ZIP_____ PHONE_____

Jeff Cook
340-5372

GE Con (consulting services)

* Writes software + does custom software development

GE Computer Services

(301) 290-9204
Mr. Bagnasco
Columbia, Md

lease + maintain PCs

G.E. COMMUNICATIONS SUBSIDIARIES

- GE Americom: (formerly RCA) provides satellite services to industry using a fleet of five satellites.

- Federal Field Services: (formerly RCA) provides telecommunications field services for various Federal agencies.

- GEISCO: provides data communications, on-line information processing, and various information services primarily to large corporate MIS users in the U.S. and Europe.

- GE Mobile Communications: Builds and sells two-way radio equipment with national sales force and local dealers.

- GE Computer Services: Sells and maintains computer equipment.

- GE Software Consulting: Writes, sells, and maintains software for industrial customers.

Preliminary 1986 financial estimates:

	Revenues	After-tax Income
Americom	160	24
GEISCO	385	21
Computer Services	200	11
Software Consulting	100	3
Federal Field Services	450	11
Mobile Communications	275	17
Total	1570	87

Geisco

+ continue financial services ~~thru~~ emphasis
+ ~~explore~~ explore corporate network mgt
+ explore data base acquisitions
+ RHC's ??
+ expand JV's in info svcs delivery, system integration

–
–

Americom

+ CBS, ABC
+ cable bird
± K-3 ?

– sell pieces to ASC
– reduce employment

Computer Services

± combine w/ Geisco

Consulting Services

+ continue GE-critical consulting
– find GE-acceptable buyer
+ evaluate more profitable or strategic role – tie to Geisco ?

Federal Field Services

± evaluate ROI, cash flow
– sell

Mobile Communications

– Sell

Citi – GEISCO ?

GEISCO / American LBO

- American → cable G3 → sell ports to ASC cable
  → ABC, CBS C-band
  → more vigorous K-3
  → corp data – Spot Net ?
- GEISCO → cap for regional EDI, money transfer net mgt area

- synergies real or perceived
  VSAT / bypass for GEISCO

- software con ?
- Lynchburg ? ⟶ sell (Motorola ?)

- related acquisitions / seeks
  Control ASC ?
  Easy Link ?

Gene Murphy 12/1/87

Σ 1.7b sales & 100m net incl Globecom

	sales	net
~~[illegible]~~ Govt Svcs	~~4~~50?	15
Geisco	600?	20
American		
Consulting	100	
Mobile	350	
Comp services	~~1~~00	
Globecom		

consulting = job shop
American Pres: wants go GE
GEISCO Pres: difficult
whole better than parts
Bassidy (Larry) (cp?) not interested in one/one
consulting co: GE dependent for software conv - next 2-3 yrs.
Welch: big, creative deals; swaps.
comp svcs could be folded into Geisco

GECC interests in term

high tech

good for image if not too risky

is there a risk? cash flow, appety growth

assets — tangible or intangible

— long term advantage? (people, tech, etc)

K-1

~~#80~~ 5 in use

K-2

11 in use
NBC

16 spokes

5 C band
80% fill
3R & 4 video cable

R R
1, 2, 5 mics networking
one use
video?

Kevin Shera, Pres GE American

K-3 "sold out" per Ed Hannity

General Electric Company
$ in millions

	Revenues					
	1988	1987	1986	1985	1984	198
Major Appliances	$4,657	$4,436	$4,107	$3,617	$3,650	$3,07
Consumer Products						
Lighting	$2,150	$2,100	$2,070	$2,083	$2,082	$1,75
Electronics	0	3,200	2,244	850	830	78
Housewares	0	0	0	0	120	47
Batteries	110	100	160	164	167	13
Broadcasting & AC	0	0	0	42	138	17
Total	$2,260	$5,400	$4,474	$3,139	$3,337	$3,30
Power Systems						
Turbines	$1,350	$1,300	$1,537	$1,803	$2,000	$2,01
Nuclear	900	850	850	950	997	80
Con. & Eng. Svcs.	1,800	1,700	1,700	1,800	2,000	2,15
Power Delivery	770	800	800	820	800	72
Capacitors	200	190	190	208	203	19
Total	$5,020	$4,840	$5,077	$5,581	$6,000	$5,87
Industrial Systems						
Transportation	$600	$540	$570	$640	$620	$75
Ind. Electronics	880	850	820	780	750	73
Carbaloy & Wire	60	130	170	197	238	25
Semiconductor	100	550	325	235	280	22
Motors	970	940	940	1,002	1,035	1,02
Contractor Equip.	640	620	640	670	630	61
GESCO	660	640	650	677	620	55
Total	$3,910	$4,270	$4,115	$4,201	$4,173	$4,13
Aerospace	$5,300	$5,000	$4,245	$3,052	$2,585	$2,05
Technical Systems						
Medical Systems	$2,800	$1,700	$1,516	$1,146	$1,105	$99
Mobile Comm.	270	250	250	363	415	34
GEISCO	500	500	500	525	550	52
Calma	140	140	140	170	220	18
Communications	1,300	1,200	700			
Total	$5,010	$3,790	$3,106	$2,204	$2,290	$2,04

First Boston estimates

Materials						
Plastics	$2,011	$1,795	$1,496	$1,295	$1,350	$1,07
Eng. Materials	625	625	625	575	650	60
Ladd Petroleum	125	125	125	160	175	16
Ceramics	50	50	50	52	54	
Total	$2,811	$2,595	$2,296	$2,082	$2,229	$1,83
Financial Services						
GECC						
ERC						
Kidder Peabody						
GEVENCO & Other						
Total	$753	$673	$585	$499	$448	$39
NBC	$3,400	43,200	$1,817			
Aircraft Engine						
Military	$4,000	$4,550	$4,150	$3,175	$2,400	42,00
Commercial	1,950	1,650	1,400	1,100	1,000	1,10
Other	420	400	370	350	331	33
Total	$6,370	$6,600	$5,920	$4,625	$3,731	$3,43
All Other	$0	$0	$772	$0	$434	$1,41
Corporate Items	100	100	213	302	54	11
Total GE	$39,591	$40,904	$36,727	$29,302	$28,931	$27,67

G.E. articles from Dialog

Fidelity Tests New Global Messaging
Network World v4n32 PP: 11-12 Aug 10, 1987 ISSN: 0887-7661

Fidelity Investments (Boston, Massachusetts), a major money-management and investment company, is successfully beta testing a global electronic messaging system, Equinet, from Financial Telecommunications Inc. (FITEL). The messaging system reduces the time and work needed to complete international bond and equity transactions. Equinet also is being tested by some of Fidelity's largest trading partners, including the brokerage house of Solomon Brothers Inc. and Wells Fargo & Co.'s Wells Fargo Investment Advisors. Brokers, investors, and financial institutions can be linked by Equinet to a central computer in London over General Electric Information Services Co.'s (GEISCO) Mark III network. Using Equinet, the broker enters completed orders on an IBM Personal Computer AT with a FITEL proprietary message format, and a batch file is loaded into Equinet's host system in London over a 1,200-bit/sec. or 2,400-bit/sec asynchronous line provided by GEISCO. The host system sorts the file and readies it for output. Maps.

Prescription for a New Service
Computerworld v21n23 PP: 83,85 Jun 8, 1987 CODEN: CMPWAB

By acquiring American Hospital Supply Corp. in 1985, Baxter Travenol Laboratories Inc. absorbed American's highly regarded Asap online order-entry system. Baxter has since launched a joint effort with General Electric Information Services Co. (GEISCO) to use Asap as part of an electronic document interchange system for the health care industry. According to Irvin Uskup, Baxter's vice-president of business technology, by opening Asap to orders for other suppliers, Baxter expects to increase the use of the system among both current users and new ones. This should help to boost Baxter's sales. Baxter will function chiefly as the sales representative for the joint service, called Asap Express. Baxter and GEISCO hope to make the multisupplier service generally available this fall, after testing it this summer. Baxter is rewriting the software used to access Asap by personal computers so as to make it more user-friendly.

Irish Woo Software Operations
Computerworld v21n9 PP: 57,65 Mar 2, 1987 CODEN: CMPWAB

The Travelers Corp. is ready to join the few US corporate computer users that are setting up online software development or maintenance facilities in Ireland. Later in 1987, The Travelers will open a facility in Limerick, Ireland, for the design, development, and testing of its application software that is online with facilities in Hartford, Connecticut, and Atlanta, Georgia. The chief advantage is the workforce, which, according to The Travelers' Bill Gollnic, is less expensive than in the US, well-educated, and loyal. American Airlines has looked into locating an online software development facility there, and Geisco, a division of General Electric Co., has opened such a facility in Dublin. The time difference between Ireland and the US allows Irish facilities to access computers in the US during less busy night-time hours. Ireland has difficulty competing for data entry work with areas in which labor is less expensive; however, its advantage is its ability to handle sophisticated projects.

General Electric Takes On the Fed
Dun's Business Month v129n2 PP: 62-65 Feb 1987 CODEN: DURVAH

While private companies in many countries own the clearing houses that process checks and electronic payments for the banking system, the Federal Reserve System does the job in the US. However, General Electric Corp.'s General Electric Information Services Co. (GEISCO) has been challenging the Fed with the operation of a processing center for the Cal-West Automated Clearing House Association, forcing the agency to improve the pricing and efficiency in its district clearing houses. GEISCO costs less, demands less paperwork of its customers, and offers 7-day, 24-hour service. When GEISCO substantially underbid the Fed's charges for clearing, the agency suddenly dropped its rates from 12c an entry to 1c each. The Federal Reserve Bank has numerous advantages due to its position as a governmental institution, including its insistence on totaling the net balance for all participating banks, thus demanding information early from GEISCO. The Fed also is able to rent personal computers (PC) to banks cheaply, while banks must pay for the PCs they use to communicate with General Electric's Automated Clearing House.

GE INFORMATION: GE Information Services and Transtema announce agre for high-tech support for international shipping
October 20, 1987

An agreement has been concluded between GE Information Services and the Swedish consulting and software house Transtema, integrating Transtema's systems and services with GE Information Services' global teleprocessing network facilities. The agreement between Transtema and GE Information Services means that network communications are now an integral part of more software appplications aimed at the specific needs of shipping lines, ship management companies, shipping agents and freight forwarders.

Consulting expertise, software development, systems and communications are all available now from one supplier. The technology is based on one of the largest teleprocessing networks in the world. The GE Information Services' network incorporates 70 countries, covering all major ports and inland locations.

Currently GE Information Services and Transtema both have large client bases within the shipping industry, and see the cooperation as benefitting users of specific applications.

This includes the resale by Transtema of GE Information Services' base products for electronic mailbox services (The QUIK-COMM System) and trade document transfer (The EDI EXPRESS System) in combination with Transtema's software packages:

TRADEWARE contains modules for document production, cargo booking, container control, marketing statistics and financial reporting. SHIPMASTER, an onboard PC-system with modules for load planning, maintenance and repair, ship administration and communication.

GE Information Services, part of General Electric Company of the U.S.A., is headquartered in Rockville. It offers a broad range of worldwide computing and communications services for network-based business applications, systems integration services and managed data network services.

Industries served include international trade and shipping, transportation, communications, international banking, manufacturing, retail and health care.

Transtema, with headquarters in Stockholm and local

offices in Gothenburg, Malmoe, Oslo, Helsinki and London, is also represented through agents in 35 countries. The company has 120 employees, including 60 consultants, with a turnover of $15M. Transtema is owned by Swedish shipping companies Johnson Line and Transatlantic

---

MICROCOM: Microcom MNP protocol to be incorporated into future CCITT standard on modem error control
October 6, 1987

Last week in Geneva, Switzerland, Study Group XVI of the Consultative Committee on International Telephony and Telegraphy (CCITT) reviewed international communications standards to consider which error-control protocol to select for use in switched network protocol modems.

During the deliberations, six European administrations (Germany, Belgium, France, Netherlands, Italy, Sweden) and IBM Europe supported the use of the Microcom Networking Protocol (MNP). The use of a modified version of the Link Access Protocol (LAPB or LAPD) was supported by the United Kingdom and Japan.

Since CCITT requires unanimous consent on such matters, no standard was officially selected. However, CCITT concluded that any future protocol standard should include MNP error control and will have to be compatible with the existing installed base of MNP protocol modems.

Further, CCITT reported that the standard should also include a LAP-based protocol and any of its future developments and enhancements, although there was no conclusion as to which LAP-based protocol would ultimately be specified.

"Microcom is actively working along with other concerned parties to develop the final CCITT standard," according to Greg Pearson, vice president of technology planning at Microcom. "I hope that by using accelerated approval procedures, we can arrive at a conclusion no later than 1989."

"This represents a significant step forward in the standards process," said James Dow, president of Microcom. "Because it recognizes the role of an industry de facto standard (MNP) in the creation of an official CCITT standard. This insures that all existing and future users of MNP protocol modems are guaranteed compatibility with the CCITT standard in its final form."

MNP is currently used by over 100 data communications companies internationally, including more than 40 modem manufacturers and several value-added networks including GTE Telenet/UNINET, GEISCO, CSC INFONET, Tymnet and the IBM Information Network. MNP has an installed base of over 300,000 users internationally.

Microcom Inc., inventor of the MNP technology, was founded in 1980 and is headquartered in Norwood. The company is a leading manufacturer of data communications equipment including high-performance error-correcting modems for both general purpose data communication and for IBM PC-compatible applications.

Microcom (NASDAQ:MNPI) markets its products through an international network of distributors and through direct sales to OEM's and large corporate users.

GENERAL ELECTRIC: GE Information Services and Racal sign cooperative marketing agreement
March 19, 1987

A cooperative marketing agreement, announced Thursday by GE Information Services-a (represented by GEISCO Limited in the U.K.) and Racal-Guardata Limited, enables users of GE's worldwide teleprocessing services to combat computer fraud against financial institutions worldwide.

A unique solution, developed initially for GE Information Services' Money Transfer System (MTS), offers new capabilities to prevent technology based crime in the area of network based services for the provision of Electronic Funds Transfer. The cooperative marketing agreement combines the strengths of a premier supplier of data security solutions with the world's leading provider of teleprocessing and data processing services, to develop and maintain security capabilities and solutions for GE's clients worldwide.

Professor Henry Beker, director in charge of Racal-Guardata, commented: "The Cooperative Marketing Agreement has given us the opportunity to make significant advances in EFT technology. To date, we have developed one of the most secure EFT systems available in the world today."

Jamie Graham, director, International Banking and Financial Services, GE Information Services, said: "This is a unique combination of technical skills and banking

systems ability which provides GE's clients with a greatly enhanced security environment for International Funds Transfer, and which further reduces the associated risks."

The first result of the agreement is the announcement today of an upgraded version of GE's Money Transfer System (MTS), incorporating the security features. It is the intent of the two organizations to provide ongoing enhanced data security solutions for services or applications utilizing the GE worldwide teleprocessing network.

The standards for use within security systems for the financial services industry covering message authentication, key management, etc., are being defined and developed through the aupices of the American National Standards Insititute (ANSI) in the USA and the International Standards Organisation (ISO) in Europe.

The GE/RACAL solution is a two tier cryptographically based system using the Data Encryption Algorithm (DEA), firstly through the now widely accepted ANSI X9.9 Message Authentication technique and, secondly, by uniquely integrating Personal Authentication and linking the various components together, using ANSI X3.92, with the Message Authentication.

Together, these two techniques provide a mechanism that ensures end-to-end message authentication and authorization that will identify the originating device as well as the authorizing officer. This is a first step in the introduction of Electronic Signature.

The inclusion of these new security features into MTS by GE has been achieved without significant impact on the current operational methods or user costs. MTS allows authorized banks' corporate customers to generate payment instructions using either their own micros or mainframes for automated delivery to the bank at any of its delivery points worldwide, under conditions strictly controlled by the bank.

To date, the completed instruction is generated by the bank customer adding the required input data to a preformatted payment skeleton. With the deployment of the new security system techniques, the provision of a free format capability can be provided by the bank to its customer base.

The 'Package' required by customers for GE's MTS consists of security hardware, the MTS application and

security interface software. The security equipment is tamper-resistant and operates as a peripheral device to the host computer. In the case for a PC, this will be a Security Card that slots into the PC (IBM-b PC or most compatibles). In the case of a mainframe this will be a fault tolerant Security Module. Each authorizing officer is issued a Watchword Generator, this hand-held calulator-like device, again tamper resistant, is used to calculate a digital signiture.

GE Information Services-a, a division of General Electric Co., USA, operates the worlds' largest commercially available teleprocessing network. Racal-Guardata is a world leader in data security systems, providing expert consultancy service, system design service, products and support facilities worldwide.

APOLLO COMPUTER: Leading corporations, research centers establish Network Computing Forum
March 3, 1987

In a move aimed at pioneering the next generation of computing, a group of leading corporations and research centers Tuesday announced the establishment of an industry forum to foster practical applications of Network Computing - a new approach to computing in which workstations, supercomputers, other computer systems, and a variety of network servers are tightly integrated through high-performance network links.

In a Network Computing environment, both computational and data management tasks are distributed across a network of diverse systems in an efficient and transparent manner -- letting users access a broad range of computing resources through their own workstations.

Charter members of the Network Computing Forum include: Alliant Computer Systems Corp.; Apollo Computer Inc.; Apple Computer Inc.; Boeing Computer Services; Caterpillar Inc.; Celerity Computing Systems; Concurrent Computer Corp.; Convex Computer Corp.; GE Corporate Information Technology; The MacNeal Schwendler Corp.; Manufacturing and Consulting Services Inc.; Mentor Graphics Corp.; MIT Project Athena; Motorola Inc.; Oracle Corp.; PDA Engineering: Racal-Redac Inc.; Rockwell International Corp.; San Diego Supercomputer Center; Scientific Computer Systems; Software Productivity Consortium; Stellar Computer Inc.; Structural Dynamics Research Corp.; Swanson Analysis Systems Inc.; Texas Instruments Inc.; University of Iowa; University of

Michigan; Westinghouse Electric Corp.; and 3Com Corp.

These charter members will invite other interested users, software suppliers and hardware vendors to join the Forum. Forum membership is open to corporations and research centers actively involved in developing Network Computing applications and products.

Network Computing is the next logical, evolutionary step in computing -- the successor to batch, timesharing, dedicated personal computing, and the current generation of workstation networks.

The new approach of computing on the network through a workstation requires the tight integration of multiple computing resources on the network to serve the diverse needs of work groups. In a Network Computing environment, these resources -- both general purpose and specialized -- appear as a closely cooperating system to the user seated at a workstation.

The purpose of the Network Computing Forum is to advance the state-of-the-art in practical Network Computing services and applications, for the greatest benefit to the user community. The Forum will meet on a regular basis to discuss, review, and adopt network protocols, services and architectures that support vendor-independent, integrated Network Computing environments. These protocols, services and architectures will take advantage of existing industry standards, where applicable as a common base.

Through the Forum, members can publicly share results of research and development acitivities in Network Computing, and participate in promoting standards for this emerging area. Forum members working on specific network computing products and projects can take advantage of an open forum community of technical computing users, vendors and researchers sharing similar goals and facing similar problems.

The Network Computing Forum will place an early emphasis on efficient, portable mechanisms for building, locating and invoking Network Computing services. Work will then proceed to defining and implementing network services in areas such as security and authentication, software licensing, and transparent high-performance access to a wide range of computing resources from the workstation. The technical agenda of the Forum will be set by the Forum's executive committee, based on recommendations from the technical review committee. Each member of the Network

Computing Forum will be allowed to name a senior representative to the Forum's executive committee. The first technical session of the Network Computing Forum is scheduled for Spring 1987.

