

Integrated Broadband
Networks:
Ongoing Annotated
Bibliography

Robert Baker
David C.H. Park

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Columbia Institute for Tele-Information
Graduate School of Business
809 Uris Hall
Columbia University
New York, New York 10027
(212) 854-4222

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INTRODUCTION

In Fall 1987, the Center for Telecommunications and Information Studies embarked on a two year study of Integrated Broadband Networks (IBN). The project, which is funded by the Markle Foundation, is focusing on public policy issues and implications for potential users.

The purpose of this document, which continues to evolve, is to make bibliographic information which the Center comes across in the course of its work available to others. In return, we ask the reader to supply the Center with additional references and to point out errors in the pages that follow.

The classification scheme may also continue to evolve. The categories included are (and will continue to be) overlapping. Many of the references could be entered in several categories. For present purposes, each is entered only once, in what is considered its primary category. However, keywords are used and an index of keywords of individual references is included. Keywords are in one-to-one correspondence with categories.

In addition, an index of authors is included for greater ease in using the bibliography.

The reader will appreciate that there is an enormous literature on some topics potentially relevant to IBN (for example, on economics issues or on ISDN). On the whole, we have included here only those items which actually mention broadband or some other term very closely associated with it.

COMPREHENSIVE REPORTS

"Broadband Communications: The Commercial Impact," Ovum Ltd, 1987, Stephen Timms. {300 page review of broadband networks. From an international perspective, the report discusses the evolution to broadband, future scenarios and markets, technology, tests and trials, suppliers, and users.} (Applications, Evolution, Players, Technology, Trials)

"A Competitive Assessment (Update) of the U.S. Fiber Optics Industry," Draft, U.S. Department of Commerce, International Trade Administration, Office of Telecommunications, JAN 88. {Five factors will determine success of U.S. fiber optic companies: (1) open access to overseas markets; (2) commitment to R&D; (3) protection of patents; (4) adoption of Standards; (5) liberalization of U.S. export control policy.} (Economics, Fiber, Players)

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"Broadband Optical Fibre Networks," in Megapolitics: Computer and Government Decisions for the Future, Spary/Zshaber, Mittelstands-Verlagsgesellschaft, 1986, Christian Schwartz-Schilling.

{Prediction that broadband networks will be implemented by DBP in early 1990's. Broadband networks are seen as evolving from narrowband ISDN.} (Applications, ISDN)

"The Broadband ISDN-The Next Generation Network," IEEE (CH2314-3/86/0000-00385), 22-25 JUN 86, vol. 1, p. 385-90, P.E. White. Description of on-going research at Bellcore. Mentioned specifically: (1) Bellcore research directed toward development of economical point-to-point star distribution; (2) Optimal bit rates of 45 Mbs and the need for one switching fabric.) (Standards)

"The Broadband Universal Telecommunications Network," IEEE Communications Magazine, vol. 25, no. 1, JAN 87, p. 69, Daniel J. Harrold, Robert Strock. {Overview of broadband networks. Applications: 4 network switchable channels with 100 Mbs capability; 30 high fidelity audio channels; 4 ISDN channels; 12 telemetry channels; 560 Mbs for each user. Architectures: star and double star are discussed. The article ends with discussion of who will implement broadband networks.} (Applications, ISDN)

"An Engineering and Policy Analysis of Fiber Introduction Into the Residential Subscriber Loop," CTIS, NOV 87, Marvin Sirbu et. al.. {Comprehensive overview of fiber networks. Paper considers various loop architecture economies and marketing and policy issues associated with broadband networks in the US.} (Applications, Economics)

"Telecommunications in the Coming Decades," IEEE Spectrum, NOV 87, p. 62, Stephen B. Weinstein. {Overview of new network technologies and various applications, especially video. Concludes with discussion of various field trials in Canada, US, France, Germany and Japan.} (Applications, Trials)

"Telecom Reform at the Crossroads: Competition or Industrial Policy?," International Institute of Communications Forum, London, 28-29 JAN 88, Gregory C. Staple. {Article focuses on broadband networks and suggests US policy of competition needs to be balanced by an industrial policy component.} (Regulation)

A High-Fiber Diet for Television? Impact of Future Telephone, Fiber and Regulatory Changes for Broadcast, Charles L. Jackson and Louise A. Arnheim, National Association of Broadcasters, April 1988. {Overview of the current state of affairs in the technological, economic and regulatory arenas as they pertain to the broadcasting industry. Conclusion is that the provision of a ubiquitous gateway of large bandwidth would allow the

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broadcasting industry to become independent of the cable industry.) (Architecture, Applications, Economics, Evolution, Players, Regulation)

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"VCR, Not Broadcasting, is Cable's HDTV Competitor, HBO's Horowitz Says," Communications Daily, 22 OCT 87, p. 9. {Cable official says HDTV is an urgent priority for cable because of competitive threat of VCR employing HDTV.} (Players)

"Scenarios Considered at HDTV '85 and New Alternatives," HDTV '85, Wes Viven. {Forecasts of HDTV diffusion in US, Canada, Japan and Europe.} (Demand)

"The Mitaka Experiment," Tokyo Bureau of the Wall Street Journal, 24 FEB 86, **Bradley K. Martin**. {NTT experiment in Tokyo suburbs involving videotelephony and video shopping. Response so far has been tepid.} (Japan)

"Video on Demand: A Wideband Service or Myth," IEEE ISS, MAR 86, p. 1735, **C.N. Judice**. {Judice considers three applications: advanced pay per view; democratic TV; video library. He states that none are immediately practical, but video library could be practical when capital costs of the subscriber loop fall below \$1,600/sub.} (Demand, Economics)

"Applications of Future Broad-Band Services in the Office and Home," IEEE Journal on Selected Areas in Communications, vol. SAC-4, no. 4, JUL 86, p. 429, **Heinrich Armbruster**. {Armbruster considers applications of broadband networks. Classifies them as follows. Dialogue: videotelephony; videoconference; high speed document traffic. Retrieval: film retrieval; broadband videotex; document retrieval; high definition image retrieval. Access: cabletext. Distribution: television (HDTV).} (Evolution)

"Single Mode Fiber Transport and Coaxial Distribution of Video On Demand," IEEE CH2298-9/86/0000-0889, SEP 86, **C.W. Lundgren**. {Limited video on demand will cost \$10/customer/month in capital expenditures and \$22/customer/month in expenses.} (Economics)

"Perfect Picture? Next Generation of TV's Promises Breakthrough in Image Quality," Wall Street Journal, 24 AUG 87, **Jeffery Tannenbaum**. {The first HDTV sets will reach the US in 1991, and will cost \$3,000-\$4,000. Standards are currently a problem.}

"Europe Unveils Major HDTV Campaign," Communications Daily, 1 SEP 87, vol. 7, no. 169. {European broadcasters, TV set, and component manufacturers start drive toward own HDTV system as alternative to US-backed Japanese MUSE system.}

"B-ISDN," Telecommunications, OCT 87, p. 66. {Briefly classifies applications as follows: dialogue; messaging; retrieval; and distribution.}

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"Videophones - Not Quite Here Yet But...", Telespan, 15 OCT 87, p.12. {There are fewer than 1,000 functioning two-way video teleconferencing rooms. Generally, business video conferencing systems have failed. Those systems which have succeeded, like the system used by the Philadelphia police, are in very specialized, niche areas.} (Demand)