"The leading industry participants found here today recognize the exciting potential of harnessing the computing power being networked together, taking advantage of all the unique capabilities provided by the systems on these modern networks," said Leonard R. Yencharis, president of The Yencharis Consulting Group, the moderator for the Forum's press conference. "To move rapidly toward practical applications, and solve problems encountered along the way, requires active participation of end users, software suppliers and hardware vendors. The 'go it along' approach simply will not work in an area such as Network Computing. The best way to proceed with Network Computing is within the broader context of an open industry forum."

According to the forum's managing editor, John Robotham, the Network Computing Forum has a unique focus. "We know of no other industry group addressing the problems and opportunities that are the focus of the Forum. We expect our work to complement that of other industry standards organizations by drawing on existing industry standards where applicable, as a common framework for the group's activities."

GE INFORMATION: GE Information Services and Transtema announce agre for high-tech support for international shipping
October 20, 1987

An agreement has been concluded between GE Information Services and the Swedish consulting and software house Transtema, integrating Transtema's systems and services with GE Information Services' global teleprocessing network facilities.

The agreement between Transtema and GE Information Services means that network communications are now an integral part of more software appplications aimed at the specific needs of shipping lines, ship management companies, shipping agents and freight forwarders.

Consulting expertise, software development, systems and communications are all available now from one supplier.

The technology is based on one of the largest teleprocessing networks in the world. The GE Information Services' network

incorporates 70 countries, covering all major ports and inland locations.

Currently GE Information Services and Transtema both have large client bases within the shipping industry, and see the cooperation as benefitting users of specific applications.

This includes the resale by Transtema of GE Information Services' base products for electronic mailbox services (The QUIK-COMM System) and trade document transfer (The EDI EXPRESS System) in combination with Transtema's software packages:

TRADEWARE contains modules for document production, cargo booking, container control, marketing statistics and financial reporting. SHIPMASTER, an onboard PC-system with modules for load planning, maintenance and repair, ship administration and communication.

GE Information Services, part of General Electric Company of the U.S.A., is headquartered in Rockville. It offers a broad range of worldwide computing and communications services for network-based business applications, systems integration services and managed data network services.

Industries served include international trade and shipping, transportation, communications, international banking, manufacturing, retail and health care.

Transtema, with headquarters in Stockholm and local offices in Gothenburg, Malmoe, Oslo, Helsinki and London, is also represented through agents in 35 countries. The company has 120 employees, including 60 consultants, with a turnover of $15M. Transtema is owned by Swedish shipping companies Johnson Line and Transatlantic
---

ORACLE 2: Oracle and Industrial Networking Inc. in partnership to pr map interface for distributed database
May 4, 1987

Oracle Corp. (NASDAQ/NMS:ORCL), developer and marketer of ORACLE relational DBMS, fourth generation language and decision-support software and Industrial Networking Inc., leading supplier of MAP-compatible factory LAN systems, Monday announced a partnership program, under which Oracle's distributed DBMS, SQL Star, will function with the MAP protocol and interfaces provided by INI.

Under the agreement, the companies will collaborate on the development of the interface between Oracle's and INI's products and will cooperatively market their products to large manufacturers.

According to Martin Picard, Oracle's product manager for manufacturing network products, "This announcement culminates a joint effort of the past several months between INI and Oracle where a team has been working on the interface between the INI MAP/One products and our SQL Star distributed DBMS.

"We are excited about the third-quarter release of the interface products which will allow dissimilar computers running Oracle software to communicate across MAP networks."

Picard noted that the initial products will allow networking of DEC VAX and IBM PC computers on MAP networks. Interfaces for several other Oracle-supported computers used in manufacturing automation are planned.

The two firms will cooperate in the marketing of MAP-based distributed DBMS systems, with each company licensing its own products to manufacturers who wish to connect databases over MAP networks.

Davis Fields, INI's product marketing director, stated, "MAP provides a proven way for manufacturers to tie together the different computers in their facilities.

"Oracle's SQL Star integrates the databases on those different computers. Both of our companies have established clear leadership in the intelligent connection of computers. Together, we believe that we can offer a more complete solution to manufacturing companies pursuing a MAP-based CIM strategy."

Oracle Corp. was founded in 1977 and in 1979 introduced the first commercial SQL-language DBMS, ORACLE. The ORACLE DBMS provides a high-performance relational system across a wide range of computers and operating systems, from mainframes to micros. ORACLE is compatible with IBM's DB2, so that programs written for DB2 will run with ORACLE in the many machine environments in which it is implemented.

Today, in addition to the implementations on IBM mainframes under MVS and VM/CMS, ORACLE runs on DEC, DG, HP, Prime, AT&T, Stratus and many other minicomputers. The same ORACLE capabilities are also available for PCs running

under the MS-DOS and UNIX operating systems.

Oracle distributes its products through a worldwide network of 50 direct sales offices in the United States, Canada, Western Europe, Japan, China and Australia. ORACLE is also licensed by international distributors and through the authorized dealer program. Additionally, Oracle provides a full range of consulting services and markets its products to value-added relicensors through its Alliance program. With its direct and OEM marketing efforts, ORACLE is used by 31 of the top 50 multi-national corporations, at over 180 government agencies and at thousands of sites overall.

Industrial Networking Inc., a joint venture between Ungermann-Bass Inc. and General Electric Co., develops and markets local area networks and communications products for industrial applications.

INI has established ongoing business relationships with many of the world's leading original equipment manufacturers: including GE, Cincinnati Milacron, FANUC, GMF Robotics, Gould, Intel and IBM. INI's products are sold throughout the United States and overseas in Europe and Japan.

Keeping risk at bay in the global banking era. (risk management on international banking markets)
Euromoney Jan, 1987, p70(4)

Technologies allowing banks to conduct business on a global, 24 hours per day basis have also increased banks' exposure to risk. No bank in the world has as yet managed to centralize all exposure areas under one risk management system. A number of software vendors have developed risk management programs. Most banks, however, prefer to develop their own computerized risk management systems in house. Products offered by risk management software vendors and systems developed by some of the major international banking institutions are described, including those systems offered by BIS Software, GEISCO (General Electric Information Services Co), IP Sharp, and the STREAM system from SWIFT (Society for Worldwide Interbank Financial Telecommunications).

Mind-Set Is His Business
Datamation v33n4(OEM Edition) PP: 108,110 Feb 15, 1987 CODEN: DTMN

Anthony L. Craig, the new president of the General Electric Information Services Co. (Rockville, Maryland), says that his job is to focus the organization so it maintains a single mind-set that can be carried across cultural and international boundaries. The company, now GE Information Services, has gone from a timesharing company to a telecommunications and network-based service provider that has the world's largest commercially available teleprocessing network. Craig sees the company as moving to a multienterprise, multinational business like electronic data interchange. In addition, the company hopes to become the leader in international treasury management and financial custody services. Craig is faced with the need to maintain his customer base while convincing users that GE Information Services is the network of the future.

New Software Entries Enhance Prospects for Electronic Mail Services
January 1987 5 pp.

Summary
Overview
Market Size and Growth
Driving Forces
Product Characteristics
Competition

TABLES AND FIGURES: Table 1. Electronic Mail Service Providers

The development of enhanced personal computer software combine with a number of other factors could provide the necessary catalys rapid growth in the electronic mail market.

For full text ($100) use Format 9

General Electric Company
3135 Easton Turnpike
Fairfield, CT 06431
Number of Employees: 391,000

Sales:	$37,725,000,000	Total Assets:	$34,591,000,00
Net Worth:	$15,109,000,000	Total Liabilities:	$19,482,000,00

General Electric Communications & Services
570 Lexington Ave
New York, NY 10022

Immediate Parent: General Electric Company - 1983501
Executives:
Top Officer Of Non-Parent
Eugene F Murphy/Sr VP
Corporate Family Hierarchy:
General Electric Company 1983501
---

* General Electric Information Services Co (GEISCO)
401 N Washington St
Rockville, MD 20850
Immediate Parent: General Electric Communications & Services - 1983483
Business: Commercial Teleprocessing Network
Executives:
Top Officer Of Non-Parent
Anthony L Craig/Pres
---

* General Electric Consulting Services Corp
401 N Washington St
Rockville, MD 20850
Telephone: 301-340-4000
Business: Data Processing, Software Consulting Services
Executives:
Top Officer Of Non-Parent
Kevin W Sharer/Pres

TABLE HEADINGS:
Table 1 - GE Financial Services Results 1986-87
Table 2 - Divestitures And Acquisitions
TEXT:

* Aircraft Engine earnings rose 10-20%. Revenue expanded over 20% due to higher shipments of CFM-56, F-110, and F-101 engines. Margins are being depressed by higher R&D investments. Nonetheless, business is extremely good. GE has won about 70% of the available commercial engine bookings during what has been a buying spree by the airlines. This will offset a decline in military engine shipments that starts in 1988 as the B-1B, KC-10, and C-5B

programs wind down. Second sourcing of F-404 engines will begin to impact next year as well. Excluding the Stealth bomber, GE believes its Aircraft Engine business will stabilize at about $6.5 billion in 1987 dollars through 1992. Margins will rise due to cost reductions and higher spare-parts sales. GE is already planning to reduce employment from 42,000 to 36,000 over the next couple of years.

* Materials operating profit expanded over 20% on higher sales. Plastics led the parade with a sales gain of about 20% propelled by increasing plastics use by the automobile makers and favorable foreign currency impact. Ladd Petroleum operated at breakeven versus a loss last year. Ceramics had flat sales and losses.

* Technical Products earnings rose over 20% despite lower revenues. Calma sales fell 0-10%, but losses were reduced. Communications Services margins improved, but divestitures reduced sales. Medical Systems operating profit rose sharply on volume increases. Business was strong across the board, and the consolidation of GE's Japanese joint venture also boosted sales and profit.

* Financial Services posted a 53% earnings gain for the quarter. Employers Reinsurance increased its income by over 50%. GE Credit Corp. benefited from the absence of a $50 million after-tax write-down on its fleet of land-based drilling rigs and other unspecified reserves. Kidder Peabody made a modest contribution to earnings. The numbers are shown in Table 1.

Table 1
GE Financial Services Results
$ in millions

	Third Quarter			Year-to-Date		
	1987	1986	% Gain	1987	1986	% Gain
Total	$164	$107	53.3%	$487	$351	38.7%

Coming and Goings

The past several weeks have been busy for GE in terms of acquisitions and divestitures. Some of the deals are listed in Table 2.

Table 2
Divestitures and Acquisitions

Unit	Revenues	Price
Divestitures		
Carbaloy	$100 million	NA (1)
*Americom — probably Globecom	$100 million	$160 million
Consumer Electronics (80%)	$3.2 billion	NA (1)
Lighting Ballasts	$75 million	NA (1)
Acquisitions		
Thomson Medical Systems (80%)	$780 million	NA
Gelco (Fleet management)	$640 million	$250 million

(1) Not applicable or available.

COMPANY: GENERAL ELECTRIC CO. INDUSTRY CROSS REFERENCE: DEFENS; AEROSP; HSEAPP; MACHNY; ELECTS SUBJECT DESCRIPTORS: *BUSINESS SEGMENT REPORTING; *FINANCIAL INFORMATION; *ORDERS AND CONTRACTS; *SALES/EARNINGS ESTIMATES; *QUARTERLY RESULTS; *DIVESTITURES

Electrical Equipment Quarterly - Industry Report
FIRST BOSTON CORPORATION (THE)
Sankey, M.A., et al
DATE: 870930
INVESTEXT(tm) REPORT NUMBER: 718127, PAGE 87 OF 112
This is a(n) INDUSTRY report.

TABLE HEADINGS:
GE Operating Unit Model 1983-88

TEXT:

GE from E/C

Thursday 1/15/87

ICL and GEISCO Announce Plans to Launch Business Transactions Venture (FTOL) - N03460

SO: Financial Times of London Jan 15, 87 p5 1 page

GE's GEISCO and the UK's largest computer firm, ICL, have announced plans to form a joint venture in the field of electronic interchange of business information. The venture, to be based in the UK, will handle business transaction assignments such as ordering and invoicing by computer. July has been set as the commencement date for the venture, expected to be called International Network Services (INS). INS will be 60% owned by ICL and 40% owned by GEISCO, and will have over 450 customers when launched, many of whom are already existing clients of the parent firms. The partners believe a revenue level of $74.5 million/year could be reached within a few years.

Order # * N03460

Wednesday 2/18/87

GEISCO Expands MARK*NET Product Offerings (GEISCO NR)
SO: General Electric Information Services Co
Newsrelease Feb 12, 87 3 pages

General Electric Information Services Co, the GE unit providing information services over its worldwide teleprocessing network, has unveiled three products for its Value-Added Network Services (MARK*NET) offering. The products include Asynchronous-to-3270 conversion service, which permits asynchronous users to access 3270 applications on their own host from more than 650 MARK*NET access locations; enhanced Asynchronous-to-3270 Protocol Conversion Service via Simware, which supports 3287 print streams; and extended MARK*NET X.25 Service, adding 63 network access points in the US. Concurrent with the VAN product offerings is a revised VAN pricing structure which features volume usage discounts, usage incentives and a cluster billing option.

Order # * P63148

Tuesday 2/24/87

GE Enhances QUIK-GRAM Mail Product (GEISCO NR) -
P63638

SO: GE Information Services Newsrelease
Feb 23, 87 4 pages

GE Information Services has enhanced its QUIK-GRAM paper mail product, a service introduced in 1985 which allows US users of GE's QUIK-COMM EMail system to communicate with anyone having a US postal address. The two enhancements are: a Text Insert message, which allows a user to customize text in frequently-used messages; and a Stored Text function, which enables a user to store, retrieve, and delete frequently-used message texts. Additionally, GEISCO has amended its QUIK-GRAM price schedule to accommodate volume users.

Order # * P63638

Thursday 2/26/87

Master Control Systems Unveils LinkMaster Service (MCS NR)
SO: Master Control Systems Inc Newsrelease Feb 25, 87 2 pages

Chesapeake, VA-based Master Control Systems has introduced its LinkMaster service, a combination of teleservice, software and hardware offerings billed as a new concept in electronic services. LinkMaster comprises: PhoneWare, a resident software program which enables users of LinkMaster to run commercial software on a pay-per-use basis by means of a "key" process; Master Mail/Master Word, which gives electronic mail processing capability to users whether or not they are a member of the service they are sending mail to; Master File Transfer, a data file transfer application; Master Gateways, enabling users to access all online services available; and Master Hardware, an assembly of lease and purchase packages designed to make computing affordable to everyone. LinkMaster is available over the General Electric Information Services Co's MarkNet packet switched network.

Order # * P63849

Wednesday 3/4/87

New Joint Venture Between GEISCO and ICL Will Offer UK-Based Data Services (Telephony) - P64451

SO: Telephony Feb 23, 87 v212 n8 p72

A new joint venture, to be named International Network Services Ltd, will combine the value-added network services of ICL with part of the services of GEISCO Ltd. The new company will provide paperless business communications services, including electronic data interchange, to UK-based national and multinational companies in markets such as retail, insurance, travel and leisure, health, and government.

P64451

Monday 3/9/87

Small British Firms Rebel over Govt's VAN License (Lon Sun T)
SO: London Sunday Times Mar 8, 87 p77

Provision of Value Added Network services (VANs) is one of the major boom areas in British telecommunications, but the tortuous workings of the British government in licensing VAN providers has consistently irritated those providers. Last week, the government issued its second VAN license, which seeks to define what new services may not do, rather than what they may do. The first VAN license was published in 1982, but the government's disallowance of a license for an IBM-British Telecom joint venture (called Jove) threw the process into confusion. The new license, however, is being criticized by small companies on four counts: 1) it doesn't help small companies get into the market; 2) the regulations are too complex; 3) some of the rules are not enforceable; and 4) it does not promote true competition, since larger companies are not prevented from cross-subsidizing their services. Among the big players in the UK VAN market are ICL, IBM, GEISCO, and Midland Bank.

P64978

Friday 3/13/87

Europeans Considering International Virtual Network (Comm Wk)
SO: Communications Week Mar 9, 87 n134 p5 1 page

Twenty-six European PTTs under auspices of the Conference of European Postal and Telecommunications Administrations (CEPT) are trying to jointly provide an international virtual network service: a foundation of private and public-switched transport, packet switching, and some protocol conversion that would form a pipeline on which others would build value-added services. CEPT would form a joint venture that would provide one-stop shopping and one-stop billing for all of a multinational corporation's European data communications and telephone needs. Another option on the system would provide similar one-stop services under a less formal framework. Either way, a multinational would be able literally to go to one source in one country to arrange all of its European telecommunications. If successful, the plan would not only make an important imprint upon European telecommunications but would carve out an entirely new role for CEPT, which, until now, has been a forum for discussion aimed at simplifying and improving telecom interface from country to country. While the plan seems to portend serious competition for IBM, General Electric Information Services, Electronic Data Systems, and others now providing international value-added services, CEPT assures these competitors that its plan is not for a "closed shop." In fact, CEPT officials also tout the opportunities for US and Japan to join in the plan.

Order # * P66032

Monday 3/23/87

GEISCO Establishes Marketing Program for Teleprocessing Services (GEISCO NR) - P66962
SO: GE Information Services Co Newsrelease Mar 17, 87 3 pages

GE Info Services has established a new marketing program under which computer VARs can resell GEISCO's electronic mail, wide area networking, and other network-based teleprocessing services to their customers. Those resellers can become GEISCO VA$Ps (Value Added Service Providers), and thus enhance and complement their existing hardware and software offerings. Applications available to resellers in

the program include: QUIK-COMM; BusinessTalk; Electronic Document Interchange systems (EDI); and financial, sales, and marketing network-based applications.

Order # * P66962

Tuesday 3/24/87

GEISCO and Racal-Guardata Ink Cooperative Marketing Pact for Secure EFT Systems (GE NR) -

SO: General Electric Information Services Co Newsrelease 4 pages

General Electric Information Services Co has signed an agreement with Racal-Guardata, a recently formed Racal subsidiary, to offer EFT users a solution to computer fraud against worldwide financial institutions. Based on GEISCO's Money Transfer System, the new security service offers new capabilities to combat technology-based crime. Standards for use within these security systems covering message identification, key management, etc, are being developed through the American National Standards Institute (ANSI) in the US and through the International Standards Organization (ISO) in Europe. The GE-Racal solution is a two-tier cryptographically-based system using a data encryption algorithm, first through the now widely-accepted ANSI X9.9 Message Authentication System, and second by uniquely integrating Personal Authentication and linking the various components together, using ANSI X3.92, with the Message Authentication.

Order # * P67183

Wednesday 4/1/87

GE Selects VAR Route for Data Network Service Sales (Comm Wk)
SO: Communications Week Mar 30, 87 n137 p54 1 page

General Electric Information Services has decided to market its wide-area networking and network-based teleprocessing services exclusively through value-added resellers, and is actively looking for VARs to expand its sales force. Besides expanding the products and services a VAR can carry, the networking products will help them avoid hefty research and development costs and let them carry products taht ordinarily might be beyond their scope, said GEISCO

Distribution and Development Manager Dennis Crane. The company will call its VARs "Value-Added Service Providers" (VASPs). At present, GEISCO VASPs include Wildata, a unit of a Norwegian shipping company, and Logistix, Denver, CO.

Order # * P68350

Wednesday 4/8/87

Times Mirror Buys Into Electronic Publishing Company (Times Mirror NR)
SO: Times Mirror Corp Newsrelease Apr 6, 87 2 pages

Times Mirror Corp has become part owner of American Database Corp, producer of a series of travel databases for businesses offered on General Electric Information Service Co's GEnie online system. Times Mirror will take over management of the travel services and add a few of its own information services to the GEnie menu.