"NCTA Names HDTV Panel," Communications Daily, 29 OCT 87, p. 2. {HDTV panel consists of cable operators and entertainment producers.} (Players)

"Bellcore Shows a Handful of Goodies," Telephony, 14 DEC 87, **Ellis Booker**. {Bellcore's Advanced Laboratory for Interactive Video Experiments demonstrates HDTV applications in pay-per-view, and video conference calls.}

"TCI Casts Tentative Ballot for HDTV," Broadcasting, 13 JUN 88, p. 50. {TCI is testing a fully compatible "progressive scanning" technique called "superNTSC," made and marketed by Faroudja Laboratories of Sunnyvale, CA, in two cable systems. SuperNTSC sacrifices wider aspect ratio in favor of full compatibility and uses processing and memory storage in the receiver to increase the apparent resolution of the displayed image.} (Players, Technology)

"Thinking the Unthinkable," **William F. Schreiber**, Broadcasting, 11 JUL 88, p. 32. {Three points. (1) Significant competition from recorded HDTV is probably 9 to 10 years away, even if (as the author considers unlikely) HDTV receivers are introduced on a wide-scale basis within the next two years. (2) Fiber optic delivery is more important than broadcast delivery of HDTV. (3) NTSC is likely to prove to be a "millstone around the necks of today's broadcasters." The inherent inefficiencies of NTSC imply that a graceful, planned obsolescence is in order.} (Regulation, Standards, Technology)

"HDTV Market is Likely to be Larger ...," TV Digest, AUG 88, p. 3. {Survey of consumer reaction indicated that they were willing to pay as much as \$3500 for large screen HDTV} (Economics)

"House Members Didn't Take Kindly...", TV Digest, AUG 88, p. 3. {Rep. Cooper (D-Tenn) chided consumer electronics industry witnesses for parochial, self-preserving attitudes. House Committee Chairman Dingell (D-Mich) indicated that Congress will step in if industry continues to lag in their development of commercial HDTV potential.} (Players, Regulation)

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"Southern Bell Demonstrates HDTV over Fiber Backbone at Democratic Convention," Fiber Optic News, 1 AUG 88, p. 3. (Southern Bell demonstrated a multipoint, switched HDTV system at the Democratic Convention in Atlanta, GA.) (Trials)

"Bellcore Researchers Compress HDTV Signal", Bellcore News Release, Bell Communications Research, Livingston, NJ, 31 AUG 88, Ron Riechmann. (Bellcore scientists have managed to compress a digital HDTV signal with 1,125 lines using less than 120 Mbs. This is well below the more than 1 Gbs that is required to transmit an uncompressed HDTV signal of the same quality.)

"BellSouth Moves Into Info 'Gateway' Era", Communications Week, 5 SEP 88, p. 1. (BellSouth began offering a wide array of data services at hourly rates that peak at \$3/hr.)

"Seeing Red Over the Yellow Pages", Cablevision, 12 SEP 88, p. 11. (NCTA opposed Southwestern Bell's request to offer electronic yellow page service outside its operating region.) (Players, Regulations)

"HDTV: Will US Be in the Picture?", New York Times, 21 SEP 88, p. D1. (FCC has ruled that any future High Definition Television system deployed in the US must be backward compatible with current NTSC standards (so as not to automatically make all currently existing receivers obsolete). This policy may give US industry a chance to compete in the US TV manufacturing market. But the US players are ill-equipped or uninterested. The only US manufacturer of TV's, Zenith, is losing money and under pressure to sell out.) (Economics, Players)

"Intel Buys GE's Video Venture, Aiming to Enliven Uses for PC's," Wall Street Journal, 17 OCT 88, p. B4. (Intel purchased GE's Digital Video Interactive (DVI) technology venture with the intention of pursuing the development of medium to low cost hardware that supports interactive graphics and sound. Intel is also encouraging software development.) (Players, Technology)

"Ameritech Joins Northern Telecom, Motorola in Project," Wall Street Journal, 17 OCT 88, p. B5. (The project is geared toward exploring the service applications that are appropriate for ISDN. Concentrating on "enterprise integration," the types of industries targeted include manufacture, health care, education and municipal government.) (ISDN, Evolution, Players, Trials)

"Computer Magazines' Electronic Spinoffs Give Readers a Quick Way to Talk Back," Wall Street Journal, 19 OCT 88, p. B1. (Several computer enthusiast specialty magazines may have found the way to

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target the ideal market for interactive services. Networks that are linked with (and advertised in) computer magazines seem to be able to succeed where other, more general magazine companies like Times-Mirror and Knight Ridder have failed.) (Evolution, Players)

"Hopes Rise Again for Pay-Per-View TV," Wall Street Journal, 2 NOV 88, p. B1. {Less than 15.5 Million US households (33.3% of those with cable) have addressable systems. Warner Communications estimates that a service could net \$10.00 per subscriber per month from such services. Most systems, however, barely generate 80 cents per subscriber per month. AT&T and RBOC's are offering new ordering systems, to make purchasing easier for the subscriber. Of those systems with impulse technology (allowing impulse buying of movies), fully 1/2 of sales were made after the movie being bought had already started.) (Economics, Players)

"Technology May Change Ad Strategies", Multichannel News, 7 NOV 88. {If or when telcos are allowed to deliver video to the home, the combination of telephone-like addressability and direct marketing databases would allow advertising to be tailored to specific homes.}

"Indiana Bell Sets New Service", Communications Week, 14 NOV 88, p. 10. {A new network management system, the Ameritech service Management System (ASMS) will allow customers to access telco computers to report problems, check line status and do some network reconfiguration without having to wait for a regularly processed order. The service was developed at Bellcore using Ameritech funds.}

"Computer Channel Plans to Offer 200 'Channels'", Multichannel News, 21 NOV 88. {Computer Channel Corp. plans to offer 200 "channels" of interactive programming for cable subscribers who own PC's beginning in mid-1989. The programming will be transmitted in the spaces between channels.}

"Motorola Exec Predicts End of Broadcast TV", Multichannel News, 21 NOV 88, p. 47. {Motorola chairman, Robert Galvin predicted that IBN would make use of EM spectrum for delivery of TV signals unnecessary, freeing spectrum for other uses. His prediction was disputed by broadcast industry representatives.}

"ATV Researchers Outline Progress to Task Force", Multichannel News, 21 NOV 88, p. 49. {Nine US HDTV developers, NHK-TV and European Thompson-RCA made presentations to the American Electronics Association's HDTV task force on 10 NOV. The task force concluded that the support and funding that the foreign

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efforts had benefitted from was obvious but that the US efforts were original and in need of relatively little additional funding to produce marketable products.)