Order # * P69100

Thursday 6/11/87

British Insurance Brokers Name IBM to Supply Computer Network (FTOL)

SO: Financial Times of London Jun 11, 87 p10 1 page

A consortium of City of London insurance brokers and underwriters named IBM yesterday as its preferred supplier for a computerized data network designed to revolutionize the flow of money among the City's insurance operators. The consortium, which will manage the network, includes Lloyd's of London, Lloyd's Insurance Brokers Committee (LIBC), and the London insurance market's two data processing bureaus, the Institute of London Underwriters (ILU) and the Policy Signing and Accounting Center. IBM won the three-year contract over International Network Services (INS), a joint venture of GEISCO of the US and ICL of the UK. The network is expected to produce annual revenue of between $12 million to $15 million for IBM UK by 1990.

Order # * P76555

Tuesday 6/16/87

General Electric Information Services Adds Linkmaster (GEISCO NR)
SO: General Electric Information Services Co Newsrelease
Jun 16, 87 3 pages

General Electric Information Services Co has added Linkmaster, an online PC software leasing service, to its GEISCO teleprocessing network. Users may dial into the network and transfer the bulk of a software package onto a PC. The process takes about one hour per 300 kilobytes of data. After that, the user's PC logs onto Linkmaster for 15 seconds each time the leased software is run. The central Linkmaster computer activates the software and records user information. The single-use charge is about $0.25 for a $400 software package. The one-time subscriber's fee for Linkmaster is $179.95, with connect charges ranging from $8 to $24/hour, depending on time of day and transmission speed.

Order # * P76927

Wednesday 6/17/87

Newsgrid Now Available on GE Information's GEnie (GEISCO NR) - P77075

SO: General Electric Information Service Co
Newsrelease Jun 16, 87 2 pages

Newsgrid, a realtime, financial news, interactive database is now available on General Electric Information Services' GEnie online computer information network. Newsgrid joins several services already available on GEnie. The service uses 11 of the top hard news sources, including AP, UPI, and Reuters, to provide its readership with continual updates from 5 AM to 11 PM (EDT) during the week, and from 8 AM to 5 PM on weekends. Newsgrid's editors cull the data from those 11 sources, edit and keyword the information, and then transmit the items to GEnie for distribution. GEnie adds to Newsgrid a special feature called "Livewire News Room," a set of eight limited-access files where GEnie users can read, download, or comment about the issues the service presents. Rooms 1-4 are "read only;" Room 1 is for US and world news; Room 2 for business news; Room 3 is the Sports Room; and Room 4 is the Features Room. Rooms 5-8 are for discussions of what is in the news, and includes a monitoring service that transmits important items that

break in any of the first four "rooms." Access to Newsgrid via GEnie is $5/hour as you go. There are no monthly charges on GEnie and the signup fee is $18.

Order # * P77075

Thursday 6/25/87

Email Expected to Grow Rapidly Through 1991 (Cptrwrld)
AU: Donna Raimondi
SO: Computerworld Jun 22, 87 v21 n25 p43 2 pages

A report on electronic messaging from Link Resources Corp in New York predicts that services such as GEISCO Quikcomm, Easylink, MCI Mail, and others will expand 26% per year from $237 million in revenue in 1986 to $758 million in 1991. While the number of messages sent through service bureaus will increase from 210 million in 1986 to 1.6 billion in 1991, the number of subscribers is expected to grow much faster, the report projected. Compliance with CCITT X.400 electronic messaging standards should promote messaging services' connections to both host-based intraoffice systems and international messaging systems, thus contributing to their market expansion. Service bureaus just this year are beginning to implement X.400 strategies.

Order # * P78012

Wednesday 7/1/87

GEISCO, Baxter Travenol Labs Join to Form
EDI Health Care Clearinghouse (GE NR) - P78688

SO: General Electric Information Services Co
Newsrelease Jun 29, 87 4 pages

GEISCO and Baxter Travenol Laboratories Inc, the world's largest manufacturer/distributor of medical/surgical supplies, have formed a marketing arrangement involving Baxter's ASAP Interchange and GEISCO's EDI* EXPRESS System. Under the arrangement, Baxter Travenol will become an EDI*EXPRESS System sales agent for the hospital industry. EDI*EXPRESS was introduced by GEISCO in November, 1985, as an electronic data interchange system conceived as an open system, capable of data transmission supporting a wide

range of business documents in both standard and private formats. The service is available in more than 750 cities worldwide. ASAP Interchange was introduced by Baxter Travenol in August, 1986, as the first electronic invoicing and EFT system designed for the health care industry.

Order # * P78688

Wednesday 7/1/87

GEnie and BIX in the Online Vanguard (Online) -

AU: Mick O'Leary
SO: Online Jul 87 v11 n4 p76

Eight years ago, when online services began to first appear, expectations were that they would eventually be delivering a variety of computer-based services to millions of subscribers. Membership of database services number instead in the hundreds of thousands rather than millions, and instead of a large uniform body of consumers, membership comprises mostly distinct consumer groups. The largest of these groups consists of PC enthusiasts, because they have the equipment and expertise needed to go online. The attractiveness of the microcomputer users' market has not been ignored by information companies. GEnie, introduced in the Fall of 1985, is a CompuServe clone and runs over the telecommunications network maintained by GEISCO, the General Electric Information Services Company. It provides another use for GE's network and more importantly, gives the company a foothold in the electronic information business. BIX is an electronic version of Byte magazine. More than being just a full text database, BIX serves as an electronic complement to the leading microcomputer journal. It offers "downloadable" programs in a software library and provides the program code that accompanies articles published in Byte.

P78369

Monday 7/27/87

GEISCO Offers Quik-Comm to DISOSS, PROFS Dial Up Connection (GEISCO NR) - P81213

SO: General Electric Information Services Co
Newsrelease Jul 21, 87 6 pages

GEISCO is offering users of IBM's Distributed Office Support System (DISOSS) and Professional Office System (PROFS) an interface to its own Quik-Comm electronic mail system. DISOSS Connector conversion software is placed on an IBM client's MVS host computer. Using the GE DSXMIT High Speed Service compatible package and DISOSS Connector, the client's MVS can gain direct access to the Quik-Comm system for message exchanges. The Quik-Comm to PROFS interface is installed similarly, with the software package placed on a client's host and accessed by menu. Prices for Quik-Comm to PROFS service are the same as standard offline pricing of Quik-Comm: $0.35 for a 1-300 letter note; $0.70 for a 301-1,500 letter memo; and $1 for the first page of a 1,500+ letter document, with $0.80 for each additional page. Rates for Quik-Comm to DISOSS are the same. Licensing fees for either Quik-Comm to PROFS or to DISOSS cost $10,000 per copy, and $1,000 for a maintenance fee in subsequent years.

Order # * P81213

Thursday 7/30/87

Telenet Staking Claim to EDI Market (Cptrwrld) -
AU: Elisabeth Horwitt
SO: Computerworld Jul 27, 87 v21 n30 p13 1 page

Telenet Communications has entered the electronic data interchange (EDI) services market through an agreement with Sterling Software Inc to resell that company's Ordernet EDI services. Telenet reportedly has the largest packet switching network in the US. Ordernet finished third last year in EDI service revenue, behind McDonnell Douglas and General Electric Information Services Co (GEISCO). While Telenet will resell the Ordernet software and services, Ordernet will include Telenet as part of its marketing plan for new users. Bergen Brunswig, which currently uses Ordernet to process and electronically distribute 70% of its purchase orders, is interested in the integration of the EDI service with Telemail, Telenet's electronic

messaging service. Telenet is counting on Bergen Brunswig's response to the service to be typical of the market at large, which market research company Input sets at $1.4 billion by 1991. The Telenet EDI service will be available by the fourth quarter.

Order # * P81824

Thursday 7/30/87

1986 ANNUAL REPORT -- Dow Jones - P81454

SO: Dow Jones & Co 1986 Annual Report
Feb 27, 87 56 pages

THE COMPANY

Dow Jones and Company is a leading publisher of business news and textbooks. Its electronic publishing arm, Information Services, delivers a wide array of business, financial, and economic news over newswires, radio and television and computerized retrieval services. Its operations include: 1) Dow Jones Communications and Field Service division; 2) DowPhone; 3) Telerate Inc; and 4) Dow Jones News/Retrieval.

FINANCIAL HIGHLIGHTS (Consolidated)

$000s except/share

FY Ended Decr 31,	1986	1985	% Change
Revenues	1,134,867	1,040,918	9.0
Net income	183,362	138,608	32.3
Net income/share	1.89	1.43	32.2

LETTER TO THE SHAREHOLDERS

Dow Jones was ranked number one in quality of products and services for the fourth consecutive year in Fortune magazine's survey of corporate reputation. Last year, agreements were made to increase its ownership in Telerate Inc by 13%. The Dow Jones News Service, commonly called the Broadtape, registered its most impressive year ever. Operating against the

backdrop of a stock market that experienced huge surges and falls, the Broadtape kept subscribers up-to-date and forewarned of impending developments. While continuing to make significant gains in the investment community and in the private sector, News/Retrieval achieved the greatest success in the corporate market, where it is mirroring the evolution of the Broadtape and becoming viewed as an essential business tool. News/Retrieval is now provided directly to major companies such as Boeing, JC Penny, and Procter & Gamble, as well as to subscribers of WangPac, GE's GEISCO network, British Dialcom electronic mail system, MCI Mail, and Westlaw, the online legal research service. DowPhone, the company's three-year-old audiotex information service, also began supplying news reports to customers of Charles Schwab & Co, the nation's largest discount brokerage firm.

Order # * P81454

Tuesday 8/4/87

GE Information Services Inks Marketing Agreement with ISI-Dentsu (GEISCO NR) - P82304

SO: General Electric Information Services Co
Newsrelease Jul 27, 87 2 pages

General Electric Information Services Co (GEISCO) has signed an agreement giving ISI-Dentsu distribution rights for its s network-based teleprocessing services to Japanese companies operating in the US. A distributor of GEISCO teleprocessing services in Japan since 1971, ISI-Dentsu has formed ISI-Dentsu of America for the sole purpose of bringing those same services to American offices of Japanese firms, starting July 1, 1987. ISI-Dentsu is a long-time supplier of software packages for manngement systems of overseas branch offices of Japanese banks. In 1985, it began selling GE's Global Banking System to Japanese banks. The American unit will offer GEISCO teleprocessing services to over 150 Japanese concerns in the US.

Order # * P82304

Tuesday 8/11/87

GEISCO Gives Up on Developing Kanji Characters,
Taps ISI-Dentsu (Comm Wk) - P83073
SO: Communications Week Aug 10, 87 n156 p38

General Electric Information Services has admitted defeat in trying to learn the Japanese Kanji character set and has turned to a Japanese company, ISI-Dentsu, Tokyo, to market GEISCO's value added network services to Japanese companies operating in the US. ISI recently set up an American subsidiary called ISI-Dentsu of America, based at GEISCO's Rockville, MD headquarters. Other offices are in New York and Los Angeles. Operations began in July.

P83073

Friday 8/14/87

System Simplifies International Trading (MIS Wk) -
SO: MIS Week Jul 13, 87 v8 n28 p8 1 page

In response to the needs of the international securities trading market for a failsafe system to record and track post-trade details, Fitel Ltd of the UK has developed the Equinet system, which uses the GEISCO network to connect client's personal computers with a London-based Tandem NonStop computer to continuously update trading information. Equinet is used by brokers, custodian banks, and investors in major trading centers in Europe and the US; customers include Brown Brothers Harriman of Boston, First National Bank of Chicago, Salomon Brothers, and Shearson Lehman Brothers. Later this year, Fitel expects to make available two new systems: Xnet, for use in the non-bank foreign exchange market, and Equiloan, an inter-dealer loan system for multiple currencies and foreign securities.

Order # * P83211

Thursday 8/20/87

GEISCO Shops for X.400 Email Software (Comm Wk) -

SO: Communications Week Aug 17, 87 n157 p6

General Electric Information Services is shopping for X.400 software for its Quik-Comm electronic messaging service, with a target purchase date of October. GE is looking for a package that can offer Message Transfer Agent (MTA) capability, as defined by the CCITT's X.400 standard. MTA acts as the "post office" of the message handling system, in charge of routing, switching, and transferring electronic messages. The vendors GE is currently evaluating are Sydney Development Corp, DaNet of West Germany, France's Marben, and England's Logica. GE is trying to avoid the cost of developing its own X.400 software, a pricetag estimated at $300 million.

P83661

Friday 8/21/87

Fidelity Tests Global Messaging; Equinet System Simplifies Transactions (Net World) - P84101

AU: Jim Brown
SO: Network World Aug 10, 87 v4 n32 p11 2 pages

Fidelity Investments and some of its investment partners are beta testing Financial Telecommunications Inc's Equinet, which links brokers, investors, and financial institutions to a central computer in London over General Electric Information Services Co's Mark III network. Fitel officials claim four out of ten international bond and equity transactions go awry because of disagreements over information on transaction orders. According to George Sullivan, Fidelity's VP-Mutual Funds Operations, some of Fidelity's international transactions have been in limbo for as long as 14 months because of such disagreements. Currently, Fidelity has a staff of 11 people who process $75 billion in domestic trading transactions each year. But the company needs a staff nearly as large, eight people, to process only $7 billion in yearly international trading, noted Sullivan. Equinet is designed to supplant the current practice of exchanging hard copies of transaction orders over telex. With Equinet, a broker enters completed orders

on an IBM PC-AT using Fitel proprietary messaging formats, which move the messages over the GEISCO network to the service's Non-Stop II host system made by Tandem Computer. Once a file is received, the Tandem system sorts it and readies output files destined for other brokers, investors, or financial institutions. Fitel charges between $25 and $30 per transaction to provide Equinet service.

Order # * P84101

Wednesday 8/26/87

SEC's Edgar to Be Enhanced (Forbes) - P84271

AU: Gary Slutsker
AU: Janet Novack
SO: Forbes Aug 24, 87 v140 n4 p94

Plagued with the shortcomings of its EDGAR (Electronic Data Gathering, Analysis & Retrieval) system, the Securities & Exchange Commission has given the project a new director and re-opened bidding for the final Edgar contract, worth an estimated $35 million. Likely bidders are Arthur Anderson, GE Information Services, and Bechtel. Edgar was conceived in 1983 to bring the SEC into the computer age, with the ability to receive financial reports electronically from public companies and disseminate them to investors. Edgar would also work as an electronic cop, scanning documents for irregularities. However, the SEC plan to get Edgar's contractors to pay for computers and to cover the cost by wholesaling the SEC data to information disseminators was vetoed by the General Accounting Office. Inadequate financing was aggravated by technical shortcomings: Edgar was unable to automatically scan documents for anything other than keywords. With a leader who has realistic expectations about Edgar, the SEC may finally get an efficient system.

P84271

Thursday 8/27/87

Scaling the Heights of the PTTs (Tlcom Prod & Tech) - P84524
SO: Telecommunications Products and Technology
Apr 87 v5 n7 p18 6 pages

With the exception of the UK, European telecommunications networks are government-controlled, and there is not a

competitive environment for the usual range of related business products and services, such as common carrier systems, value-added networks, electronic mail, and videotex, although most PTTs are beginning to relinquish their monopoly position on terminals and modems. The increasingly sophisticated communications requirements of large-volume national and multinational users and the availability of alternative carrier networking are also posing challenges. The largest companies have moved to circumvent monopolistic licensing arrangements and high rates by using such applications systems vendors as GEISCO, setting up private networks, or moving their telecommunications units to deregulated environments, such as in Britain. In response, countries such as France and the Netherlands are taking preliminary steps toward privatization, and even West Germany's Deutsche Bundespost, the most rigid of the networks, is under review. Interconnectibility and standards are expected to become major issues in the future.

Order # * P84524

Friday 8/28/87

GEISCO, ACS Network Systems Sign Marketing Agreement (GEISCO NR)

SO: GEISCO Newsrelease Aug 24, 87 4 pages

General Electric Information Services Co (GEISCO) has signed an agreement with ACS Network Systems, which develops Electronic Data Interchange (EDI) software for IBM System/36 and System/38 minicomputers. Under the pact, GEISCO will market for ACS and support ACS' EDI/36 and EDI/38 communications and translation software as a front end to GE's EDI*Express System third party EDI network service. According to Allan G. Boynton, Manager of Retail Programs EDI for GEISCO, the agreement with ACS will allow GEISCO to offer a complete EDI solution to the base of potential clients with System/36 or System/38 environments.

Order # * P84937

Tuesday 9/8/87

GE Information Services Selects Supply Tech as
EDI*Express System Sales Rep for Automotive Industry (GEISCO NR)

SO: General Electric Information Services
Co Newsrelease Aug 31, 87 3 pages

General Electric Information Services Co has selected Supply Tech Inc of Southfield, MI, as an EDI*Express System sales representative for the automotive industry. Supply Tech will market, install, and support the enhanced electronic mail service, which provides electronic exchange of data for standard business documents, such as invoices, purchase orders, material releases, shipping notices, and other documents between trading partners through host computer systems or personal computers.

Order # * P85954

FRIDAY 9/25/87

Coors Links PCs to Monitor the Flow of Beer (InfoWorld) - P87968
AU: Mark Stephens
SO: InfoWorld Aug 24, 87 v9 Issues 34-35 p12 1 page

Since 1984, the managers at the Adolf A. Coors brewery in Golden, Colorado, have turned increasingly to PC networks to meet the information management needs of all aspects of the business. The Coors network uses a fiber-optic Ethernet backbone with links to IBM, DEC, and HP mainframes used for manufacturing, distribution, sales, and finance, as well as a GEISCO dial-up network for outside distributors. There is also a satellite connection to the new brewery under construction in Elkton, Virginia. Seventy-five percent of the 400 or so PCs at Coors are connected to a network or mainframe, and software is standardized. By 1990 Coors expects to have a fully integrated network, with advanced workstations for both the company and its distributors.

Order # * P87968

Wednesday 9/30/87

European Companies to Create Paperless TradingSystem (FTOL) - P88339
AU: Terry Dodsworth
SO: Financial Times of London Sep 30, 87 p28 1 page

Europe's largest chemical companies are trying their hand at setting up a computerized order system to replace conventional, paper-based ordering and invoicing. Shell Oil, Exxon, Imperial Chemical Industries, Montedison, Akzo, and CIBA-Geigy are backing adoption of electronic data interchange (EDI) technology supplied by General Electric Information Services Co (GEISCO). GE European affiliate International Network Services has already set up a pan-European EDI service for the shipping industry.

Order # * P88339

Friday 10/2/87

Survey: EDI Use to Double Yearly (Comm Wk) -P88610
AU: David Meyer
SO: Communications Week Sep 28, 87 n163 p20 2 pages

A survey of corporate users sponsored by 12 banks shows that electronic transactions undertaken by corporations will double in volume each year for the next three years. The banks are examining how their large corporate customers use electronic data interchange, or EDI, to conduct paperless billing, shipping, payment, and remittance transactions. Results indicated that corporations expect banks to handle electronic transactions. Respondents said their demand for EDI evolved from nonfinancial transactions with trading partners involving purchase orders and waybills; the highest volume of EDI transactions was reported by the railroad, automotive, and pharmaceutical industries. One surprising result was the intensity of transactions with industrial customers rather than suppliers. Corporations see EDI as a means of broadening and locking in their customer base. The study also showed that the three leading providers of value-added EDI services accounted for 60% of the market: General Electric Information Services Co (GEISCO); McDonnell Douglas EDI Systems Co; and the OrderNet Service Division of Sterling Software, Columbus, OH. Respondents cited software as the largest single cost of EDI operations.

Order # * P88610

Wednesday 10/28/87

FTOL Survey: Value-Added Data Networks -- Even More Messages in Store (FTOL) - P91470
AU: Terry Dodsworth
SO: Financial Times of London Survey on World Telecommunications Oct 19, 87 p32 1 page

Value-added networks (VANs), defined for regulatory purposes as services which use the telephone network to manipulate information, lie at the meeting point of telephone systems and data processing. VANs meet the need for real-time information in developing a mass market for the airline and tourist trades, as well as the demand for interchange of information within and among corporations and financial institutions. With the proliferation of personal computers, it has also become cheaper and more efficient to send messages over a data network, and corporate messaging systems and electronic mail services are among the fastest-growing VAN applications. Value-added services are also supported by governments which believe that they help make corporations more competitive. Two of the major players in the UK are US-based: IBM and the General Electric subsidiary Geisco, which has formed a joint venture with the British ICL computer group to offer diverse industrial services, including Tradanet, Motornet, and Brokernet, for the retailing, automotive, and insurance industries, respectively.

Order # * P91470

Friday 10/30/87

The User's Objectives: The Right to Choose (Intermedia) - P91760

AU: George McKendrick
AF: International Telecommunications Users Group
SO: InterMedia Jul/Sep 87 v15 n4/5 p28 3 pages

Although monopoly PTTs defend the benefits of limiting customer choice in telecomunications equipment and services, this stance has become increasingly unacceptable to users who would prefer to make their selections from competing suppliers of customer premises equipment, basic or value-added networks, and transmission services. By artificially limiting the range of choices, a PTT is depriving its customers of access to innovative products, and multinational companies are compelled to use less-than-optimal networking facilities because of equipment and service

incompatibilities. More and more often, business users are turning to competitive private data networks, such as Geisco, Tymnet, and Telenet, to obtain cost-effective, reliable, standardized service within and across national boundaries. The inutility of government intervention in the public telecommunications equipment area is recognized by the Council of Europe, which has indicated its commitment to promoting efficient public telecommunications networks by ending such practices within its sphere of influence.

Order # * P91760

Thursday 11/19/87

NORA Database of FCC Documents Available via GE Information Services Teleprocessing Network (GEISCO NR)

SO: General Electric Information Services Co
Newsrelease Nov 12, 87 3 pages

GE Information Services' worldwide teleprocessing network now allows users to connect to National Online Regulatory Access (NORA), a database of FCC documents. A product of Data Development, based in Stuart, FL and Alexandria, VA, NORA provides the full text of many documents cycled through the Common Carrier Bureau of the FCC. Users can access NORA in more than 650 cities in the US with an IBM or compatible personal computer.

Order # * P93564

Monday 11/23/87

GE Information Services Offers QUIK-COMM Email for All-in-1 VAXes (GEISCO NR) - P94003

SO: General Electric Information Services Co Newsrelease Nov 17, 87 2 pages

General Electric Information Services Co has come up with a QUIK-COMM to All-in-1 interface that allows users of Digital Equipment Corp VAXes running on that proprietary software to gain entry into the GEISCO electronic mail network. QUIK-COMM to All-in-1 allows a company to maintain its normal software environment and send messages to recipients on IBM PCs, TTY-type terminals, telex, PROFS,

DISOSS, or All-in-1. Prices for QUIK-COMM to All-in-1 are $0.35 for a Note (1-300 words), $0.70 for a Memo (301-1500), and $1 for page one of a Document (1501-3000), with $0.80 for each additional page. The license price for All-in-1 connector package is $5,000 per copy and $750 for a maintenance fee in subsequent years.

Order # * P94003

Tuesday 11/18/86
General Electric Outlines Plans for GEISCO

The corporate reorganization taking place as a result of General Electric's $6.3 billion takeover of RCA will signal some changes in GE's teleprocessing and electronic networking services arm -- General Electric Information Services Co (GEISCO). The Rockville, MD-based division has gotten a new president in 17-year IBM veteran Anthony L. Craig, who joined GE in 1983. Most recently Craig served as a GEISCO Senior VP with responsibility for non-US activities. Other changes in store for GEISCO include reallocation of some people and resources into field organizations. GEISCO is now one of nine GE/RCA units in the GE Communications and Services Organization headed by GE Senior VP Eugene F. Murphy. Murphy was formerly an Executive VP with RCA. Two other GE subsidiaries which formerly reported to GEISCO, Software International Corp and General Electric Consulting Services Corp, will now report to Murphy. # M71498

Tuesday 10/21/86
RCA and GE Unveil Merged Corporate Structure

Following a six-month integration effort, an RCA spokesman revealed the corporate structure of the newly-merged service and communication businesses of GE and RCA, which went into effect Sep 1. The two main divisions are the Communications and Services Division, which includes both companies' communications operations, and the Consumer Service Division. The first division is headed by GE Senior VP Eugene F. Murphy, and encompasses the Business Communications and Electronics Services subdivision. Headed by VP and Genl Mgr Alan W. Crites, the subdivision includes GE Information Services Co (GEISCO) and RCA Service Co's Business Services and Systems unit. Also in the Communications division are seven organizations, including RCA Americom and Software International Corp. Another wing of the division is RCA's Government Service unit, led by division VP and General Manager Michael F. Camardo. The Consumer Service Division includes RCA Service Co's Telephone Systems and GE's Major Appliance Parts and Service units. # * L8326

Wednesday 9/24/86
General Electric Creates New Information and Communications Unit (WSJ)

General Electric Corp has created a new information and communications unit, combining businesses from GE and RCA. The new unit will include RCA's satellite, overseas telex, and communications maintenance businesses, along with GE's mobile communications and computerized network services operations. GE acquired RCA earlier this year. The new unit will be headed by Eugene F. Murphy, 50, and will comprise: General Electric Information Services Company (GEISCO), RCA Americom, RCA Globcom, Software International Corp, and GE Consulting Services Inc, as well as others. According to Murphy, GE hopes to discover many synergistic relationships between the companies in the new unit. As an example, he said relationships with foreign governments already established by RCA Globcom, a common carrier with satellite and cable transmission facilities, should aid GEISCO in establishing new network services for multinational companies. # L4841

LBOs ARE TAKING THEIR LUMPS

Leveraged buyout companies are now facing pinched cash flows, reduced prices for assets, and a suddenly cautious junk bond buyer. Were their critics right after all? ■ *by Carol J. Loomis*

IN THE LAND of leveraged buyouts, Black Monday brought down the curtain on Act 1 (light drama, with touches of comedy) and raised it on Act 2 (heavy, heavy). An audience generally skeptical of LBOs is waiting for the denouement. The critics have long complained that these deals serve little economic purpose beyond enriching management, underwriters, and lenders, and that the companies have become so prodigiously leveraged with debt that they could not withstand a financial storm. The principals of the LBOs have responded by chanting their mantra, "Cash flow, cash flow," and flashing deal-generated profits as prodigious as the debt. But it's crunch time now.

The stock market crash, in its countless reverberations, threatens the cash flow of the LBOs. Should the crash be a harbinger of a recession or a slowdown in economic growth, the operating profits that the LBOs need to pay interest on their debt would be cut. More immediately, the crash has impaired the ability of LBOs to sell off divisions and raise the large hunks of money typically required for debt repayments. What the investment banking trade calls "exit strategies"—the routes that the sponsors of LBOs use to cash out their investments—are also a problem. One exit is a public offering, of which not too many are likely to be made soon. Another is a refinancing that might require the company to issue junk bonds.

Alas, since the third Monday in October, fears of a recession and doubts about the creditworthiness of many leveraged companies have sent the junk bond market into a state of shock (see previous story). In mid-November, one concern that was trying to complete an LBO, Southland Corp., owner of the 7-Eleven chain of convenience stores, had to scuttle its plan to issue $1.5 billion in junk bonds. The bonds could not be sold, even at rates of 18%.

Southland is worth examining closely, for it illustrates the intricate dangers of trying to pull off an LBO at this particular moment. As in most LBOs, Southland was trying to go

Buyers refused *his junk bonds and now Jere W. Thompson, Southland's CEO, must find another way to complete his buyout of the company.*

COMPANY	TYPE OF DEAL	DATE BEGUN	PRICE (millions)	CURRENT CAPITALIZATION* Debt (millions)	Equity	STATUS REPORT
Beatrice	LBO by Kohlberg Kravis Roberts	4/86	$6,200	$3,900	−$126	A rousing success. But the crash could knock down the price of the company's domestic food business, now up for sale.
Safeway	LBO by Kohlberg Kravis Roberts	8/86	$4,900	$3,600	−$18	Plans that the company had to go public soon may now gather some dust. Capital spending has been cut severely.
Southland	LBO by Thompson family	7/87	$4,900	$4,700**	$213**	The company could not sell junk bonds to complete its deal. The next step is uncertain.
Borg-Warner	LBO by Merrill Lynch Capital Partners	4/87	$4,400	$3,700	$194	The company's bonds slipped recently as investors brooded about a $2-billion debt repayment due in 1988.
Owens-Illinois	LBO by Kohlberg Kravis Roberts	2/87	$3,700	$4,400	$180	The company is trying to pile leverage on leverage by buying Brockway, but antitrust approval is needed.
R.H. Macy	LBO by management	7/86	$3,700	$2,800	$264	A sluggish economy tends to hit retailers hard. The company is holding down hiring and battening the hatches.
Jim Walter	LBO by Kohlberg Kravis Roberts	8/87	$3,400	$3,300**	$150**	A pending deal, for which Drexel Burnham is urgently peddling junk bonds. The prognosis is unclear.
Burlington Industries	LBO by Morgan Stanley	5/87	$2,800	$2,900**	$125**	Around $900 million in assets must be sold. The first plant to go was offloaded to a pleased competitor.
Harcourt Brace Jovanovich	Leveraged recapitalization	5/87	$2,600	$2,900**	−$1,160**	The company paid a big price to do its deal, but is banking on a strong cash flow from operations and major cost cutting.
Holiday	Leveraged recapitalization	4/87	$2,600	$2,800	−$777	A program of selling real estate assets is about 80% complete, but getting rid of the rest may be slow going.
Lear Siegler	LBO by Forstmann Little	12/86	$2,100	$725	$200	A rarity: a deal that didn't use junk bonds. After $1.2 billion in asset sales, the company is largely down to "keepers."
Supermarkets General	LBO by Merrill Lynch Capital Partners	4/87	$2,000	$1,900**	$199**	Traditionally a well-run market leader, it needs to cut capital spending as an LBO and is taking the risk of doing so.

*Latest figures published. **Pro forma figures.

An Equity-Light, Debt-Laden Dozen Deals

Some LBOs have paid off a portion of their debt, as this table of megadeals from the last two years shows. Beatrice and Lear Siegler were among those able to sell assets before the market went sour and thus pare their debt. More recent buyouts are still loaded up. Four of these companies actually have negative net worth. The leveraged recaps that Harcourt and Holiday went through had the effect of obliterating their equity and then some.

private using a mountain of borrowed money to buy out the public shareholders. In such ventures, management and LBO sponsors—a Kohlberg Kravis Roberts, say—normally contribute a sliver of equity capital, enough to make up about 10% of total capitalization. The rest comes from bank loans and subordinated debt. Meanwhile, a vast collection of midwives, including investment bankers, commercial bankers, lawyers, and sometimes the sponsors themselves, collect enormous fees for aiding this exotic birth.

It ordinarily takes two steps to get an LBO out of the womb. In the first, the sponsors make a tender offer for perhaps 70% of the company's outstanding stock. At Southland, a tender for two-thirds of the company took place last July at $77 a share, a 40% premium over the $55 the shares were trading at before the buyout was announced. Making the tender and sponsoring the buyout was a shell company called JT Acquisition, formed by the Thompson family, whose sire (Joe) founded Southland. JT Acquisition financed the tender with $2 billion borrowed from a group of banks and a $600-million "bridge loan" from investment bankers Goldman Sachs and Salomon Brothers.

JT ACQUISITION then revved up for the next step that included securing permanent financing, buying the remaining Southland shares, and merging JT Acquisition with Southland. In this part of the deal, the shareholders still holding the common were to get about $61 in cash plus preferred shares in the new, private Southland. In other words, the old shareholders were to supply some equity capital to help buy themselves out. The company expected to issue $1.5 billion in junk bonds to pay the $61 a share and to pay off the bridge loan.

As a private company, Southland's capitalization was supposed to be about $4.9 billion. Interest charges were expected to run to $530 million in 1988, causing Southland a $225-million loss for the year. Sounds grim, but that's ordinary stuff for LBOs. Unfortunately, the Thompsons were trying to sell the junk bonds just as the stock market went through the most *extra*ordinary decline ever. Prospective junk buyers withdrew in alarm, suddenly apprehensive about every aspect of the deal, including Southland's ability to meet its interest payments and to sell about $1.1 billion in assets to help out cash flow.

In the end, there was no acquisition of the remaining shares and, for now at least, no merger. The banks and the two investmen

REPORTER ASSOCIATE *Terence P. Paré*

bankers are sitting with $2.6 billion in loans made to JT Acquisition, which now owns 70% of Southland but does not as yet have control of the company's assets and earning power with which to service its debt. The Southland saga is not over and the players are making urgent efforts to see that the show goes on. But critics of LBOs and of the huge fees they generate for Wall Street are chortling to see Goldman and Salomon trapped in their $600 million bridge loan. Caught with them are a few of their institutional customers on whom the two firms had laid off part of the risk. Around Salomon, these folk are known as "the bridge club." The hand they are holding now is none too good.

Southland's troubles and those of some other recent deals stem partly from the bull market that prevailed earlier this year. Sponsors were tendering for shares at premiums to stock prices that were already astronomical. The $77 that the Thompson family offered for Southland stock last summer was nearly 20 times 1986 earnings, a steep multiple for a company that had not been showing a lot of growth. In April, Supermarkets General, owner of the Pathmark chain, went private by paying stockholders 29 times earnings; Burlington Industries, the textile company, topped that in May with a price that was 39 times earnings.

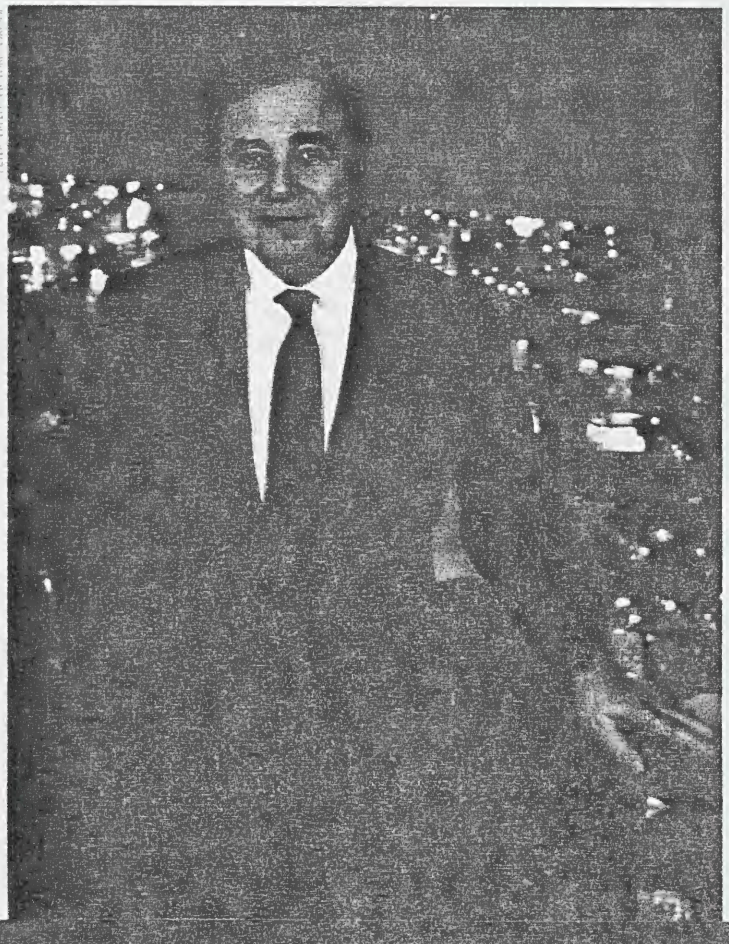
LBO sponsors still thought the deals worth doing because they believed enough cash could be squeezed out of operations and sales of assets to service the debt. Nonetheless, prices got so high this year that even some of the principals cried folly. One absurd series of events occurred at Jim Walter, the Florida housing and construction company. Kohlberg Kravis Roberts, the biggest LBO sponsor, and Paine Webber, a relative newcomer to the game, went at each other in a bidding war to take Jim Walter private.

WHEN Paine Webber pushed its bid up to $69 a share, or 16 times earnings, Jim Walter's management publicly protested that the price would saddle the company with more debt than it could handle. Jim Walter's board agreed and accepted KKR's lower bid of $60 in August. The sight of directors rejecting a higher offer for a lower one must have thrilled shareholders. But as it happens, the buyout may not be completed anyway. KKR was selling junk bonds to finance the purchase when the stock market crashed and the high-yield buyers backed off. Like the Southland deal, this one is also in jeopardy.

No big LBO completely escaped the effects of Black Monday—not even Beatrice, a highly successful buyout and at $6.2 billion the biggest of the bunch (see table). Donal Kelly, the deal magician who is Beatrice' chairman, hawked most of its assets month ago when stock and deal prices were still le itating, and has so far negotiated sales about $6 billion. He has yet to sell the crow jewel, the U.S. food business, includin Hunt-Wesson, Tropicana, and Swift-Ekric Only a few months ago there was speculatio that Kelly could peddle these goods for a much as $4 billion, a feat that would raise t tal profits on the Beatrice deal to roughl that amount. But today, such logical buyer as Ralston, Heinz, and Pillsbury are sellin 25% to 35% below their 1987 highs. Havin been marked down themselves, they wi surely shave any bids they make for othe operations. No telling now how many rock the crown jewel will bring.

Whatever Kelly garners from the sale wi be dessert, but many other LBOs are still tr ing their teeth on the first course. Burlingto Industries went private this year, in an LB sponsored by the Morgan Stanley inves ment banking firm, to escape raider Ashe Edelman and Dominion Textile of Montreal, Burlington competitor. A large part of Bu lington's $2.9 billion in debt comes du swiftly: $650 million by next June, anothe $250 million a year later. Morgan Stanle proposes to meet those commitments b

Finkelstein of Macy *is hoping his LBO escapes shoppers' slump.*



Jovanovich of Harcourt *is thinking debt service, not charity.*

selling $900 million in Burlington assets.

But this deal closed officially only in early October, and the financial world began to question whether Burlington and Morgan Stanley could find buyers. An answer came in early November, when the company announced that its most modern denim plant would be sold for $205 million. The buyer? None other than that Witch of the North, Dominion Textile. Neither Morgan Stanley nor Burlington relished dealing with this enemy. But Morgan Stanley liked the price and, besides, thought that Burlington's bondholders would welcome proof that an asset sale was still possible.

ANOTHER high-wire act is Borg-Warner, a deal engineered by Merrill Lynch Capital Partners last spring. Borg-Warner has $3.7 billion in debt, of which $2 billion comes due in 1988. The company has talked at times of refinancing its huge chemical division. But such a scheme would require a healthier junk bond market than now exists. In the weeks after Black Monday, that $2 billion appeared to be weighing on the minds of bond investors and Borg-Warner's 12.75% junk bonds slid from around 93 to 84.

At some price, Borg-Warner, Burlington, and other LBOs will unload assets. Their creditors will see to that. But they will also have to look to operating earnings to make up for any cash shortfall from the sale of assets. That means the companies will be bearing down with new ferocity on cost-cutting programs they already have in place.