"US West to Roll Out Gateway Developed With Minitel Unit", Communications Week, 28 NOV 88, p. 6. (The new gateway venture includes both US Minitel and Omaha's largest newspaper.) (Evolution, Players)

"Movietime Ups PPV Take: Survey", Multichannel News, 5 DEC 88, p. 32. {A random survey of 500 Movietime viewers showed that 27% of the viewers were induced to watch movies they would not otherwise have bought while 6% bought PPV movies based on what they saw there.} (Economics)

"25% HDTV Penetration Seen By End of Century", Multichannel News, 5 DEC 88, p. 133. {A report commissioned by the Electronics Industry Association predicts HDTV penetration will be 25% by AD 2000. Further predictions included: (1) HDTV will be a substitute technology for NTSC; (2) Total sales volume will not be affected, only product mix; (3) HDTV sets will probably be made mostly in the US. The formation of an HDTV Information Center in Washington DC was also announced.}

"FCC Gets High Marks so Far in Advanced TV Inquiry", Broadcasting, 12 DEC 88, p. 74. {Most of the press concerning FCC actions regarding the HDTV inquiry have been favorable. The article goes on to review the actions and some of the filings that have been made to date.}

"HDTV Sets' Size a 'Big' Problem", Multichannel News, 19 DEC 88, p. 25. {A spokesman for Zenith was quoted as saying that the best presentation format for HDTV is in sets with screen sizes of 30 inches or more but a 31-inch tube weighs 90 pounds and is 20 inches deep. Cost is also a potential problem.} (Economics, Demand, Players)

"Video Conferencing May Soon Come Alive", Wall Street Journal, 16 JAN 89, p. B1. {Comment on the CCITT's efforts to draft a videoconferencing standard.} (Standards)

"Road Test a Buick in Your Home (Advertisement)", Wall Street Journal, 19 JAN 89, p. A10. {In a foreshadowing of possible things to come, Buick is offering a free disk containing an interactive advertisement of their new automobiles.}

"High-Definition TV", Broadcasting, 23 JAN 89, pp. 34-35. {DoD

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will provide up to \$30 Million in funding to private organizations that are working to develop low-cost HDTV. The bandwidth decisions that eliminate the possibility of adopting Japan's MUSE-E system are also reviewed.) (Regulations, Japan)

"Schedule Set for HDTV System Testing", Broadcasting, 23 JAN 89, p. 74. {A group that met in Moscow last year in order to promote adoption of a world HDTV standard reconvened in Moscow to develop a comparative test plan by which the relative merits of different HDTV systems could be tested. The test will involve viewing on 18-inch, 40-inch and 120-inch projection screen TV's, post-production capabilities, "down-conversion" to NTSC, PAL and SECAM as well as transfer to 35 mm film.)

HDTV Effort Needs US Support: AEA Executive", Multichannel News, 23 JAN 89, p. 32. {American Electronics Association president Dick Iverson calls for government involvement in an HDTV consortium.) (Players)

"Fiber Deployment Update", Federal Communications Commission, Washington DC, 17 FEB 89, Jonathan M. Kraushaar. {Report documents the size of the installed base of optical fiber in the telecommunications industry for the years 1985-1988. By the end of 1988, the report states that a total of over 3.3 million fiber miles have been installed by long distance carriers, RBOC's and metropolitan authorities installing fiber based systems in the US.)

"William Glenn Believes That The United States Can Compete in HDTV Market", Fiber Optics News, 27 FEB 89, pp. 7-8. {Director of the New York Institute of Technology's Science and Technology Center, which is one of the most advanced imaging and display research centers in the US, is quoted as saying that, "We [the US] can certainly out-innovate anyone any day of the week, but to successfully implement our nation's innovations, it takes a longer range investment stand that we have had over the last 20 years." Further, he said, "The amount of memory in HDTV receivers is predicted to be greater than all the memory of all computer put together, so whoever gains that market will be able to pick up the computer market as well."}

"AT&T and Zenith in TV Deal", New York Times, 1 MAR 89, p. B1. {Announcement of plans to work jointly to develop and produce an entire HDTV system, concentrating on receivers. Estimated price of the receivers, which will be based on Zenith's NTSC-compatible design, is below \$2000, approaching \$1000. Initial prices for Japanese MUSE receivers are estimated to be more than \$3000. The partnership has applied to DoD DARPA for funding. DARPA has said

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that it will award grants of \$30 Million to private groups for development of HDTV. To date, 20 requests have been received.) (Players)

"'Smart' TV Set Tapes Viewer's Preferences", Insight, 6 MAR 89, p. 46. {A San Francisco based company is marketing a \$6000 device that incorporates a TV with and intelligent VCR. The SmartTV has a telephone link which it uses to consult a central computer to gain programming schedules and viewer preferences. SmartTV then automatically records programs according to the options and preferences communicated from central. Up to 186 hours of programming can be stored and commercials can be scanned at 30 times normal speed or edited from the recorded presentation entirely. SmartTV presents the home viewer with a menu of available recorded material. Metaview expects SmartTV's price to drop to below \$1000 within three years.}

"Southern Bell Provides HDTV System for Monitoring of Discovery Launch", Fiber Optics News, 20 MAR 89, p. 6. {Southern Bell provided NASA Including a monitoring system with 3 HDTV cameras and 4 monitors. In addition, a monitor was set up in Orlando, 110 miles from the signal origination site. The signal was transmitted over optical fiber. This is the farthest distance that HDTV has been transmitted over fiber to date. HDTV transmission equipment was supplied by Grass Valley Group and Bellcore supplied technical assistance.} (Players)

"TIA Report maintains Fiber Optics Will Strengthen US Competition in HDTV", Fiber Optics News, 17 APR 89, pp. 1-2. {The Fiber Optics Division of the Telecommunications Industry Association, which is composed of 42 companies manufacturing optical fiber components and systems for telecommunications applications, released a report that states that there is a synergistic relationship between optical fiber technology and HDTV and that alternative optical fiber interconnection standards should be adopted concurrent to terrestrial broadcast standards.}

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"A Preliminary Analysis of the Rand LMS Study", Bell Communications Research, DEC 86, Martin A. Koschat, Dale E. Lehman and Elaine Sieff. (Regarding peak-load pricing, it's more efficient than flat-rate pricing, contrary to conclusions of a flawed Rand study.)

Transmission Cost Comparison (SSE/R-86/019), Satellite Systems Engineering, Bethesda, MD, 1987. (Compares the costs of transmission for three technologies: Satellite transmission, Optical Fiber and Microwave. Although the cost advantages of fiber are restricted to short-haul applications, it was noted that the crossover point (essentially the demarcation between short-haul and long-haul) has progressively increased. Over a period of 18 months, it was noted that the crossover point increased from 1000 miles to 1300 miles, meaning that faster rates of economy for fiber are eroding the long-haul advantage of satellite technologies.) (Complementary Technologies, Evolution)

"Local Competition in the Telecommunications Market and Resale of Network Services," Bell Communications Research, 1986, M.B. Hoffberg, et.al. (Emergence of new competitive structure for local exchange. "Campus managers" concentrate demand of otherwise unrelated end users and provide competition to LEC, while generally being customers of LEC. Internal campus bypass is provided between members of campus. External campus by-pass links members to others outside campus without using facilities of LEC.) (Evolution, Players)

"Value/Cost Considerations for Broadband Services on Optical Fibre," Globecom '86: IEEE Global Telecommunications Conference Communications Broadening Technology Horizons, Conference record (Cat # 86ch2298-9) Houston TX, 1-4 DEC 86 (New York, IEEE 1986), p. 396-400, vol. 1, M. De Bortoli, A. Moncalvo. (CSELT). (How to achieve economies for local loop network.) (Evolution)

"ISDN Service Provisioning Costs," IEEE ISS, p. 320, MAY 87, P.E. Proctor. (Service provisioning costs in a steady state ISDN environment will be substantially less than today. Savings are due to four factors. (1) Integrated access of ISDN -- two circuits can be carried on a basic access line. (2) Reduction in circuit design. 3) Reduction in plug-in administration. 4) Availability of performance monitoring data.) (ISDN)

"Costing and Pricing the Network of the Future," IEEE ISS, MAY 87, p. 483, Bruce Egan. (Development of new costing and pricing structure for efficient utilization of future network.)