STEVEN RUBIN—THE IMAGE BANK

KKR's Henry Kravis *has one buyout deal he's not grinning about—Jim Walter.*

Harcourt Brace Jovanovich, the publisher that wiped out its equity in a leveraged recapitalization to evade British publisher Robert Maxwell this year, is preparing to make the ultimate sacrifice. Chairman William Jovanovich has decided to sell the company's airplanes. *Grant's Interest Rate Observer* reported that one of its readers asked a rude question at a recent analysts' meeting: "If you need the planes, why are you selling them? If you don't need them, why did you buy them?" Harcourt's answer was not totally to the point. But an adviser to the company says that in the midst of cost cutting, it is necessary for management to show that it too is tightening its belt. Among the belts getting attention are philanthropic contributions: Harcourt is canceling them all at least through 1988.

The belt brigade is also at work at R.H. Macy, a 1986 LBO. Says a manager in Macy's New York headquarters: "We had been running especially lean around here since we went private. But the minute the stock market did what it did, things really went on hold. Budgets are looking supertight. The message is, 'Use your pencils down to the nub.' There used to be rumors here about the company going public pretty soon. I guess we've heard the end of that for a while."

And that's the way it is at one of the more flourishing LBOs. Macy's has just concluded what its chairman, Edward S. Finkelstein, calls "a very good year." Definition? After interest charges of $500 million on $3 billion in debt, the company lost only $14 million, instead of the $63 million it forecast when the buyout was done. In LBO land, such are the yardsticks used to measure progress.

Capital spending would be falling under the ax in today's post-crash environment had not the typical LBO, as a first order of business, already shredded expenditures in order to beef up cash flow. Usually the shredding has been accompanied by explanations that the munificent spending of the past will carry the company through the future. Sponsors of LBOs tend to define the future as the number of years it will take them to exit this deal, at which point other poor souls will have to worry about making capital improvements.

MICHAEL L. ABRAMSON—WOODFIN CAMP

Beatrice's Don Kelly *still has his crown jewel to sell.*

In the nine months ended in August, Safeway, a 1986 LBO, spent $160 million on new stores and capital improvements, less than half the amount it spent in the same period last year as a public company. Supermarkets General, whose stores have always been exceptionally well run, spent $160 million in fiscal 1986 and expected to spend $285 million in 1991. Merrill Lynch Capital Partners, which took the company private this year and now controls it, has cut the forecast for 1991 to $165 million. It remains to be seen what happens to a business that must invest heavily in new stores and modernization, or run the risk of losing out to competitors who are spending freely.

LBO sponsors are now more likely to be around long enough to discover how their strategies turn out. Many of the exits are boarded up for the moment. Robert Mancuso, 40, one of the seven Merrill Lynchers who sit on the Supermarkets General board, believes the world has changed radically. He recalls fondly how Merrill Lynch took Denny's, the restaurant chain, private and then sold it off within a space of two years. But, says Mancuso: "The words 'long term' have been redefined as a result of October 19. The long term may be five to seven years now instead of two." Traditional thinkers who cling to the notion that long term might even exceed seven years will not find in that statement much evidence of radical change. F

REUTERS AFTER THE CRASH: SLOWING DOWN TO A GALLOP

Its growth may slacken, but plans to be a global supermarket for financial services are intact

CEO RENFREW: "WE'VE SEEN NO VISIBLE EFFECT ON SALES AND ORDERS SO FAR"

JOHN COLE

The day was already looking gloomy as reporters and editors began straggling into the Reuters financial desk in New York on the morning of Oct. 19. The Tokyo bureau was reporting share prices plunging in response to worries over the dollar and the Dow's sharp drop the Friday before. London was coming in with more of the same.

Then, as the New York Stock Exchange opened and U.S. stocks started to go into a nosedive, phones began ringing off the hook. As befits an organization that has unflappably followed wars, assassinations, and financial crises for more than a century, Reuters journalists coolly churned out a record flow of news stories as the events of Black Monday unfolded. Recalls one veteran reporter: "There was a sense of excitement rather than one of panic."

What was a tough day's work for the journalists, however, was just the beginning of the challenge for their employer. Until Oct. 19 few companies had benefited more from the boom in global finance than Reuters. Feeding on the markets' insatiable need to know, it rocketed to prominence as the world's top provider of financial news and data, with profits growing more than 40% a year (charts).

These days, though, Reuters is facing a sobering new reality. With Wall Street, the City of London, and even the wealthy Japanese retrenching, merging, and reorganizing in the wake of the crash, it looks as if the pell-mell market growth that fueled Reuters' money machine is coming to an abrupt halt. With its stock down 57% from its October peak, a chastened Reuters is battening down to weather a financial winter.

It isn't clear yet how badly the London-based company, officially known as Reuters Holdings PLC, will be hurt. Reuters isn't nearly as dependent on the U.S. equity market as such rivals as Dow Jones, Automatic Data Processing (ADP), Citicorp's Quotron Systems, and a few units of McGraw-Hill (which publishes BUSINESS WEEK).

Most of its profits come from strongholds in Europe and the Far East, where the crash hasn't yet led to the degree of cutbacks seen on Wall Street. The company's virtual monopoly in the booming foreign exchange business will cushion it. Moreover, argues John D. Jessop, an executive vice-president at Telerate Inc., 56% owned by Dow Jones & Co.: "The more the markets are bouncing around, with London following Tokyo following New York, the more people need to keep on top of them. That's good for us, and it's good for Reuters."

'ALL ON ONE SCREEN.' At least publicly, Reuters' shrewd, Australian-born CEO, Glen McG. Renfrew, remains optimistic. "We've seen no visible effect on sales and orders so far," says Renfrew, 59. "To hurt us, you'd probably have to have a lot of big people go bust." With many Reuters customers tied to the company by long-term contracts, Renfrew flatly predicts a minimum of 25% pretax growth next year. But his is a lonely voice, judging by the state of his company's stock. Barring new financial calamities, Reuters is more likely to post average annual profit increases of 15% to 20% over the next three years.

Judging from the behind-the-scenes action, Reuters is preparing for the worst. Renfrew recently ordered research spending slashed, albeit from a 1987 level that was as much as double the previous year's $42 million. He's also chopping administrative and sales costs, which soared 62% during the first half of 1987. And General Manager Michael E. Nelson is freezing senior management salaries until at least Mar. 31, while barring all new hirings "not linked to an immediate increase in revenue."

Despite these cuts, Renfrew is still pressing ahead with his audacious long-

term plan to transform Reuters into a global supermarket for the financial services industry. Already, bankers, brokers, and money managers are buying Reuters' custom-built computer terminals and analytical software to scan news and prices in Reuters' data bases. They now can sell currencies and stocks over Reuters' communications network. Commodities, futures, and other instruments will come soon. "We give the client the information, the means to process it, and the means to trade based on it, all on one screen," explains André F. H. Villeneuve, president of Reuters North America Inc. "We're doing something nobody else even comes close to."

Even to dream about such a role shows the enormous leaps Reuters has taken in the past few years. For well over a century after its founding in 1851, Reuters was little more than a member of the wire-service fraternity, churning out rapid-fire dispatches for newspapers worldwide. But in 1964, a fortuitous discovery of a computerized stock-price transmission device launched Reuters into the Electronic Age. Developed in the U. S. by a former GTE Corp. subsidiary and dubbed Stockmaster, the primitive unit was designed to replace cumbersome stock tickers on brokers' desks. Reuters grabbed the opportunity to sell the unit abroad, giving Europeans their first chance to get NYSE share quotes at the push of a button.

Renfrew, then Reuters' Brussels bureau chief and a hard-charging veteran of assignments in Asia, Africa, and Europe, was chosen to spearhead sales of the machine. The move made his career. A natural techie, Renfrew soon assumed worldwide responsibility for Reuters' growing menu of electronic choices. Prodding the company into the new era, Renfrew gained a reputation for what one executive gingerly calls "Aussie forthrightness."

Renfrew was tapped to lead a thrust into North America in 1971. That year the company's electronic ambitions got a tremendous boost with the collapse of fixed currency rates. Suddenly banks and corporate treasurers needed an electronic bulletin board on which they could post rapidly changing prices for currencies. Reuters provided one. The system, dubbed the Monitor, soon gained a near-monopoly. In 1981, Reuters upgraded the Monitor by adding a dealing system to it. The system lets dealers contact one another by computer, conduct a trade with a few keystrokes, and instantaneously receive printed confirmations of their transactions.

In the first half of this year, the two currency-market systems accounted for 56% of Reuters' sales. Traders at more than 1,500 banks now turn to Reuters keyboards and computer screens to handle 600,000 currency and bullion deals per week—which equals about a quarter of all such transactions worldwide.

Information on bonds, commodities, and even real estate is rapidly swelling the flow of data over Reuters' information network. And, oh yes, news, too. Reuters' traditional services for newspapers and broadcasters now generate only 9% of revenues. But Renfrew sees news as a vital marketing tool to entice subscribers to buy other electronic services. Although Quotron and ADP also deliver price quotes, for example, they must rely on Dow Jones to provide news stories over their systems. Reuters, on the other hand, offers a comprehensive, homegrown menu. Contends Renfrew: "News lends our package uniqueness." Accordingly, Reuters has nearly doubled its roster of journalists since 1984.

In all, some 43,000 subscribers now pay hefty monthly fees to rent 131,000 Reuters computer screens. This gives them access to information about nearly any financial market, delivered over what Reuters claims is the world's largest private communications web.

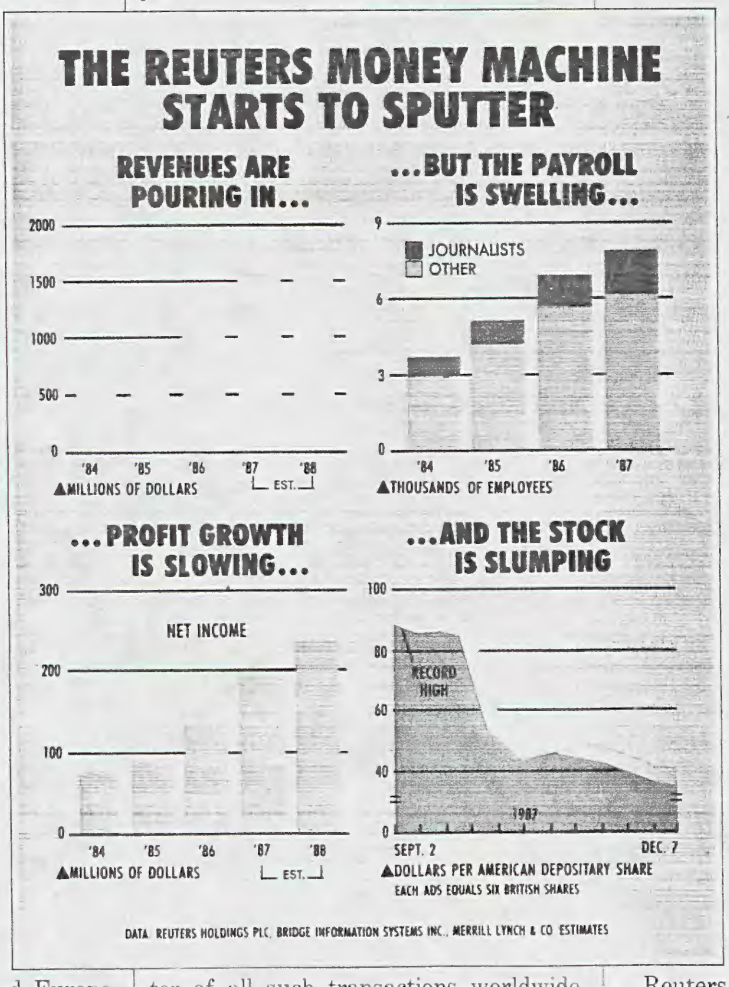
Reuters has come a long way in a short time. As recently as 1979, Reuters' sales were a third of Dow Jones's. This year, though, Reuters' sales of nearly $1.6 billion should easily exceed those of its New York competitor by several hundred million dollars.

Now the challenge for Reuters is how to keep the growth spurt from fading. Renfrew's main solution has been to hit new markets. A minor player in Japan before 1986, when government restrictions on its currency trading system were lifted, Reuters is now considered nearly essential by Japanese financial houses doing business abroad. The number of Reuters screens in Japan has nearly tripled in the last year, to 6,100.

BUYING SPREE. Until the crash, at least, Reuters also hoped for major growth from the U. S. equities market. For years Reuters stayed out of the U. S. equities business. But now it is introducing a device—Equities 2000—that goes a step beyond traditional quote machines. Many rivals continue to supply quotes only on North American issues. But Reuters is selling those plus quotes on 40,000 foreign stocks, bonds, and other securities and is aiming for 140,000 next year. Since October Reuters has signed up 65 North American customers for the system, including one unidentified broker that took 400 terminals.

Reuters is also launching an effort to wedge its way into the U. S. Treasury bond market, now dominated by Telerate. But even if it breaks into new markets—some as small as supplying credit unions with financial news and quotations—Reuters simply cannot continue to add subscribers at its recent 36% annual clip. At that rate, practically everybody in the world connected with finance would have a Reuters terminal within five or six years. So Renfrew, pursuing his concept of a supermarket for financial services, is stepping up Reuters' efforts to gain additional revenues by selling services to existing clients.

To diversify Reuters' roster of services, Renfrew has engineered some $265 million worth of acquisitions since 1985, bringing into Reuters' fold leading players in several of the areas vital to



LAURAT DAUNIS

A REUTERS PHOTOGRAPHER IN BEIRUT: THE NEWS SIDE CONTRIBUTES ONLY 9% OF REVENUES

REUTERS

his supermarket strategy. Among Renfrew's most important buys were a $55 million purchase of Rich Inc., the world's top provider of computerized trading-room systems, and a $111 million takeover of Instinet Corp., an automated system for trading U. S. shares that Reuters hopes to make into a kind of global stock and options exchange. Renfrew also picked up Schwarz-a-Tron, an options software service, plus two sizable suppliers of historical financial data, an area in which Reuters has badly lagged behind rivals.

TECHIE INDIGESTION. While Renfrew went on a buying spree, Reuters' scientists were busy developing an automated trading system. Using advanced software and Reuters' own worldwide network, they plan to take the company's currency-dealing system a technological leap further.

Reuters' goal is to extend the dealing system to everything from government securities to futures. In fact, less than two months before the crash, Reuters penned a ground-breaking deal with the Chicago Mercantile Exchange to set up an after-hours trading network using this new technology, intended to tap into booming international interest in Merc futures contracts.

When the system gets off the ground sometime in 1989, Merc brokers and their customers worldwide will be able to trade the most popular financial futures contracts after the exchange closes at 3:15 p.m. Chicago time. The main difference between the overnight shift and the frenetic daytime action in the pits: At night silent Reuters computers will match up the trades.

Renfrew's goal is to assemble most of these disparate pieces into a single, smoothly functioning system by 1989. But how quickly customers will want or be able to afford an integrated package is an open question. Reuters is trying to sell radical new services to a clientele suddenly grown fearful of spending money. Predicts analyst Ian A. Cole of Nomura Research Institute in London: "People will be more conservative in this new environment. They're not going to adopt new techniques as quickly." Cole adds that Reuters may not see significant revenues from its one-stop-shopping concept until the 1990s.

Indeed, before the crash, there was evidence that Reuters' technological push was causing indigestion even among its most advanced customers. Reuters has been trying out a new, high-speed data service with Wall Street investment houses as part of its push into the market for supplying data on U. S. equities.

Such a link would allow brokers to distribute Reuters stock quotes cheaply over their own internal information systems rather than through thousands of individual terminals supplied by Quotron or ADP. But Renfrew concedes that six of the seven major brokers testing the new link lacked the computer power to make the program work. Now, Reuters' Rich unit will bring in its own computers to see if the system will fly.

Rich, in fact, is where Reuters is likely to feel the deepest impact of the crash. Acquired in 1985, the Chicago-based supplier of trading-room systems will rack up an estimated $129 million in sales this year. With Reuters' marketing muscle behind it, Rich has landed huge contracts abroad as well as in its traditional U. S. base. It recently completed a $35

million job at Merrill Lynch Inc.'s new Manhattan headquarters. With austerity ruling Wall Street, though, "firms that are in a position to go out and buy new hardware are questioning whether they should do so," says William T. Rush Jr., chief information officer at Prudential-Bache Securities Inc.

The next few years of turmoil will be the biggest challenge yet for Renfrew and his team. Nearly all of Reuters' top executives are former journalists, unaccustomed to anything but constant upward trend lines. Renfrew's internal financial targets have been based mainly on one simple parameter: achieving a high minimum annual growth target. But that might have to change. "Telling a manager he's got to reach 25% growth isn't particularly relevant if his market isn't growing at all," says analyst Cole. "They may have to look at more cost-oriented and return-oriented figures."

INTERDEPENDENCE. Fortunately for Renfrew, Reuters is in an enviable position. For one, it is virtually takeover-proof. When Reuters went public in 1984, the press barons of Britain and its Commonwealth that had owned the news agency for decades issued two classes of shares. They kept control of the "A" class, which accounts for 25% of the equity but has 58% of the voting power. The owners can't swap shares except among themselves. Neither can they convert most of their stake into ordinary "B" class shares without 100% agreement—which is unlikely considering that such strong personalities as Rupert Murdoch and Robert Maxwell are among the big class-A shareholders.

Reuters also has no long-term debt and has $225 million in cash. So for the longer term, it remains as well positioned as any rival company to reap profits from the globalization of the financial services industry.

The international nature of the Oct. 19 debacle demonstrated only too graphically the increasing interdependence of the world's financial systems and, therefore, the need for easy access to a 24-hour flow of quotations and hot news. But with markets around the world now marking time at best, Reuters' heyday as a hot growth issue may be past. Wall Street and City of London investors, who bid up Reuters' shares by 450% since the company went public, are loath to sell out despite the stock's massive decline. And Renfrew isn't about to let Reuters settle back into its sleepy state of two decades ago. But it may take another financial market explosion to reignite Reuters' growth.

By Mark Maremont in London, with William Glasgall in New York and bureau reports

SEARCH ABOVE
Thursday 12/17/87

1987 ANNUAL REPORT - Automatic Data Processing
P95836

SO: Automatic Data Processing Inc 1987 Annual Report Aug 24, 87 35 pages

THE COMPANY

Automatic Data Processing (ADP) is an independent company dedicated exclusively to providing computerized record-keeping and information services.

FINANCIAL HIGHLIGHTS

Consolidated $000s except/share

FY Ended Jun 30,	1987	1986	% Change
Revenues	1,384,236	1,204,246	15
Net earnings	132,030	105,960	25
Earnings/share	1.76	1.45	21

OPERATIONAL HIGHLIGHTS

In the FY ending June 30, ADP achieved record results for the 38th consecutive year since its founding in 1949. In order to provide its clients with more sophisticated real time services and more efficient processing techniques, the company increased its capital expenditures for central-site data processing equipment. ADP's network services, which primarily provide industry-specific timesharing services to financial institutions, government agencies and large companies in the private sector, also maintains its internal communications network (Autonet) connecting interactive terminals at thousands of locations with ADP computing facilities in various cities. Network uptime reached an all time high of 99.8%. Average response time was less than one second.

OFFICERS AND ADDRESS

Josh S. Weston, Chairman and CEO

William J. Turner, President and COO

One ADP Boulevard
Roseland, NJ 07068

Wednesday 1/14/87

ALERT: ADP to Develop Quote System for Merrill Lynch (WSJ)

Just two weeks after Merrill Lynch and IBM abandoned Imnet, their joint computerized financial quotation network, Merrill has asked Automatic Data Processing (ADP) to develop a similar system to provide financial information to its 10,000 account executives. Under the agreement, Roseland, NJ-based ADP will deliver the system to the first Merrill branch in a year, followed by supply to all branches at the end of two years. ADP acquired Bunker Ramo Information Systems from Allied-Signal Inc last year. Bunker Ramo is the number two-ranked stock-price information supplier, after Quotron Systems, which was purchased last year by Citicorp.