"Illinois Bell Studies Local Loop Fiber," Telephony, 10 AUG 87, p. 62, George P. Lynch. (Studies by Illinois Bell found that a

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two fiber 200 Mbs line into the home would cost \$7,000/subscriber. With VLSI this may drop to \$2,000 soon.) (Evolution, Trials)

"User Arbitrage and ISDN," Presented at the USTA Conference on Local Exchange Pricing, New Orleans, LA, 16 NOV 87, L. Anania & R.J. Solomon. (In future IBN network, variable pricing could be exploited by arbitrage to detriment of carrier. Pricing may have to based entirely on access and maximum bit rate provided.) (Evolution, Standards)

"Cost Factors Relative to the Fiber Optic Backbone System," ATC Engineering & Technology (internal communication), 1988, C.T. Baggett. (Cost analyses to ascertain the economic viability of the fiber backbone in a typical suburban cable TV system. Author thinks fiber backbone can be installed for \$30 per subscriber.) (Fiber, Players)

"Fiber Revolution of 1990: A Stalking Horse," The Gartner Group, 16 FEB 88. (Analysis challenges view that the evolution from copper to optical media will be slow. If fiber is to make inroads on copper, three things must happen: (1) bandwidth for existing applications must increase; (2) fiber costs must fall; (3) multiplexing costs must decline. Gartner believes all three things will happen.) (Evolution)

"Good Bye Cable TV, Hello Fiber Optics," Forbes, 9 SEP 88. (Component costs (fiber, laser diodes) are decreasing but estimated costs of a fiber network are still in the \$200 Billion range. Current cable network investments are estimated at \$13.3 Billion. In addition, speculation is loading many cable systems down with debt.) (Players)

"Corning Develops Economic Model to Compare Fiber vs. Copper Costs," Fiber Optics News, 26 SEP 88, p. 8. (A computerized model that uses keyed in data about a given network and projects the costs of four different technologies: analog copper; digital copper; multimode fiber and single mode fiber.)

"The Economics and Pricing of Broadband," Sixteenth Annual Telecommunications Policy Research Conference, Airlie, VA, Stanford L. Levin, 30 OCT - 1 NOV 88. (At a broad brush level, suggests some principles which should inform pricing.)

"Council on Competitiveness Tells Government to Strengthen US Tech/Fiber Base," Fiber Optics News, 14 NOV 88, p. 8. (The Council published a report that stressed the apparent lack of ability on the part of US industry to capitalize upon US

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inventiveness. It urged government leadership in the matter, specifically in the forms of DoD efforts to develop the industries and wider focus of national R&D efforts.) (Evolution)

"The Price is Right: What's So Expensive About T-3?", C. Thomas Rush, Communications Consultant, DEC 88, p. 42. (The same economic arguments that favor the utilization of leased T-1 circuits for high volume communications users apply to T-3 (28 x T-1) for very high volume users. The breakeven point for T-3 is estimated to be at 91 voice lines which is 7 T-1 or one quarter of a T-3 circuit's capacity.)

"AT&T to Take a \$6.7 Billion Charge in Period," Wall-Street Journal, 2 DEC 88, p. A3. (AT&T's conversion plan from analog to digital is running about two years ahead of schedule due to competitive pressures. In an attempt to reduce depreciation charges, it took a pre-tax charge in the fourth quarter and cut 16,000 jobs.) (Evolution)

"NBC Planning to Revise Affiliate Compensation," New York Times, 12 DEC 88. (The evolving market for television is forcing networks to rethink the manner in which they distribute their programming. The trend is to get the payouts that go to local affiliates reduced.) (Players)

"Telcos" We Lose \$3.7 Billion to Bypass", Communications Week, 7 NOV 88, p. 6. (There is some discrepancy as to reporting and accounting procedures and abilities on the part of the RBOC's. A bypass board formed of FCC and state regulators is investigating claims.)

"Tempering the Urge to Tax Cable", Cablevision, 29 AUG 88, p. 36. (As cable systems change hands, property values have been generally assessed at higher and higher levels, creating a tax burden the cable companies must bear that has become non-trivial.)

"Cable Evolving into Retail Business, Says Dolan", Broadcasting, 12 DEC 88, p. 43. (Cablevision chairman Charles Dolan predicted that the cable business will come to resemble retail stores offering a wide selection of products in the future. Basic "monolithic" service packages will become a thing of the past as subscribers will be offered the opportunity to "shop" for individual channels.)

"Cable vs. Telcos Over Fiber", Broadcasting, 12 DEC 88, p. 48. (The closing session of the Western Cable Show set representatives of the cable industry opposite representatives of

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two telcos. Cable representatives were critical of telco entry into video delivery. John Sie, senior VP of Tele-Communications Inc. stated that the cost of coax for video delivery was \$350 per subscriber vs. \$1700 per subscriber for fiber. Steve Effors, president of Community Antenna Television Association criticized the FCC for not "really knowing what they are doing in every field", and being "caught in the clutches of a bunch of idealogues".)

"FCC Sets Rates for Depreciation", Telephony, 9 JAN 89, p. 1. {On 6 JAN 89, FCC prescribed depreciation rates and amortization charges that would result in a decrease of \$37 Million in annual depreciation charges for 18 large telcos.} (Regulations)

"\$24 Billion Spells Mostly Sunny Skies for the US Telecom Industry", Telephony, 9 JAN 89, pp. 22-31. {Driven by the push toward digitalization and installation of fiber, telecommunications expenditures by the RBOC's and IXC's are expected to rise slightly, contrary to earlier expectations of a slight decrease in expenditures. The IXC's project decreases in expenditures while the increases in RBOC projections more than make up for the IXC decreases.} (Evolution, Players)

"HDTV Tests on No-Frills System Run Without a Hitch, NCTA Says", Multichannel News, 30 JAN 89, p. 6. {Jones Intercable in Anne Arundle County, MD was one test site for transmission of a MUSE HDTV signal over a "no-frills" CATV transmission plant. The next step will be to deliver the MUSE signal over a satellite link.} (Players, Japan)

"AT&T Post Expected Loss", Telephony, 30 JAN 89, p. 1. {AT&T posted its first ever annual loss in the wake of its \$6.7 Billion writedown for plant modernization at the end of 1988. In spite of the negative numbers, revenues in many businesses were up for the year.} (Players)

"Dealmakers Are Burning Up the Phone Lines", Business Week, 13 MAR 89, pp. 138-146. {Reviews the growing trend to form deals and partnerships in the telecommunications industry in order to share the risks involved in new technology development and marketing.} (Evolution, Players)

"FCC IXC Study Will Take Time", Telephony, 17 APR 89, p. 1. {FCC Chairman Dennis Patrick and Commissioner Patricia Diaz Dennis endorsed a study of competition in the Inter-exchange Carrier (IXC) market. The study is likely to take several months to complete, although a working paper may soon be released. It is unknown how coming changes in FCC leadership will affect the

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study.) (Players, Regulations)

DEMAND FOR BROADBAND

"Assessing Demand for Broadband Networks: Methods of Data Collection and Analysis," ICC '79 Conference Record (35.1.1.), 10-14 JUN 79, **Michael Tyler**. (Demand for broadband should be assessed by examining applications of leading users. Paper develops flexible techniques for assessing demand.) (Applications)

New Marketing Strategy of Telecommunications Services in Japan, MIT Sloan School, Masters Thesis, 1 MAY 81, **Yusuke Kume**. (Survey results of consumer evaluation of new telecommunication services relevant to broadband networks.) (Applications, Japan)