Friday 1/31/86

ADP Contracted by Jaguar to Provide It with LAN Systems (AUD NR)

Automatic Data Processing (ADP) has been contracted by Jaguar Cars Inc to supply it with a local area network (LAN) which will allow US dealerships to correspond directly with the firm's main office. The JCIS system being installed by ADP will replace two networks currently in service which handle warranty claims, parts orders, and parts inquiry. ADP has also been contracted by Jaguar to construct a JMIS information network so that managers at the dealerships spread throughout the US can communicate with headquarters. JMIS, which is being co-developed with Jaguar, will be able to support a variety of software programs which handle business and dealership issues. Both systems, which will also interact with one another, will be ready for service in the spring of 1987.

IBM's Information Network, a Link to the Future
Benedetti, Jef
Systems/3X World v15n4 PP: 120-121 Apr 1987 ISSN: 0885-7806

With the IBM Corp. Information Network, it is possible to develop application software for the new 9370 before it arrives, without resident computer resources. Information Network has 3 units. Both IBM and third-party software are available on the network through the Network Services arm. These offerings include Insurance Value-Added Network Services, IBM COBOL Structuring Facility, Professional Office System, and Electronic Data Interchange. Network Services has host systems in 3 cities, with IBM's Communications Management Controller serving as the network ''traffic cop.'' The Remote Computing Services arm provides application development facilities for VM and MVS environments as well as a personal computer development capability. Finally, the Software Marketing unit markets IBM PC Personal Decision and Assistant series software, plus the new IBM SolutionPac for the System/36, System/370, and 9370 hardware environments.

8/5/2
Small System Management
Llana, Andres, Jr.
CommunicationAge v4n1 PP: 51-53 Jan 1987 ISSN: 8750-2712

There are many different configuration strategies among the vendors offering local area network (LAN) products. Software Link sells LANLink, a software-driven LAN that uses the standard RS232 serial ports on the back of a personal computer (PC). It employs a server card and a satellite card to link several PCs into a LAN. Other similar networking systems use a form of board-based technology to support a LAN; AST Research Inc.'s Resource Sharing and PC NET II product lines are examples of LAN board products. Another board product is one from Fox Research Inc. that uses a bus topology with CMSA/CA access, providing a NET-BIOS emulation capability to support IBM network interface. The AT&T Information Systems product is a board-based system that is designed to use existing wire facilities. A network extension unit is employed to connect the individual network access unit leads that come from the station end into the network. Many LAN vendors supply systems built around a proprietary server; these usually are configured to support the whole network with both disk and printer resources as well as interfaces to other LANs or to the public network. Digital PBX systems can be configured to support a LAN by using outboard peripheral equipment. Tables.

Service Lets Multinationals Access Overseas Applications
Horwitt, Elisabeth
Computerworld v20n27 PP: 2 Jul 7, 1986 CODEN: CMPWAB ISSN:

IBM Corp.'s Intercontinental Information Services will enable multinational corporations to share information and applications with their overseas sites. The first phase of the 2-phased introduction provides a link from IBM Information Network to international services offered in 15 countries by IBM World Trade Europe/Middle East/Africa Corp. and IBM Japan. Among the international services offered are: 1. Application Systems, 2. TSO and MVS batch processing at the IBM data center in Zoetermeer, Denmark, and 3. batch processing at data centers in the 15 countries. IBM reports that authorized US terminal users will be able to access the services using the CCITT X.25 packet-switching protocol. IBM will introduce a Professional Office System (Profs)-based connection between Information Network and its Zoetermeer data center, in Phase 2. Also introduced in Phase 2 will be bulk data transfer between Zoetermeer and other IBM data centers.

The Vendor Vanguard
Scott, Karyl

Network World v3n13 PP: 41-44 Jun 2, 1986 JRNL CODE: NWW

Packet switching with some protocol conversion is now just the foundation for a multitude of emerging services and applications. The growth of desktop computers and the need for interconnection of these computers are the major factors expected to spark growth of value-added networks (VAN), which may constitute a $1.5-billion market by 1990. VANs can now be either public data networks or a variety of intelligent public, private, and hybrid offerings. The fastest growing VAN market probably will be in local exchange areas. Bell Atlantic Corp. and BellSouth Corp. are among the leaders with their local area data transport services. GTE Telenet Communications Corp. and Tymnet/McDonnell Douglas Network Systems Inc. are also major players. AT&T withdrew its Net 1000 VAN after severe losses. IBM's Information Network will find popularity among heavy IBM users.

The Great Computer Linkup/A Guide to Company Computers
Banham, Russ
Insurance Review v47n2 PP: 24-42 May 1986 ISSN: 0749-8667

The insurance industry is fully automated today, but there are still many possibilities for improvement as computer technology evolves and expands. The current automation of independent insurance agencies is expected to drastically improve processing throughout the industry, and those who delay automating are unlikely to make a profit. IIR/ACORD, a nonprofit insurance association that develops electronic and paper standards, selected the IBM Information Network to create the Insurance Value Added Network Service (IVANS). IVANS is the first customized, shared network for insurance communications. IVANS will enable independent agents to remain independent, according to IIR/ACORD's Robert Merriman. IIR/ACORD standardization permits an agent to use IVANS, one form and one network for all transactions with all firms. However, the reluctance of such large companies as Aetna, which has its own network, might delay complete integration into the network. Meanwhile, selection of a computer system by any agency must consider the interface, software, hardware, and vendors. A table lists the computer systems used by various companies. Tables.

Application of a Full-Text Storage and Retrieval System for Records Management
Bender, Avi

The Nuclear Regulatory Commission (NRC) is undertaking a pilot project of a full-text storage, search, and retrieval system to evaluate the process of capturing documents electronically and making them available. Full-text systems provide a better opportunity for the searcher to find relevant documents since it is not necessary for the user to know the specific vocabulary used by the indexer. The NRC is using STAIRS on a timesharing basis through the IBM Information Network. The Division of Waste Management's Docket Control Center receives, stores, and distributes licensing documents. The document capturing process involves use of word processing and optical character readers. The file organization of documents stored on the STAIRS system consists of the text, a dictionary with an inverted file, and a text index. Vendors generally receive information on magnetic media and load it into the database. Full-text systems should be the desirable approach for records management. Tables. Diagrams. References.

In different case, Pacific Bell has been frustrated in efforts to cope with dial-porn problem. Cal. PUC (CPUC) can't use its regulation forbidding telephone use for illegal purposes to shut off dial-porn services, Judge Wallace Tashima has ruled in U.S. Dist. Court, L.A. In continuation of litigation between CPUC and dial-porn providers Carlin and Sable Communications, Tashima said that rule originally intended to be used against bookmaking, prostitution or other illegal services would be unconstitutional if used to shut down 976 service, according to Pacific Bell spokesman Lou Saviano.

Saviano said judge had ruled that it would be prior restraint to stop speech that hasn't been judged obscene. Under CPUC's Rule 31, service could have been cut off without hearing for vendor. Saviano said that Pacific Bell was "dismayed" by ruling, that "filth carried on some of the 976 numbers is repugnant to us, but we're frustrated at every legal attempt to get rid of it." Pacific is considering appealing ruling, Saviano said.

Meanwhile, Rep. Bliley (D-Va.), author of House measure to eliminate dial-porn services (HR-1786)(CD April 4 p6), has written Reps. Boxer and Miller (both D-Cal.) seeking their support for his bill. Cal. Democrats last week wrote FCC asking agency to consider dial-porn blocking program using customer-premises equipment (CD Dec 16 p2). Bliley commended lawmakers for their new-found interest in issue, but said he believed "only a complete prohibition will ensure complete protection for children... This is not to say that telephone companies, public utilities commissions and the FCC are unable to take steps to restrict telephone sex services [but] if only one number in one state were available, that number would be a danger to every child in the country... Providing blocking devices will certainly prevent some young children from calling telephone sex services, but many will still access them."

Bliley's bottom line: "Wouldn't it be better for children [for Congress] to take the preventive measure of stopping dial-a-porn altogether, instead of just having the telephone company channel its profits to organizations which help after the damage is done?" Bliley's bill has 140 cosponsors; neither Californian by Fri. had committed to adding support, aide said. Bliley will work to increase House support in coming weeks with new letter to colleagues seeking cosponsors in anticipation of promised effort in House Telecom Subcommittee next year for compromise bill (CD Oct 1 p2), aide added. Bliley also is supporting Helms effort in Senate.

Electronic Mailbox

GEISCO LINKS UP TO NEC VALUE-ADDED NETWORK IN JAPAN

NEC has launched Japan's first international value-added network (VAN) linking NEC network in Japan and GE Information Services (GEISCO) worldwide teleprocessing system. Action reflects efforts by govts. of both countries to promote foreign participation in international VAN business in Japan, companies said. Following recent deregulation of Japanese telecommunications market and privatization of Nippon Telegraph & Telephone (NTT), 7 common carrier competitors owning facilities, 400 leasing facilities and variety of value-added services have sprung up in Japan.

NEC-GEISCO service can be accessed from 200 locations in Japan, 650 in U.S., sites in 80 other countries. First offering is GEISCO's Quick-Comm electronic mailbox service. Other services are expected to be added soon, although GEISCO declined to say what they would be.

NTIA Dir. Alfred Sikes, in congratulatory letter to Yusai Okuyama, dir. gen.-telecommunications bureau of Japan's Ministry of Posts & Telecommunications (MPT), said: "I am sure that you join with me in believing that an unobtrusive regulatory approach is the best means of encouraging the development of customized telecommunications services -- an essential element of global trade."

U.S. Undersecy.-International Trade Bruce Smart wrote to MPT Vice Minister Shigeo Sawada that close working relationship between 2 agencies is especially necessary in international VAN area.

COMMUNICATIONS PERSONALS

Charles Steinberg resigns as Ampex chmn. as of year end, will spend about half time at company, half time pursuing "personal interests"; he will continue to represent Ampex on various TV industry committees. During his 25 years at company, he has served in almost every major position, including pres... **Stanley Baron**, NBC Technical Div. managing dir., elected SMPTE engineering vp, succeeding **Richard Streeter**, CBS, who has held post since 1984; **Richard Schafer**, Eastman Kodak, elected to newly combined post of secy.-treas. Reelected: **Blaine Baker**, MPL Film & Video, conference vp; **Irwin Young**, Du Art Film Labs, sections vp; **Stephen Kerman**, Tektronix, financial vp... **William Tricarico**, FCC secy., resigns to become exec. asst. to

GE

GEISCO (Rockville)
GE Software (Rockville)
GEMobile (Lynchburg) + Americom
RCA Fed Svc Co
RCA Americom (NJ)

→ network mgt svcs
→ field data net
→ ind-specific info systems + svcs
→ fleet info systems
→ public safety systems

→ $ sell

K3 Corp
Cable C-Band Corp
Sell to Comsat
Spotnet — NEC/Sony
ASC

100 loc/yr @ 500K = $50 m/yr ÷ 2 = $25 m/yr → GE

Possible Acquisition of GE's Communications Division

Following GE's acquisition of RCA in mid-1986, GE's information services companies were combined with RCA's telecommunications companies into a new Communications and Services division. Two RCA communications companies have been sold. The remaining companies and their lines of business are described in an attachment.

GE's acquisition of RCA was driven primarily by RCA's strength in high-tech defense R&D and manufacturing. The acquisition of NBC and the telecommunications services companies was a secondary objective at best. It seems likely that the formation of this division was an afterthought of the RCA acquisition and not a strategic move.

In talking to Gene Murphy, the former RCA executive now in charge of this division, I learned the following: This is one of the smallest GE divisions with about $1.2 billion in revenues; GE is reluctant to commit major capital to the division; there is little communication between the companies in the division; and there is little synergy with the rest of GE. The division does not seem to meet GE's size or growth objectives and does not contribute much to GE's strategic future.

Murphy did not say so, but I got the strong impression that GE would not be averse to selling the whole division. Whether or not selling the division has crossed Jack Welch's mind, there is no obvious buyer for the division as a whole. However, there are several factors that suggest that buying the division could be an attractive move.

1. Both the former RCA companies and the original GE companies have in common several elements: 1) a reputation for solid, almost utility-like, reliability; 2) a record of uninspired top management direction; 3) a focus on sales to industry rather than to the consumer; and 4) lackluster growth due to repeated failure to take advantage of strong market and technology positions.

2. There are in fact some synergies between the telecommunications companies and the information services companies that present some significant business opportunities. Generally these lie in the direction of capturing a major share of the large-scale systems integration business; i.e. planning, assembling and operating services for other companies that combine

communications and information processing.

3. The performance of most of the companies in the division could be improved by better top management direction and better marketing strategies. Some reductions of personnel costs would further improve performance in some of the companies.

4. The future of the division is controllable by selling off some of the companies and/or acquiring additional companies that complement the nucleus.

5. GE itself is a significant customer of the division. It is likely that long-term contracts for continuing this business could be included as part of an acquisition. GE also might be a customer for some of the new services that were developed.

Detailed financials on the division are not available, but a purchase price of 1.3 - 1.5 times revenues or about $1.5-2.0 billion seems to be a reasonable guess at an acquisition price. Since the cash would not be significant to GE, there probably would be an interest in a more creative acquisition arrangement.

COMMUNICATIONS SUBSIDIARIES OF GENERAL ELECTRIC

1986 Estimated Results:

Revenues: $1.2 billion Operating Income: $70 million

GE Americom: (formerly RCA) provides satellite services to industry and government using a fleet of seven satellites and a network of 60 earth station antennas.

Revenues: $140 million Operating Income: $14 million

GEISCO: provides data communications, on-line computing, and various information services primarily to large corporate MIS users in the U.S. and Europe.

Revenues: $530 million Operating Income: $30 million

GE Mobile Communications: builds and sells two-way radio equipment and pagers with national sales force and local dealers.

Revenues: $360 million Operating Income: $12 million

GE Government Services: (formerly RCA) provides telecommunications field services such as tracking ranges and surveillance systems for various federal and state agencies.

Revenues: $70 million Operating Income: $6 million

GE Computer and Consulting Services: provides maintenance and leasing services to industry for computers, electronic test equipment, and data communications equipment; also helps customers design, develop, and implement information services.

Revenues: $100 million Operating Income: $8 million

GE

Judge Greene X BOC's in info bus — next review 3 yrs.

Martin Marietta bid local co focal only

" " ~~total~~ auto or syst integ

Boeing, McD Douglas, Martin Marietta, EDS

⇒ large opptty

GE co's good resource

all urged to become major syst integ

competes w/ ATT+ above.

getting pos in that bus over next few yrs would a lot.

The Colossus of Conglomerates Moves Away From Smokestacks by Buying RCA

■ **General Electric**'s proposed acquisition of **RCA** for $6.28 billion—the largest non-oil merger ever—unites two companies that have rebounded strongly after several disappointing years. Thornton Bradshaw, 68, became chairman of RCA in 1981, a year in which the corporation lost $27.2 million. NBC, its broadcasting network, was dead last in the television ratings. Today NBC is the top-rated network. RCA's 1984 profit was $341 million, and with the GE offer of $66.50 a share, RCA's stock price has tripled during Bradshaw's tenure. For GE's Jack Welch, 50, the merger is a milestone in a long campaign to revamp his company.

The reunion of GE and RCA—GE was among a consortium of companies that started RCA in 1919 and pulled out in 1933 after a federal court ruling—creates a $38-billion-a-year giant that would rank seventh on the FORTUNE 500, just behind IBM. Both are defense contractors; both have interests in communications and electronics. But there is surprisingly little head-to-head competition between the two. "They fit beautifully," says Mark Hassenberg, an analyst with the Wall Street firm of Donaldson Lufkin & Jenrette. "It's amazing that there is so little overlap. The complement each other, rather than oppose. In defense, for example, GE makes radar and jet engines, while RCA focuses on communications and electronics." GE may have picked up a bargain. Wall Street estimates of RCA's real worth range anywhere from $70 to $90 a share.

Clinching the deal: from left, Bradshaw, Welch, and Frederick

The acquisition is the broadest but certainly not the last brushstroke on the corporate redesign that Welch began when he became chief executive in 1981. Under his stewardship GE's revenues have grown slowly, but earnings have increased nearly 11% a year, and return on equity has held steady at about 18%, well above the industry average. A tough-minded, sometimes controversial manager, Welch has trimmed staff, eliminated layers of management, shut down unproductive factories, and spent $2.5 billion to automate the plants that remained.

Above all Welch has moved the company away from smokestack manufacturing and into services and high-technology industries. Since 1981, Welch has sold 150 of GE's operations for a total of $5 billion. The biggest chunk: Utah International, a mining business he peddled to Broken Hill Proprietary of Australia for $2.4 billion.

Welch will probably run RCA much as he has GE—cutting costs, streamlining management, moving out of low-growth businesses. Coincidentally, he will have a reunion with Robert Frederick. He beat out Frederick for the top job at GE, and his old colleague left to become president of RCA and Bradshaw's possible heir apparent. Welch is unlikely to tinker with NBC's news and entertainment divisions, though he will want to know why the industry's highest ratings translate into its lowest profits.

Despite its size, the deal faces few hurdles in Washington. The Federal Communications Commission is unlikely to balk at transferring NBC's television licenses, and will probably even allow GE to retain its television station in Denver; it's the NBC affiliate in the area. Nor should there be any antitrust problems. Either the Justice Department or the Federal Trade Commission must approve the merger, but the Reagan Administration judges prospective mergers less on size than on the merged company's ability to compete, particularly in international markets. On that point, Welch has been careful to emphasize that the new, expanded GE would be better able to knock heads with the likes of Japan's Matsushita and West Germany's Siemens. Said he: "The strength we gain from

Growing Through Mega-Mergers

These are the five largest U.S. corporate combinations in which the smaller partner had at least $8 billion in annual sales. The combined revenue figures are for the latest four quarters.

TRANSACTION	PRICE in billions	COMBINED REVENUES in billions
Texaco acquires Getty (1984)	$10.1	$46.6
Chevron acquires Gulf (1984)	$13.2	$38.8
GE acquires RCA (pending)	$6.3	$37.5
Du Pont acquires Conoco (1981)	$7.2	$34.2
Philip Morris acquires General Foods (1985)	$5.6	$19.2

a relatively invulnerable position in broadcasting and some other areas will enable us to be a stronger global competitor."

Trashing junk bonds

■ Even if a proposed new rule by the Federal Reserve were already in effect, the Fed wouldn't be able to lay a glove on General Electric's purchase of RCA for $6.28 billion in cash. But after New Year's Day, deals might fall through if financed like many corporate takeovers in recent years—by low-rated junk bonds, issued by shell corporations and backed by the target company's stock. In a close vote the Fed proposed that in such transactions the target company's stock secure no more than 50% of the purchase price.

The proposal is a new interpretation of the old restrictions on buying stocks on margin. In force since 1934, the margin limitation was designed to curb speculative binges on the stock market. In its new guise it is widely interpreted as an attempt to control the vast amount of debt accumulated during the current merger mania—debt that Fed Chairman Paul A. Volcker finds incompatible with long-term economic and financial stability. **Drexel Burnham Lambert**, the New York-based brokerage that dominates the huge junk-bond market ($15 billion so far this year), took issue with the ruling. Said Frederick H. Joseph, Drexel's C.E.O.: "There is no evidence that these financings [junk bonds] are harmful to the financial system."