"Broad-Band Communications -- Economic and Social Implications," IEEE Journal on Selected Areas in Communications, vol. SAC-4, no. 4, JUL 86, p. 640, **Jurgen Seetzen**. (About 33% of businesses will use videotelephony by 2010.) (Applications)

"The Demand for Broadband Services to the Home," Paper presented at MIT Workshop on Universal Broadband Telecommunications, 29 OCT 87, **Henry Elkington**. (Fiber network will rely heavily on one way video entertainment services; demand for new services will vary from area to area.) (Applications)

"Ohio Study Finds Users Care Most About POTS," BOC Week, vol. 4, no. 45, 16 NOV 87, p. 6. (Survey of 3,000 (1/3 business; 2/3 residential) users found no great demand for new services. Among figures cited: 25% have more than one phone; 8.8% have answering machine; 2.2% have modem; 8.7% of business users subscribe to WATS.) (Applications)

"Left in the Dust," Cable Television Business, 1 JAN 88, p. 54, **Chuck Moozakis**. (Article reports HBO survey on HDTV. Of 507 residents in Danbury Connecticut, 43% said they would pay more for HDTV, 50% said they would spend up to \$1,000.)

"Venture Development: FDDI Positioned to Become Major Force in 4 Areas," Fiber Optic Newsletter, 22 AUG 88. (Venture Development Corp has published an optimistic market study of the effects of the Fiber Distributed Data Interface (FDDI) standard. Confidence is fueled by support of major vendors (IBM, DEC, and 3Com) and the Federal Government.)

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"The Reverticalization of the Telecommunications Market," IEEE Communications Magazine, JAN 87, vol. 25, no. 1, p. 16, M.W. Dawson. (Argues for limited RBOC entry in CPE.) (Players)

"Post-Divestiture Telecommunications Policy Making," IEEE Communications Magazine. JAN 87, vol. 25, no. 1, p. 47, B.R. Moir. (Argues that RBOC's should not be allowed into CPE and long distance.) (Players)

"Computer III: Breakout for the BOC's," IEEE Communications Magazine. JAN 87, vol. 25, no. 1, p. 49, R. Wiley & R.M. Senkowski. (Computer III is first step toward deregulation. Computer III still leaves many unanswered questions about CEI and ONA.) (Players)

"Computer III: The Beginning or the Beginning Of The End for Enhanced Services Competition," IEEE Communication Magazine, AUG 87, vol. 25, no. 8, p. 35, Joel R. Wolfson. (In relation to equal access, Computer III is a gamble. Considers that BOC's and AT&T may cross-subsidize between regulated basic services and unregulated enhanced services.) (Players)

"Regulatory Update: The Issue is Still the Bottleneck," Teleport Report, SEP 87, p. 4. (Green bases decision inhibiting RBOC's from long distance and manufacturing on opinion that RBOC's could thwart competition because of bottleneck control over local exchange.) (Players)

"Task Force Urges Information Service Access for All Phone Subscribers," Communications Daily, 22 OCT 87, p. 7. (Independent consumer task force commissioner urges universal telephone service entail access by all California residents to new information services.) (Players)

"Reply to NYNEX Request for Waiver to Provide International Telecommunications," Teleport Communications, 22 FEB 88. (Argues that in its request for waiver, NYNEX "grossly overstates the status of competition in large user exchange access.") (Players)

"A Major Victory for Cable Viewers," New York Times (OP-ED page), 18 MAR 88, S.W. Dean & E. Schmuckler. (Reviews recent decision against Time, owner of Manhattan Cable, in which court ruled that cable operator must make channels it does not own, like Bravo, available.)

"MacCarthy Puts Telco Burden of Proof on Cable Television," Broadcasting, 9 MAY 88, p. 32. (Commissioner Dennis (FCC) is reported to have two main concerns about telco entry into providing content: (1) her belief that telcos should be allowed

to offer certain voice storage and retrieval services (eg. electronic mail); (2) future HDTV bandwidth requirements would make fiber an imperative. She was quoted as saying that "When the cost of copper wire crosses that of fiber, I wonder whether it will make any difference to cable if telcos get in ... cable has to think strategically of what kind of business it wants to be, because fiber will be there eventually." (Players)

"Legal Factors Affecting Whether One Wire into the Home Will be a Reality in Twenty Years," Spiegel and McDiarmid, Washington, DC, 1988, Anne Swanson. (Executive summary of the evolution of American communications policy as it applies to the provision of video and information services by telcos and cable companies.) (Evolution)

"Video Program Distribution and Cable Television: Current Policy Issues and Recommendations," NTIA Report 88-233, JUN 88, US Department of Commerce. (Argues for establishment of "video dial-tone" and distribution by telcos of cable signals.)

"NTIA Says Municipal Franchising of Cable Dis-serves Public Interest," Communications Daily, 16 JUN 88. (Toward end of multiple channel competition in cable industry, NTIA wants to eliminate local government franchising of cable and allow telcos to provide leased common carrier video services for cable operators, Hollywood studios, sports organizations and broadcasters.) (Players)

"Crusader Wants Baby Bells Off the Ropes," Wall Street Journal, 14 SEP 88, p. 41. (William L Weiss, CEO of Ameritech is an outspoken critic of current regulations barring the RBOC's from manufacturing equipment and providing information services.) (Economics, Players)

"Cable Operators Attack Studies Saying They Deny Access to Many TV Stations," Wall Street Journal, 14 SEP 88, p. 40. (See title.)

"Pacific Telesis Gets Approval for Some Cuts in Prices, and Analysts See a Twofold Benefit," Frank Allen and Julie Amparano, Wall Street Journal, "Heard on the Street" column, 29 SEP 88. (California State Public Utilities Commission allowed Pacific Telesis to cut its prices in order to be able to compete effectively. This development is seen as granting PacTel the ability to stem further erosion of its client base (PacTel has lost 11 of its 20 Centrex business customers in the past 3 years), in addition to possibly presaging a softening in the PUC's stance with regard to the RBOC.) (Economics)

"NTIA Denounces Local Franchising," NATOA News, Cynthia Pols, SEP/OCT 88, p. 4-7. (The Department of Commerce agency released a report that sharply criticizes the current municipal franchising process as being politicized and inefficient. The report

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"NTIA Denounces Local Franchising," NATOA News, Cynthia Pols, SEP/OCT 88, p. 4-7. {The Department of Commerce agency released a report that sharply criticizes the current municipal franchising process as being politicized and inefficient. The report recommended that telcos be allowed to enter local markets by providing conduit on an unfranchised basis as video common carriers.} (Players)

"FCC Restricts Charges in Use of Private Lines," Wall Street Journal, 14 OCT 88, p. A3. {"Strategic pricing," whereby a local carrier charges prices for leased lines yielding 40% profit in order to encourage big users to stay on the public network, was voted to be allowed in principle by the FCC, but under restricted situations. A carrier couldn't charge rates so high in relation to true costs that they would "hinder a customer's choice of services [or] the development of new technologies."} (Economics)

"FCC Asks Revamp of Copyright Rules Covering Cable TV," Wall Street Journal, 28 OCT 88, p. B5. {In a 2-0 vote, the FCC chose to recommend that Congress revise current royalty payment rules that apply when cable companies carry programming from distant stations. FCC Chairman Dennis called such rules a "programming subsidy for cable." In favor of changing the rule: The Motion Picture Association. Opposed: The National Cable Television Association. The broadcasting industry was reported as being more interested in getting local must carry rules reinstated.} (Players)

"Separate Statement of Commissioner Patricia Diaz Dennis in Re: The Matter of Telephone Company Cable Television Cross-Ownership Rules," Federal Communications Commission, Patricia Diaz Dennis, 16 NOV 88. {Advocates a strong pro-competitive policy. Let LEC's in to provide video dial-tone, but do not let them buy up existing cable companies.} (Evolution, Players)

"The Hard Issue of Opening Cable TV to the Baby Bells," New York Times, 28 NOV 88, p. D14. {Brief review of issues and concerns regarding the FCC recommendation to open cable business to telcos.} (Economics, Evolution, Players)

"Telco Entry Into Cable Gets Blessing of Two NLC Committees," Communications Daily, 7 DEC 88, p. 1. {Two National League of Cities committees went on the record stating that telcos should be allowed to enter cable business in their local service areas. In addition, among other things, the NLC called for clearer definition of "competition" in the cable business, disputing the FCC's definition of 3 off-air signals and suggested that telcos be allowed to enter the cable business but not be allowed to buy

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existing cable companies.) (Evolution, Players)

"Muddling Through the Must-Carry Mess", Channels, SEP 88, pp. 48-51. {Summary of the must-carry debate. Questions of the lack of hard data and possible competitions between local cable companies and local independent TV stations for local advertising are raised.}

"NTIA Denounces Local Franchising", NATOA News, SEP/OCT 88, pp. 4-8. {National Telecommunications and Information Agency releases a report that criticized the current cable franchising process as too political and ill-equipped to meet "ill-defined future developments". Allowing telco entry into video provision on a common carrier basis was recommended.}

"The Ghost in the Machine -- A Natural Monopoly in Broadband Time-Sharing", Telecommunications, OCT 87, pp. 41-42. {Argues that the arguments for integrated universal service that have been applied to the telephone industry in the past will become important as an IBN is developed, indicating that IBN might best be regulated as a common carrier to ensure uniformity and control of services and the "openness" of the network.}

"The Ol' Greene Light", Communications Week, 20 JUN 88, p. 10. {Judge Greene approved Southwestern Bell's and Pacific Telesis' proposals for interLATA one-way paging.} (Players)

"FCC Takes First Steps on HDTV", Cable TV and New Media, Leander Publications, New York Law Publishing Company, NY, SEP 88, pp. 2-7. {Report on FCC actions with respect to HDTV.} (Applications)

"The Must-Carry Numbers", Cablevision, 12 SEP 88, p. 11. {FCC presented Congress with the data from a questionnaire survey of 8,500 cable systems and 1,400 television stations, which 4300 cable systems and 900 television stations answered. 280 of the 900 reported being dropped, 313 reported being shifted and 65 reported having to pay fees for carriage in certain channels.}

"Boldly into Brooklyn", Cablevision, 12 SEP 88, p. 11. {Cablevision Systems began wiring Brooklyn, NY. The company intends to offer basic cable service for \$1795/month but also intends to offer subscribers the opportunity to buy cable channels on a per channel basis sans basic. The marketing strategy is drawing criticism.} (Players)

"FCC Gives Go-Ahead to AT&T Calling Plan", Communications Week, 19 SEP 88, p. 26. {FCC approved AT&T's "Multi-Location Calling

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Plan" (MLCP) tariff, which essentially calls for volume discounts for high volume users of WATS services.)

"Regulations Must Accommodate Technology", Multichannel News, 19 SEP 88, p. 56, Jeannine Aversa. {Speaking before the International Institute of Communication's annual convention in Washington, DC, Thomas Bolger, chairman and CEO of Bell Atlantic called for a regulatory stance that allows telecommunications providers to utilize technology to its fullest capability. Mr. Bolger was quoted as saying, "Regulation for the sake of regulation, unlike art for art's sake, is an exercise in sterility, inhibiting innovation and economic growth. Regulations must be shaped by technological and market imperatives."} (Players)

Through the Looking Glass: Integrated Broadband Networks, Regulatory Policies, and Institutional Change, {OPP Working Paper No. 24}, by Robert M. Pepper, Federal Communications Commission, Washington DC, NOV 88. {In a 106-page report, Robert Pepper identifies the current franchising system as being counterproductive with respect to the development and provision of IBN. He suggests that the rules be eliminated or changed to allow anyone, not just the cable operator, to lease channels. Mr. Pepper also concluded that simply allowing telcos into video distribution would not necessarily work in favor of IBN development. If the telcos simply acquire existing cable facilities, we would be trading "one de facto monopoly for another". With regard to rate regulation of a future IBN, Pepper wrote that, "Traditional voice telephony and broadband video transmission are so different that any attempt to prove them using the same procedures or measures will likely prove futile."} (Evolution, Economics)

"...while Congress tightens screws on the FCC", Data Communications, NOV 88, p. 25. {Congress has passed an amendment to the FCC's authorization bill that requires that FCC render decisions on all tariff investigations within 12 months. The time limit is extendable to 15 months in "extraordinarily difficult cases".} (Economics)

"Information Laws Are Dated in Electronic Database Era", Data Communications, NOV 88, p. 26. {Raises the question of whether or not the Freedom of Information Act of 1966 should be perceived to include electronic information.} (Applications, Demand)

"Justice Asks Greene to Deregulate Multi-LATA Paging", Data Communications, NOV 88, p. 26. {DOJ issued a brief that recommended a blanket waiver for all RBOC's that wish to offer

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paging services outside their geographic regions.) (Applications, Players)

"Former Presidential Candidate Now Plays the Politics of Computer Networking", Data Communications, NOV 88, p. 105. {Senator Albert Gore is campaigning for a "National Research Net" that would connect the nation's supercomputers and research labs over a 3 Gbs backbone with 45 Mbs drops. He intends to introduce a bill to Congress to link the installation of such a network to supercomputer and software research appropriations. He expects that such a bill could win enough support to pass by the end of 1989.} (Demand, Evolution)

"Newspapers Pursue Compromise with Bells", Communications Week, 21 NOV 88, p. 9. {The American Newspaper Publishers Association made overtures to bridge the rift that has separated them from the RBOC's. However, they also warned lawmakers that Bell entry into electronic publishing would stifle competition in the information services market.} (Players)

"US West: Unfair Play?", Communications Week, 21 NOV 88, p. 12. {Days before a public referendum proposing to deregulate some of the businesses that US West is engaged in was to be put to a vote, South Dakota Public Utilities Commissioner Ken Stofferahn released documents that were generated internally in US West that imply anti-competitive behavior. US West claims the documents were used in training scenarios.} (Players)

"The Promise of Telco Video", Communications Week, 21 NOV 88, p. 13, Lawrence D. Gasman. {A personal perspective on the true issues behind the telco/cable struggle over video delivery. Cable companies as yet fail to see future telco IBN's as opportunities. They have confused their networks with their main business, which is assembling and marketing programming packages.}

"Continued Deregulation Looked for Under Bush", Multichannel News, 21 NOV 88, p. 50. {See title.} (Players)

"High Court Must Rule on Franchising: Attorney", Multichannel News, 21 NOV 88, p. 51. {Article reviews some of the issues and arguments on both sides of the question of whether or not cities have the legal right to offer exclusive franchises to cable companies.}

"FCC Approves Major Pieces of ONA Plans", Telephony, 21 NOV 88, p. 1. {FCC asked BOC's to resubmit proposals with emendations by MAY 89. AT&T's ONA plan was accepted with certain conditions

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which were not outlined in the article. FCC says it prefers cost-based rather than market-based pricing. A joint conference with the states and FCC will be held in order to work out differences.)