The new limitations could take the leverage out of some leveraged takeovers and give worried C.E.O.s a little peace of mind. Corporate raiders like T. Boone Pickens and Carl Icahn may find it more difficult to finance their campaigns. David-size companies will be less likely to swallow up industrial Goliaths. But the ruling limits the way in which takeovers are financed, not takeovers themselves. Acquiring companies may have to put their own credit on the line to raise cash, or they may become more creative. "There are a lot of bright, imaginative people in this business," says Roger Miller, managing director of Salomon Brothers' mergers and acquisitions department. "They will immediately go into a reactive mode and find other ways of doing things."

EDITOR *John Nielsen*
REPORTER *H. John Steinbreder*

Hungry Britons

■ Merger mania has swept through Britain too, and never has the pace been as frenetic as during the first few days of December. In a rush:

The **Argyll Group** (retailing) offered $2.8 billion for **Distillers Co.**, the world's largest producer of Scotch whisky (Johnnie Walker, Dewar's); **Imperial Group** (tobacco, brewing) announced it would merge with **United Biscuits** (Keebler cookies) in a deal valued at $1.94 billion; **Habitat-Mothercare** (retailing) bought out **British Home Stores** (also retailing) for $2.2 billion; British **General Electric Co.** (electronics) bid $1.8 billion for **Plessey Co.** (telecommunications, defense); Australia's **Elders IXL** (wool processing) made a $2.7-billion offer for **Allied-Lyons** (brewing, food); **Hanson Trust** (a conglomerate) made a hostile bid of $2.8 billion for Imperial Group (yes, the same Imperial Group that had just announced an amicable marriage with United Biscuits).

Before 1985 Britain had never seen a merger offer above $1.5 billion, and hostile takeovers were as rare as cold beer. Suddenly six of the biggest deals in history were announced within days of each other. Moreover, four were openly hostile. Of the remaining two only Habitat/British Home Stores was entirely voluntary. The Imperial/United Biscuit merger was a shotgun affair prompted by fears—well founded, as it turned out—of bids from unfriendly quarters.

Security analysts attribute the surge to an abundance of credit and a new activism among Britain's shareholders. "Paper values of companies have increased with the bull market of the past five years," says Nicholas Jones, a corporate finance director with the merchant bank J. Henry Schroeder Wagg in London. "And so has the concern of investors over management. The institutional investor is more prepared to back a good manager, even if his firm has smaller capitalization, if he makes a bid for a larger, more complacent company." As Jones sees it, hostile takeovers will continue in Britain—though not at the dizzy pace of early December.

Texaco loses again

■ A Texas state judge upheld a jury verdict requiring **Texaco** to pay $10.53 billion plus interest to **Pennzoil** for disrupting Pennzoil's agreement in principle to acquire 43% of **Getty Oil**. For now at least, Texaco does not have to post a $12-billion bond, a provision of Texas law that could have thrown the company into receivership. Still, news of the judge's ruling sent Texaco stock tumbling again. (See Personal Investing.)

OPEC circles wagons

■ Riddled by dissension and staggered by a long-term slide in oil prices, OPEC has apparently found unity by standing its traditional policy on its head. Meeting in Geneva, oil ministers in the 13-nation cartel decided they would no longer defend oil prices by curtailing production. Instead they decided to protect OPEC's market share—down from half the world market a decade ago to under one-third today—thereby risking a price war with non-OPEC producers

ALAN NICHOLS—GAMMA/LIAISON

Saudi Arabia's Ahmed Zaki Yamani talks oil with Indonesia's Subroto.

GE+RCA = A POWERHOUSE DEFENSE CONTRACTOR

THE RESEARCH LABS OF THE TWO GIANTS COULD ACHIEVE THAT ELUSIVE GOAL, SYNERGY—AND BRUISE COMPETITORS

THE NAVY'S AEGIS RADAR SYSTEM: AT $300 MILLION EACH, RCA'S JUICIEST DEFENSE PLUM

When General Electric Co. agreed to buy RCA Corp. for $6.3 billion, GE Chairman John F. Welch Jr. crowed that the combined companies would have more clout in the defense electronics business. Like many chief executives who make big deals, he was talking about synergy, a concept that usually works better on paper than in practice. In the case of GE and RCA, though, synergy may be more than just talk—and the competition knows it.

Some rivals in the $57 billion defense electronics industry are already nervous. "We should speak up and be madder than hell about the merger," says a mid-level executive at one leading contractor. "The merger may be flying in the face of more and more competition being advocated by the Pentagon."

RAD SAVVY. It is obvious why many contractors are concerned. The addition of RCA would vault GE from No. 6 to No. 2 among contractors that sell electronics gear to the Defense Dept. Based on 1984 rankings, the two units would have $3.2 billion in sales (table, page 118). Moreover, the merger would follow General Motors Corp.'s 1985 deal to buy Hughes Aircraft Co., the industry leader.

Defense electronics represents less than 10% of sales at both GM-Hughes and GE-RCA. But the GE-RCA deal links two of the nation's most experienced defense research and development labs. And in the high-tech weapons world, big companies often have an advantage. The reason: New weapons and their components are integrated wholes, not just the sum of many complex parts. "You need to have such a huge variety of access to technical data that scale is a big help," says a top electronics executive.

Because of that, some competitors—many with more than one-third of their sales in defense electronics—fear that GE-RCA, in particular, could gain an even bigger piece of the pie.

Not everyone expects the mergers to tilt the defense-electronics field severely, especially in the near term. GM was a minor player in defense electronics before the Hughes purchase and seems most interested in what Hughes's electronics can do for cars. And GE and RCA "don't have that many products in common to suddenly loom large because of the merger," contends Richard M. Landman, director of business development for ITT Corp.'s Defense Space Group.

But many competitors fret that the pooled financial clout of GE and RCA may

The Corporation

generate big investments in noncontract development, such as radar innovations, that could give them an edge in winning contracts. The investments could pay off as Congress tries to cut the deficit and the Pentagon budget gets tighter. For one thing, "it can be cheaper to juice up the old jalopy with advanced electronics than to buy a brand-new gizmo," says Wolfgang H. Demisch, a defense analyst with First Boston Corp. And the Pentagon will probably emphasize buying existing nonmilitary systems for defense to streamline the procurement process.

Thanks to these trends, GE will undoubtedly be more aggressive in defense markets. Beyond its successful fighter engines, says one industry official, GE is on-board fighter plane radar. GE has been weak, while Hughes and Westinghouse have dominated. But GE is struggling to find a niche and hopes that its heavy investment in a radar system for Northrop Corp.'s F-20 will pay off. "If the F-20 sells, GE will get production experience and be a factor in the market," says an executive at one company.

CRUCIAL BLEND. In space, where communications and reconnaissance satellites are as crucial as tanks and airplanes are in the atmosphere, the GE-RCA mix is sure to be formidable. GE builds communications satellites for the Pentagon. RCA has been turning out defense meteorological satellites and private communications satellites. The merged company

THE PENTAGON'S TOP ELECTRONICS CONTRACTORS

Company	Specialties	Defense electronics sales* (billions of dollars)	Percent of total sales
GE–ROCKWELL**	Radar, communications	$4.6	5%
GE–RCA**	Radar, satellites	3.2	8
LOCKHEED	Missile guidance	3.1	38
RAYTHEON	Radar, antisubmarine	2.7	46
SPERRY	Firing control, antisubmarine	2.3	40
LITTON	Navigation, electronic warfare	2.0	43
TRW	Communications, antisubmarine	1.8	30
BOEING	Airborne radar, flight systems	1.7	17
HONEYWELL	Electromagnetic technology	1.6	31
FORD	Communications, satellites	1.5	3

*1984 **Combined figures for separate companies

DATA: BW, *DEFENSE ELECTRONICS*

"hasn't been as vigorous as it could be." With RCA, Welch is getting "a strong presence in advanced radars, advanced satellites, and a long-term relationship with the Navy," says Demisch.

RCA's juiciest defense plum is the Navy's Aegis radar system for cruisers and destroyers—perhaps the Pentagon's largest attempt to knit together various systems. Aegis uses many tiny radars instead of just one radar staring in one direction. At nearly $200 million a copy, RCA had hoped to supply some 50 ships.

As with other systems, the military wants to heighten competition by finding alternate suppliers, and GE had been mentioned as a candidate for Aegis. But the merger could take GE out of the running, since it would be unlikely to compete with its own subsidiary. That's a small price to pay for what it's getting—new expertise to compete with ground-based radar stalwarts, such as Westinghouse, Raytheon, and ITT.

Another field that could pay dividends will also be busy researching President Reagan's Star Wars program, which is estimated to be worth some $69 billion in electronics gear over the next 10 years.

How GE blends with RCA will help determine how stiff competition in the industry becomes, and rivals say it could be at least a year before that becomes known. The mere combination of the two military divisions won't ensure success. Without management focus, RCA's and GE's efforts could fall short of a coordinated push that would threaten established market patterns. "It [depends on] how they marry the two groups," says William B. Farnsworth, deputy director of government marketing at Raytheon Co., who says that the right fit would mean "pretty stiff competition." Some people think they already see the needed focus, thanks to one man. "Jack Welch wants to be No. 1 in the things he does," says Demisch. "And he wants defense."

By Dave Griffiths in Washington, with bureau reports

HAYES COHEN

JOHN WELCH

Continued from page 236

GE's chairman made the deal of the year when he bought RCA for $6.3 billion. But he has yet to deal with problems close to home—slow growth in core businesses

Early last fall, General Electric Co. Chairman John F. Welch Jr. fielded a tough question from the class he was addressing at Harvard business school: "If you could change the past, what would you do differently?" Welch answered quickly: "I don't think I've moved fast enough or incisively enough."

Perhaps Welch already knew that his next move would be the "quantum leap" of which he had spoken so frequently. In December, he agreed to buy RCA Corp. for $6.3 billion in cash—the largest nonoil acquisition ever. The deal drew criticism: What new products would the combined companies make? Where was the much-vaunted quantum leap? Didn't the merger really represent GE's failure to develop new businesses on its own?

'STAYING POWER.' Welch vehemently defends the move. With RCA and its plum National Broadcasting Co. in hand, GE will pick up 80% of its earnings from technology and services. As Welch sees it, that's insurance against what he calls the "deindustrialization" of America.

Furthermore, the combination of GE and RCA makes the new company No. 2 among defense contractors. Since both defense and broadcasting are relatively immune to foreign competition and fluctuations in the dollar, GE gets a reliable source of income. That's critical for the long-term health of GE's core manufacturing businesses: the turbines, light bulbs, locomotives, and major appliances that absorbed $2 billion in capital investment since 1980. The merger gives GE the "staying power," Welch says, to compete abroad against government-subsidized or protected companies.

Even though regulatory approval for the merger isn't expected until summer, task forces are already determining how to meld the two companies. Job loss is inevitable—especially under Welch, who cut more than 70,000 jobs from GE in his first three years. Against the backdrop of GE's own problems—sales of $39.3 billion in 1985 were worrisomely flat—the task is sure to test Welch for years to come.

By Marilyn A. Harris in Fairfield, Conn.

Service Bulletin Details JT9D Turbine Redesign

New York—Service bulletin detailing modification/redesign of a high-pressure turbine rotor seal in Pratt & Whitney JT9D-7R4D/D1/E/E1 engines has been released following rig testing and Federal Aviation Administration approval of the redesign.

Affected are 279 engines and 99 aircraft—Airbus Industrie A310s and Boeing 767-200s.

Aircraft operators include Pan American World Airways, Trans World Airlines, United Airlines, Air Canada, Nigeria Airways, Swissair, Singapore Airlines, China Airlines, Varig S. A., El Al Israel Airlines, EgyptAir, Sabena Belgian World Airways, Braathens, Ethiopian Airlines S. C., Japan Air Lines, Civil Aviation Administration of China (CAAC), Qantas and BalAir.

The redesign eliminates the fourth knife-edge seal array in the second-stage high-pressure turbine airseal. The fourth knife-edge had been cracking and was responsible for four in-flight engine shutdowns (AW&ST Oct. 13, p. 27).

Modifications to eliminate the fourth seal in existing engines will be done at maintenance centers normally used by the aircraft operators. Pratt & Whitney has agreed to pay for the configuration changes.

The FAA also has prepared an airworthiness directive on the modification. Release of the directive is imminent. □

Israelis Prepare Lavi For First Flight Test

Washington—First flight test of the Israeli Lavi fighter should take place late this month, after late delivery of the Lear Siegler flight control system computer forced postponements.

The first flight was postponed from July until mid-September and then until late November (AW&ST July 28, p. 18). Changes in the system design were responsible for the delay, a Lear Siegler official said. Lear Siegler delivered two flightworthy computers last month.

A study of the Lavi program costs by the U. S. General Accounting Office will be completed later this month. The final draft then will be circulated to executive branch agencies for comment. Rep. Lee H. Hamilton (D.-Ind.), chairman of the House Foreign Affairs Committee Europe and Middle East subcommittee, requested the study on Mar. 12 to verify a Defense Dept. study that found Lavi unit costs to be excessive and total program costs too high in relation to Israeli defense budgets (AW&ST June 9, p. 26).

U. S., Europe to Discuss Space Subsidies

Washington—U. S. government will restart discussions with Europe to eliminate commercial space transportation subsidies, according to Robert Brumley, Commerce Dept. deputy general counsel.

The U. S. plans to reopen an investigation closed last year by the U. S. Trade Representative, after Arianespace was cleared of dumping launch services in the U. S. at unfair prices. "We plan on making sure their practices are not subsidization," Brumley said.

Brumley said that by mid-1987, when U. S. ELV production lines should have started, it will be apparent whether the U. S. policy changes toward private ELVs will succeed in helping the industry. If the companies do not have commercial orders by then, "their credibility will be in question," he said.

Serge Dassault Named To Head French Company

Paris—Serge Dassault has been appointed chairman of Dassault-Breguet, ending months of debate within the company and the French government on the firm's new organizational structure.

A major management change had been planned in the wake of the death this year of Dassault's father—company founder Marcel Dassault—and the retirement on Oct. 29 of B. C. Vallieres, who had been president of the French military/civil aircraft manufacturer for 31 years.

In addition to the appointment of Dassault, four company managers were named as vice presidents to head the firm's major activities. Charles Edelstenne has become vice president of economic and financial affairs, Jacques Estebe was named vice-president of industrial affairs, Bruno Revellin-Falcoz was appointed vice president of research and technical affairs, and Hugues de l'Estoile was given the title of vice president-international relations.

"Following the death of my father and the retirement of Vallieres, it was time to inject some youth in the company," Dassault said. "We now need to get down to work to face the many challenges ahead of us. We need to push the French government for the go-ahead on our Rafale fighter; we have to move ahead on our company-funded work to modernize the Mirage 2000 for future exports; we should be offering our help to those countries looking for assistance in developing a new single-engine fighter."

Dassault said the company is reducing its total workforce because of a slump in export sales for the Mirage 2000 and the gap in work due to government delays in approving production for the Rafale. □

New GE Unit Broadens Communications Base

General Electric's new Astro Space Div., created by the merger of its Space Systems Div. with RCA's Astro-Electronics Div., provides a broader base in the communications satellite field as a result of complementary military and civilian market experience.

Unlike Hughes Aircraft, TRW and Ford Aerospace & Communications, which have supplied both civil and military communication satellites, RCA and General Electric previously had specialized.

Thirteen RCA-built commercial communication satellites are in orbit, and another 20 are in production, according to a company official.

RCA also has been the sole supplier of low-altitude polar-orbit meteorological satellites both for civil and defense applications for more than two decades since it built the first Tiros weather satellite launched in 1960.

General Electric has had more extensive military experience, however, as evidenced by its DSCS-3, the newest addition to the Defense Satellite Communications System.

General Electric and RCA have been competing against one another for elements of the space station program, such as the Goddard Space Flight Center work package, including free-flying platforms, automation and robotics.

General Electric's Spacecraft Opera-

Astrotech Curtails Space Unit Operations

Washington—Astrotech International last week severely curtailed operations of its space subsidiary, General Space Corp., bringing an end to Astrotech's efforts in several commercial space areas, including the plan to privately finance a space shuttle orbiter.

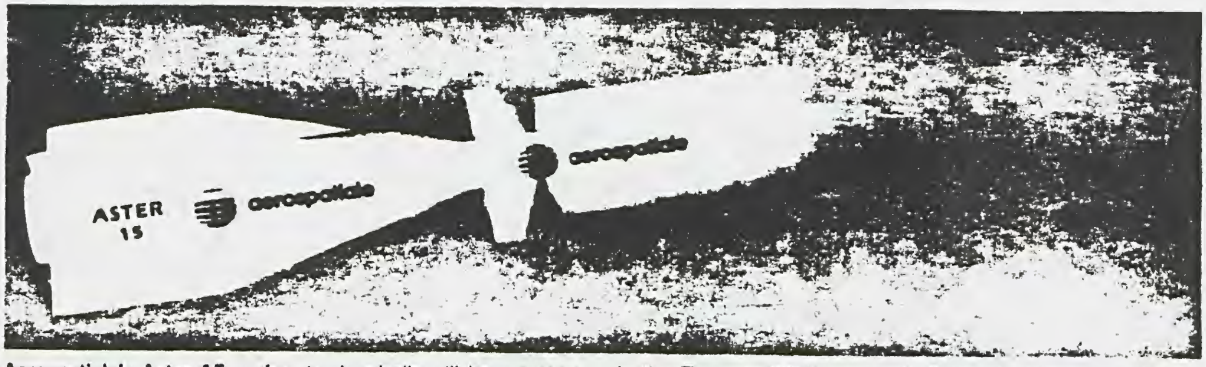
Astrotech stopped development of its orbiting power station and reusable upper stage projects to stem continuing financial losses from its developmental space businesses.

Astrotech also said it would not pursue acquisition of International Space Corp., a materials processing venture based in Florida.

Astrotech Space Operations, the satellite processing facility based near Kennedy Space Center, will continue to operate, but at a reduced level.

Richard Smith, the former Kennedy Space Center director who joined General Space in August, resigned as president, although he will maintain an association with the parent company.

Aerospatiale Plans Aster 15 Missile in Surface-to-Air Role



Aerospatiale's Aster 15 surface-to-air missile will have a range of 15-17 km. (9.3-10.5 mi.) against highly maneuverable aircraft or subsonic missiles, and 10 km. (6.2 mi.) against supersonic/maneuvering missiles. Scale model of the Aster 15 was displayed at France's Le Bourget naval show. Aster 15 and the Aster 30, with an operating range of 10-35 km., is being developed for use in the Thomson-CSF/Aerospatiale SA90 air defense missile system which is scheduled to enter French military service in the mid-1990s (AWST Oct. 13, p. 63). Both missiles use the same second stage, while the first-stage boosters will be sized to their specific strike range. The SA90 is expected to be deployed in land- and ship-based versions.

tions, at Valley Forge, Pa., with approximately 3,000 employees, will remain at that location but will become part of the new Astro Space Div. along with about 2,300 employees of the RCA Astro-Electronics Div. at East Windsor, N. J. The new division will be headquartered at East Windsor and will be directed by Charles A. Schmidt, formerly group vice president of RCA's Government Communications Systems Div.

The new division will be part of RCA Aerospace and Defense, headed by John D. Rittenhouse, RCA executive vice president.

The remainder of General Electric's Valley Forge Space Systems Div., with about 7,500 employees, including Reentry Systems Operations and Military & Data Systems Operations, has been renamed the Federal & Electronic Systems Div. Reporting to it will be the RCA Automated Systems Div., Burlington, Mass., with about 1,700 employees. Allan J. Rosenberg retains his title as vice president and general manager of the division, which is part of General Electric's Aerospace Group, headed by senior vice president Louis V. Tomasetti and located at Valley Forge.

Another element in the restructuring of the two companies' operations is the new name for the RCA Communication & Information Systems Div., which becomes the Government Communications Systems Div.