"Dennis Knocks FCC Cable/Telco Assumptions", Telephony, 21 NOV 88, p. 15. {FCC Commissioner Patricia Diaz Dennis released a statement that the tentative conclusion reached by the FCC the previous summer was not supported by the evidence. "If LEC's were allowed unconditional entry into the cable television business, they could and probably would do so through acquisition of existing systems." The Commissioner stated that the NTIA's suggestion of a video dialtone has great promise and that New York state's proposal of allowing LEC's to provide broadband common carrier service bears consideration.)

"Policy Debate in '88 Hottest Since Divestiture", Communications Week, 26 DEC 88, p. 20. {Brief of the highlights of regulatory change in 1988. Included are ONA, price cap regulation and customer-specific tariffs.)

"Dennis Upbeat, Greene Less So, about ONA Rules", Data Communications, JAN 89, p. 25. {FCC Commissioner Patricia Diaz Dennis said that the ONA rules indicated that the FCC now accepts the convergence of telecommunications and information processing and that the "30-year effort" to separate the two is "almost at an end". However, Judge Greene was quoted as saying that the conditions that existed at divestiture and that required separating businesses still exist and did not see the RBOC's moving very quickly into the information services market.)

"Telco Entrance Into Cable TV Deplored, Endorsed, and Called Unready", Data Communications, JAN 89, p. 26. {Deplored by cable, endorsed by telcos and called unready by broadcasters and the Citizens Communications Center. FCC commissioner Dennis was quoted as saying, "...if we let telephone companies offer video services, we should also let cable companies offer two-way voice, data and video services. In other words, we should let cable companies do more of what telcos do now."} (Evolution)

"Panelists Spar Over Cable, Telco Issues", Broadcasting, 9 JAN 89, p.50. {FCC Commissioner James Quello fired questions at an INTV panel that included representatives from TCI, Paramount Studios and independent broadcasting industry. The representative from TCI warned against telco "bypass" of broadcasters. However, consensus in the Broadcasting industry seems to be that the threat of telco entry has made cable companies more willing to make deals and that the drive toward

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allowing telco competition with cable should be continued, although with caution.) (Evolution, Players)

"Justice: Loosen Rules on Bell Manufacturing", Communications Week, 9 JAN 89, p. 5. {DoJ requested that Judge Greene reinterpret MFJ restrictions to allow RBOC's to finance the manufacturing activities of any company "in which they have neither a significant equity interest nor influence over operations". Further, DoJ suggested that RBOC's should be allowed to receive royalties from equipment sales to third parties.) (Economics)

"Congress Eyes Cable Market", Communications Week, 9 JAN 89, p. 30. {A senior counsel to the House Committee on Energy and Commerce was quoted as saying that it is unlikely that Congress will seriously address the issue within the next two years, perhaps not before the next five years.}

"The Paralysis of MFJ Analysis", Communications Week, 16 JAN 89, p. 15. {Personal perspective of the chairman of BellSouth. He says that the MFJ restrictions on research and manufacturing are materially hurting the technological sophistication of American industry.) (Economics, Evolution, Players)

"FCC's Quello Doubtful on Cross-Ownership", Telephony, 16 JAN 89, p. 1. {FCC Commissioner James Quello made a statement on 12 JAN in which he expressed doubts similar to those expressed earlier by Commissioner Patricia Diaz Dennis with regard to allowing telcos to freely enter the cable business. He said that he saw "little upside to replacing one unregulated monopoly with another larger monopoly". He also expressed interest in letting telcos compete with cable companies if some regulatory safeguards were instituted. He stated that nationwide telco entry into cable could require a new regulatory structure.) (Evolution, Players)

"The Regulatory Debate Over Gateway Service", Telephony, 16 JAN 89, p. 21. {When Judge Greene allowed RBOC's to provide information gateway services last year, he set the stage for the appearance of certain paradoxes. One of these is currently before the Judge awaiting a ruling. Bell Atlantic has proposed to offer a gateway in the state of Pennsylvania in which centralized processing of information occurs. The processor, which would be located in Philadelphia if approved, would provide user instructions and assembler-disassembler information for routing the call to the information provider. The call would originate and terminate in the same LATA and if needed be routed to an IXC even if the caller is in a LATA other than the one in which Philadelphia is situated. The alternative would be to

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duplicate the processing capability in all five LATAs in Pennsylvania, which Bell Atlantic claims would raise the cost of the trial by over \$2 Million and delay implementation by at least 6 months. There is a precedent for this sort of transLATA processing in, for example, furnishing directory assistance information.) (Economics, Evolution, Field Trials, Players)

"BellSouth Heralds Merged CPE, Network Services", Telephony, 23 JAN 89, pp. 13-14. (Acting under authority granted by the FCC, BellSouth merged its CPE manufacturing and marketing activities with its network services activities, using accounting procedures to separate regulated from unregulated activities. The reorganization, though costly, allowed BellSouth to dissolve its money-losing manufacturing subsidiaries. BellSouth broke even in 1988 despite the multimillion dollar reorganization. Former FCC Chairman Mark Fowler is credited with the order that allowed the reorganization. Mr. Fowler was quoted as saying that Judge Greene is acting as a "mini FCC" without the regulatory experience. "He is about 10 years behind".) (Economics, Players)

"Greene Blocks Bell InterLATA Gateways", Communications Week, 30 JAN 89, p. 1. (Report on Judge Greene's decision to disallow Bell Atlantic's request to use centralized route processing in its gateway trial.) (Field Trials, Players)

"FCC to Consider Price Caps", Communications Week, 30 JAN 89, p. 4. (FCC Commissioner Dennis Patrick will champion price cap legislation.)

"Greene Rejects InterLATA Gateway Plan", Telephony, 30 JAN 89, p. 9. (Judge Greene ruled on 25 JAN that Bell Atlantic's proposed centralized processing gateway scheme constituted interexchange service and that the "official services" exemption under which such interexchange services as directory assistance are allowed are not germane. The "official services" are those that are "necessary to run the telephone system". Judge Greene stated that the proposed gateway service "is not an inherent part of any service being legitimately provided by the regional companies". The decision is expected to drive the price of gateway services higher and delay introduction, particularly in rural areas where demand may not be great enough to justify the expense of a gateway processor.) (Economics, Evolution, Players, Field Trials)

"PacTel Allowed Overseas", InformationWEEK, 20 FEB 89, p. 24. (In separate decisions, Judge Greene allowed a PacTel waiver request to participate in a Japanese consortium to build a trans-Pacific fiber optic cable and denied Nynex's request to participate in a 50/50 partnership with Britain's Cable and

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Wireless in a trans-Atlantic fiber optic cable. The reason for the differing decisions was that Nynex wanted to sell rights in the US but PacTel would participate only in the Japanese side of the cable.) (Players)

"Cross-Ownership Needs Study", Telephony, 6 FEB 89, p. 1. (FCC Commissioner Patricia Diaz Dennis went on record saying that public hearings on the issue of allowing telco/cable cross-ownership are needed.) (Players)