Joseph B. Howe remains division vice president/general manager and assumes responsibility for RCA's Government Volume Production Dept., Camden, N. J. □

News Digest

J. Russell (Russ) Clark, Sr., aircraft designer and former president of Vought Aeronautics Div. of LTV Aerospace Corp., died Oct. 28 in Dallas. Clark, who helped design one of the first military helicopters, was chief project engineer for all Vought F4U Corsair fighter aircraft and Vought F8U Crusaders. He served as general manager of Vought's A-7 Corsair 2 program.

Three former Lockheed employees contend the company used unsafe materials in production of USAF/Lockheed C-5B aircraft and that the aircraft should be grounded. Lockheed has denied the allegations. The former employees charged that metal being used in the aircraft had been improperly heat-treated.

Transportation Dept. has issued a show-cause order aimed at terminating air service between the U. S. and South Africa. The order proposes to revoke the permit of South African Airways to offer New York-Johannesburg service and prohibit U. S. carriers from service between the nations.

Hughes Electro-Optical & Data Systems Group has fired four mid-level executives after a company investigation disclosed they had mischarged costs for a field test unit for the M-1 tank thermal imaging system to another M-1 contract. The company refunded the $170,000 mischarge to the government.

Thomas G. Plaskett resigned his job as senior vice president-marketing of American Airlines and senior vice president of AMR Corp., American's parent company, last week to become president and chief executive officer of Continental Airlines.

Hughes AIM-120 AMRAAM missile passed within lethal distance of a drone using electronic countermeasures for the first time on Oct. 29. The test was the first in the initial operational test and evaluation phase of the program period.

Scientific Atlanta last week signed a volume discount agreement with Intelsat providing for price reductions up to 50% for small Earth stations designed for satellite communications in less populated areas. Intelsat will act as purchasing agent to consolidate as many as 160 orders expected in the first year.

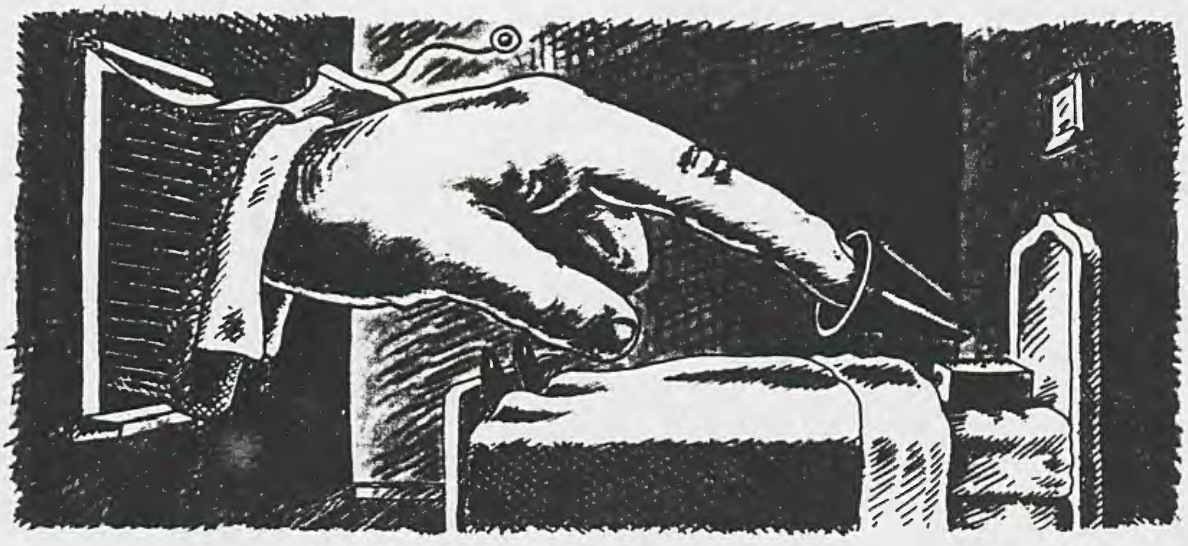
Goodyear board chairman Robert E. Mercer told employees that a takeover attempt was "a distinct possibility." Goodyear has engaged the investment banking firms of Goldman Sachs & Co. and Drexel Burnham Lambert to assist in studying a possible restructuring of assets or capital, Mercer said. Financier Sir James Goldsmith is interested in acquiring Goodyear, according to industry observers.

Boeing Co. has increased the takeoff gross weight of its 737-400 transport by 7,500 lb., allowing the 146-seat derivative twinjet an additional 400-stat.-mi. range with full passenger load. The landing gear and parts of the airframe structure have been strengthened to handle the additional weight. The 737-400 was launched five months ago (AWST June 9, p. 30).

Channels of Communications Sept- 1986

GOINGS-ON BEHIND THE SCREENS: TOPICAL MONOLOGUES AND SKETCHES

TALK SHOW



HOW RCA DIED IN ITS SLEEP

RCA has gone gently, very gently, into that good night. Its demise was sealed when the board of directors agreed to a $6.28 billion friendly takeover by General Electric, the largest such transaction ever outside the oil industry. Yet the whole affair was curiously undramatic, as if the disappearance of a 66-year-old company whose history was the history of broadcasting itself amounted to nothing more than a transfer of resources to a larger and more efficient user. Only an apoplectic shareholder meeting seven months ago, at which a gang of retirees, many of them former RCA employees, complained of being raped, swindled and abandoned, shattered the genteel atmosphere.

What the stockholders, with their elaborate conspiracy theories, failed or refused to recognize was that RCA had very little choice in the matter. How can a $10 billion company be unable to safeguard its sovereignty? Possibly the French were asking themselves a similar question in the summer of 1940. The rules have changed so quickly; the world has become so predatory. RCA equipped itself with the most up-to-date antitakeover weaponry—staggered terms for the board of directors, a particularly punitive version of the poison-pill defense. But it was all for naught. When the RCA board met last December to consider a friendly offer from GE, it was clear to all that the only alternative was a hostile one.

"It wasn't a case of 'Okay, let's forget GE and go back to where we were,' " as one board member recalls. "Once you get in play, there's the likelihood of others moving in." Independence was already an obsolete issue; only RCA's ultimate owner was in doubt. At least GE wouldn't break up the company and sell off the pieces, as the takeover artists rumored to be nosing around the company would have done.

Wall Street heavies and forward-looking chief executives have now thoroughly inured themselves to the pitiless mechanism of the takeover, like cavalry officers adapting to tank warfare. The public, on the other hand, seems to be lagging. To most of us, the giants of big business, like the inhabitants of Olympus, seemed immortal. A share in a blue chip was a share in eternity. And then a $10 billion corporation disappeared overnight. What happened to the status quo? "There is no more status quo," as Nicholas Heyman, an analyst at Drexel Burnham, so succinctly puts it.

You have to wonder if RCA was entirely adjusted to the post-status quo. Bankers and analysts almost uniformly praise Thornton Bradshaw's six-year tenure, with the caveat that the company seemed not to have a clear plan for the future. Its antitakeover measures were too little, too late. Its attempted acquisition of MCA in 1985 was clumsy. Above all, it moved without urgency, as if its survival were not at stake. Bradshaw, a professor at Harvard Business School 35 years ago, learned his tactics in another era, the age of effortless prosperity. The ease of that time is written in his friendly, donnish features. And it is that ease and gentility, resting on a buoyant status quo, that has disappeared with RCA.

For the next three years, while he remains as "consultant," Bradshaw will report to GE chairman Jack Welch, who, at 50, is 18 years his junior. The same experts who admire Bradshaw with reservations adore the iron-browed Welch, as if he were the very incarnation of the new rules which all seek to master. He acts, it has been said in a striking phrase, with the fierce passion of a man who sees the world on fire. He has moved with remarkable speed to get GE out of manufacturing and into electronics, high tech and services—thus RCA. The

ILLUSTRATIONS BY ROBERT KAUFMAN

TALK SHOW

new acquisition will be subjected to Welch's severe standards: Win or go. Divisions that can't thrive in a world on fire—the failing semiconductor business, as a likely example—will be sold. Executives with the pace of yesteryear will be fired. NBC chairman Grant Tinker, who has announced his retirement, must be replaced. This may prove frustrating. Tinker has never been one for urgency; he moves with an implacable patience. He has the innerness, the reserve, of an earlier generation. Somehow, that worked. Perhaps networks ought not be run by men who feel the world is on fire. One wonders if Jack Welch understands that.

JAMES TRAUB

NO WAY TO TREAT A LADY

No more pastels for Johnson and Thomas. Their Italian *alta moda* will descend into moody monotones of steel, slate and charcoal. And it's deep six for the Corvette engine in the Daytona Spyder. This fall, Crockett is cruising in a genuine Ferrari.

Hype about the third season of *Miami Vice* keeps barraging us: Don Johnson's holdout, the show's new design and color scheme. More than ever, *Vice* promises to be slick, riveting and very, very hot. But will twisted messages continue to lurk behind the new and improved packaging?

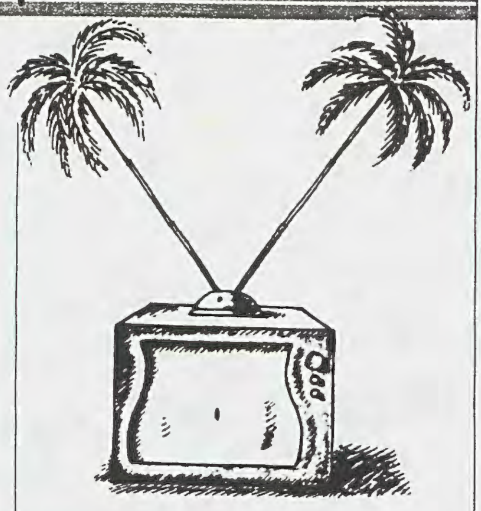
For two seasons, the show has been shamelessly antiwoman, its female characters uniformly deceitful, demented, decadent. Heterosexual relationships are uncool. Partnerships between men are the ultimate experience.

For starters, none of the male characters has had a permanent relationship with a woman or wants one. Take Crockett's love life. Given the choice between wife and career, Crockett quickly teamed with Tubbs, a partnership that was obviously deeper and tighter. Once, he wavered, almost falling for a socialite, until she let him oversleep the morning of a stakeout. Tubbs got beaten up. Women. Always in the way.

Remember when Switek asked his girlfriend to move in with him? To use Tubbs's expression, the guy must've left some of his groceries at the market. First she tacks up a picture of Princess Diana and Prince William (marriage is bad enough, but kids?), then she can't understand why sex should be secondary to Zito and Switek gyrating in their jockey shorts to Elvis on the tube. It doesn't take Switek long to dump her.

When women aren't chilling men's careers, they're being untrustworthy. There's the time Trudy turned in her boyfriend for dealing dust. "I'm a cop," she explains when confronted with the betrayal. "You got no soul, no honor," her lover replies—the ultimate *Vice* invective. When women are featured at all, they're usually prostitutes or posing as such. Should Trudy and Gina appear, they invariably go undercover as hookers, wrapped snug and hung loose. Clearly, the writers of this Emmy Award–winning show know a woman's proper profession.

But for those few females who escape street work, a special role is reserved: victim. When Gina is raped on assignment, Sonny no longer finds her desirable—the old problem of used goods. And then there are the out-and-out killers. Rita was the



sensitive, cultured wife of a drug dealer. He showered her with everything but respect. She was slapped around, thrown into a swimming pool and manipulated by her husband until she snapped and murdered him. When females appear on *Vice*, they are what men have made them.

It's ironic that a show with millions of women tuned in and turned on each week earns more than a gold card for male chauvinism. To quote Sonny Crockett: "What the hell's going on here?"

WENDY LEBING

MUSICAL CRITICS' CHAIRS

Back when there was a Volkswagen Bug, I took pride in being able to distinguish one year's version from the next. There were subtle, barely perceptible changes in each model, which the connoisseur could discern. I thought of the Bug recently because of *Sneak Previews*, or maybe it was *At the Movies*, although it could have been *Siskel & Ebert & the Movies*.

All these movie-review shows, which critique the product of Hollywood manufacturing, are produced in Chicago, where no one's footprints are in cement, although some mobsters' torsos are.

Roger Ebert, Pulitzer Prize–winning critic of the *Chicago Sun-Times* (where I'm employed), will tell you, "Gene and I are making movie criticism a cottage industry in this town." He's right. He and Gene Siskel started *Sneak Previews* on Chicago's public station, WTTW, nine years ago. Then the show went national on PBS. When their contract expired in 1982 and WTTW refused to offer them the appropriate bucks, they walked, but not far—to the Tribune Entertainment Co., where they started *At the Movies*. WTTW countered by teaming Jeffrey Lyons with Neal Gabler, and later with Michael Medved. When Siskel and Ebert's Tribune deal concluded, in came the Walt Disney Co., offering them $800,000 apiece to do their shtick in syndication, taped, again in Chicago. Meanwhile, Tribune enlisted *New York Post* critic Rex Reed and Showtime's movie star interviewer Bill Harris to fill the aisle seats on *At the Movies*.

All of which begs the question: How many of these shows does one nation need? It's a question that will no doubt be answered soon, but it seems evident that your typical TV viewer—who may not be your typical moviegoer (i.e., a teenager)—is unlikely to sit still and watch six people talk about movies for 90 minutes each week.

It looks like, for a season at least, America will have three places to confirm what it already knows: Arnold Schwarzenegger can't act; the latest *Rocky* movie stinks; and, by God, Meryl Streep gets good roles.

P.J. BEDNARSKI

Channels of Communications
Jan/Feb. 1986

ntertain-
ɔab from

ds: You
you're
the time
jockeys.
laugh—
. As for
rules are
hey must
ferably,
ers, who
ɪrd Stern
ɪas mas-
e follow-

esh has
riages to
illegally.
really.
to India,
[Ameri-

dude.

him?
re a guy
nd, like,
o to bed

stuff.
ave sex.
me over
ands.

nd got a
ite kids
sex with
'cause
makes

o news-
u'll still
without
order to
ıe over-
st select
udience
he care-
t from
sey, the
. After
sketball
ontract,
g Island
ınd was
ɛt after
with a
ɔund up
Soviet

KGB agent who recanted his defection to the United States. The whole thing took two minutes, tops, the bulk of it spent on the big story: the man and the ducks.

Now all of this may come as a shock to those of you who are used to reporting on budget deficits and nuclear-arms proposals. But that's the point of this class: to accustom you to the fact that your job is *not* to report the news. It is, in the inspired words of WHTZ news director Jeff Young, ". . . to retain the audience that is handed to you by the disc jockey." In 1986, in the trendy rock format known as contemporary hit radio, news is not to be reported, but sold. Edward R. Murrow wouldn't approve. But, as Howard Stern might say, look where Murrow is today.

JEFFREY L. WOLF

What the GE/RCA Deal Says About TV Today

GENERAL ELECTRIC'S startling acquisition of RCA sent powerful signals to the nation about the health of the television business.

Grant Tinker's rejuvenation of NBC, as chronicled in this edition of *Channels*, clearly was one of the keys to the $6.3 billion buyout.

NBC was expected to contribute close to half of RCA's pretax profit last year. (In the new combined company, that will come down to about 10 percent of GE/RCA's profits and only about 6 percent of its revenues.) NBC's owned stations—worth nearly half the price of the acquisition—give GE a relatively secure franchise in the broadcast sphere. This becomes important to a company faced with intense competition from foreign manufacturers of consumer-electronics products.

GE also offers NBC something. GE has, of late, been encouraging internal innovation and risk-taking—in today's lingo, "intrepreneurship." As NBC nears a decision on whether to launch a round-the-clock cable news network, the GE acquisition, although it brings an element of the unknown to the corporate planners, might bode well for that venture.

Even without the GE resources, however, Tinker, in the short four-plus years since taking over the company, has made NBC the most attractive place to work in

network television. With CBS's balance sheet muddied by its scuffle with Ted Turner, and ABC's short-term prospects uncertain in light of its acquisition by Capital Cities, it is the GE/RCA giant that offers television professionals the most secure future.

It must also give television people a degree of comfort to know that GE made a recent pass at CBS, sensing that it could be CBS's "white knight." That move was the first sign that GE's vaunted planners had become enamored of the industry's prospects.

Nevertheless, the allure of a triumphant NBC and last year's takeover traumas at CBS, ABC, and Metromedia—combined with the free-market temper of our time—suggests that media powers may not soon rest secure from large-scale institutional change. The broadcasting community has lobbied long for a free market, and what the industry has won is a free, volatile, and high-pressured market that it will have to live with through the rest of the '80s. MERRILL BROWN

Are You Now, or Have You Ever . . . ?

THE AMERICAN Legal Foundation is a watchdog group dedicated to countering the now notorious "liberal bias" of the media. According to its brochure the foundation combines the attributes of think tanks and investigative journalism. Michael P. McDonald, its 29-year-old chief counsel, whose beetle-browed image appears four times in that brochure, says that the ALF's resources are spread pretty thin these days. There are so many things for conservatives to do. One is making documentaries. "There's a dearth of good conservative filmmakers and producers out there," says McDonald.

Short of actually making a documentary, though, the ALF has been trying to insert itself into the production of someone else's documentary, as a sort of symbiont, or parasite, depending on your point of view. The documentary the group wants in on is *Who Are the Russians?*, a projected PBS series of as many as 10 parts, which is not likely to air for another two or three years. (The producers have so far raised only $350,000 for a $7 million-plus production.) The ALF has demanded that, to protect the Fairness Doctrine rights of its 40,000 contributors, the film's producers (1) inform the foundation of all steps they take "to correct [the film's] deficiencies," (2) provide the ALF with copies of "proposal revisions" and "progress reports, memos, etc . . . of a nonpersonal nature," and (3) allow an ALF observer to sit in on all planning sessions.

PBS executives have deflected the requests. Peter S. McGhee of WGBH, the Boston station that is producing the series, wrote to the ALF last summer that the show's development is not something the producers will discuss "with interest groups, whether it is yours . . . or the Socialist Workers Party."

It would be easier to dismiss the ALF as a band of busybodies if the Right had not already been so successful in getting its way in such matters. Last year, following criticism of the documentary *Vietnam: A Television History*, also produced by WGBH, PBS yielded an hour of air-time to the right-wing group Accuracy in Media so it could present a stinging criticism of *Vietnam's* veracity, and even its integrity. The real damage of the critique may well have been its equation of PBS's careful and extensive, if controversial, study with its own outright expression of dogma. The ALF has that same cynical view of the documentary genre. It seems to be arguing, "It's our obnoxious bias against theirs." Moreover, the foundation's unctuous use of government regulation to gain entry in editorial processes imitates the ve thought-police mentality it is so anxio to vilify in the Soviet Union.

The ALF has attacked the propos documentary in a flurry of letters whc hectoring tone surely owes more to t ambush-interview technique than to think-tank conference. The foundati argues that the series as project amounts to "sophisticated pro-Sov propaganda," a "Potemkin-village vi of the Soviet Union as a place wh . . . personal freedom flourishes."

Not that the WGBH outline for t series isn't unsettling, even if you do share the ALF's ideological predispo tions. The description of Joseph Sta contained in a 500-word précis for t third installment doesn't get around the purges—what one historian h called Stalin's "orgy of savagery"—halfway down the page. The writer *b ances* the fact that Stalin filled "a v network of prison camps" with t thought that he opened the way f younger men to rise; in one grotesc sentence he equates the "desperation" some of Stalin's subjects with the "as ration and achievement" of othe Nowhere does the statement say that S lin—who Nikita Khrushchev later s should be tried for his crimes, and w some historians have suggested w insane—killed millions of his peop The focus of the program is on Stali "epic and monumental" military a