"FCC Needs Congressional Pressure; Price Caps Slated for March Agenda", Telephony, 6 FEB 89, p. 10. (FCC chairman Dennis Patrick pulled the price cap proposal from the congressional agenda shortly before the Congress was due to consider it on 30 JAN. The proposal is due to be resubmitted for consideration in March. It was pulled in order to allow more time for FCC and Congress to discuss the matter. The plan for LEC's was seen as being the most contentious, requiring a harder "sell". The move was seen as being responsive to the new conciliatory spirit under the Bush administration.) (Economics, Players)

"Siemens Goes to Bat for RHC's", Telephony, 6 FEB 89, pp. 15-16. (Siemens told the US Commerce Department that US competitiveness is being eroded by the restrictions on design and manufacture of hardware and software that are imposed on the RHC's. NTIA is conducting an on-going investigation of the economic impact of the restrictions. Richard Blake, VP for Strategic Planning for Siemens says that while foreign telecommunications concerns are making forward progress, the US "ties the hands of seven of its most potentially dynamic telecommunications firms".) (Economics, Players)

"New York PSC Votes to Order New York Telephone to Interconnect With Teleport Communications", Fiber Optics News, 27 FEB 89, p. 6. (New York Telephone must file a tariff providing Teleport and other carriers with an interconnection arrangement for private line service. In MAR 87 Teleport filed a petition with the FCC regarding anti-competitive activities on the part of New York Telephone. The FCC has yet to rule on the matter.) (Evolution, Players)

"AT&T Price Cap Vote Revamps Market", Communications Week, 3 APR 89, p. 16. (The institution of price cap regulation, whereby prices charged, not profits, are regulated, was welcomed by many in the telecommunications industry as a step forward, "setting the stage for complete deregulation". FCC estimates that the new rules could save consumers \$700 million and businesses \$200 Million over the four year trial period.) (Economics)

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"MFJ Measure Due This Week", Telephony, 17 APR 89, p. 1. (Action is expected in the Senate to alter some of the restrictions that the MFJ imposes on telcos. Senator John Breauz (D-LA) indicated that he would introduce a resolution to the Senate to "get the ball rolling" although there is still no agreement as to what the Senate should do.) (Players)

"Court Sidesteps Cable/Telco Issue", Telephony, 17 APR 89, p. 1. (US Court of Appeals in Washington declined to address the issue of the constitutionality of the telco/cable crossownership ban. The issue was raised in regard to a 1985 finding by the FCC that Northwestern Indiana Telephone Co. had violated the ban.) (Players)

"FCC Approves Tariff 12 Concept; Rejects AT&T's Tariff Restrictions", Telephony, 17 APR 89, p. 12. (FCC approved the concept of providing customized networks for large business customers but rejected Tariff 12 provisions due to restrictions of availability to other customers. Commissioner Patricia Diaz Dennis called for an inquiry into competition in the IXC market.) (Economics, Players)

"FCC Releases Price-Cap Plan", Telephony, 24 APR 89, p. 1. (FCC's order for price cap-regulation of AT&T was released in a 500 page document. In addition, FCC proposed a price-cap plan for the LEC's.) (Economics)

"MFJ Bill Would Allow RHC's Into Manufacturing, Info Services", Telephony, 24 APR 89, p. 8. (A bill intended to bring about MFJ reform, superceding existing anti-trust regulations, is expected to be introduced soon by Rep. Swift (D-Wash.) and Rep. Tauke (R-Iowa). The bill would place FCC in charge of regulating RHC information activities.) (Evolution, Players)

"DoJ Hits Greene's Legal Standards", Telephony, 24 APR 89, p. 85. (DoJ Maintains that Judge Greene erred in upholding most of the MFJ restrictions during the 1987 triennial review. Justice charged Greene with "three fundamental misconceptions". These were (1) mistaking "legitimate" investment of profits from regulated activities into unregulated activities as cross-subsidization; (2) improperly equating the interests of competitors with the interests of consumers; and (3) arbitrarily excluding two key factors from his assessment: the success of divestiture and the potentially increased effectiveness of FCC.)

PLAYERS

"The New Border Wars: Confrontation Between Cable and Telco Interests," Telematics, vol. 1, no. 4, AUG 84, p. 1, F.W. Lloyd & T.J. Leahy. {Overview of cable and telco strategies to prevent each from usurping the other. Author foresees near term confrontation and long term cooperation.} (Regulations)

"Telephone and Cable Companies: Rivals or Partners in Video Distribution?," Telecommunications Policy, DEC 84, Walter S. Baer. {Review of cable and telco activities in 80's, re: new services and field trials. Concludes that major battleground between the two could be in future metropolitan area franchises.} (Trials)

"Comments on DOC Study," MCI Internal Memo, 8 JUL 87, Israel Switzer. {There are three reasons why cable networks do not have the potential to evolve into 2-way switchable broadband networks: (1) cable architectures are not suitable; (2) broadband itself will not arrive until well into the next century, ISDN will come first; (3) any new services which do catch on will be driven by business customers, and telcos will meet that demand.} (Demand)

"Looking for Allies," Broadcasting, 28 SEP 87. (Hollywood looking to telcos as future potential allies.)

"ATC Set to Enter Fiber Optic Cable Era," Multichannel News, 5 OCT 87, p. 76, Les Luchter. {ATC set to install fiber backbone in 1988 at a cost of \$25/subscriber. ATC will ultimately provide HDTV over fiber.} (Applications, Economics)

"Kahn Says Cable Industry Move to Fiber Optics is Vital to Future," Communications Daily, 8 OCT 87. {Kahn says cable operators need to replace coax with fiber to increase channel capacity and profits.} (Regulation)

"Seeing Fiber Optics in a New Light: Cable's Mindset Beginning to Change," Cablevision, 12 OCT 87, p. 48, Fred Dawson. {From a CATV perspective, addresses issue of cable-telco competition over providing video to consumers through fiber.} (Applications, Evolution, Regulation)

"Cable and Telcos Lock Horns over FCC Cross-Ownership Inquiry," Communications Daily, 4 NOV 87, vol. 7, no. 213. {Centel puts forth arguments against telco's ownership of fiber in local loop.} (Regulation)

"The CO 100: A Statistical Survey of the American Telephone Industry," CO Magazine, DEC 87, p. 22. {Ranks telcos by access lines and various financial measures.}

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"Reply Comments and Request for Further Notice of Inquiry; FCC Docket No. 87-266," 16 DEC 87, Association of Independent Television Stations, Inc. (In the matter of telephone company-cable television cross-ownership rules). (In light of new technologies, Association wants insurance that consumers continue to enjoy access to local free broadcast stations. Association wants the FCC to clarify some issues. To wit: (1) Who should own fiber into home? (2) Would regulation of fiber transmitter as common carrier depend on who owned the fiber? (3) If fiber approaches infinite capacity then will "must carry" rules apply? (4) What should be the relationship between "free television" and fiber television?) (Regulations)

"Reply Brief of Teleport Communications to New York Public Service Commission," Teleport Communications, 29 JAN 88. (Teleport argues that NYNEX is practicing anti-competitive behavior by under-pricing fiber lines in areas of Manhattan where Teleport is strong.) (MAN-LAN)

"Telcos and Utilities," Cable Television Business, 15 MAY 88, **Chuck Moozakis**. (Brief descriptions of skirmishes and alliances between CATV companies and telcos and electric utilities.)

"Prepping for the Big Catch," Cablevision, 4 JUL 88, p. 37, **Virginia Munger Kahn**. (Summation of the diversification activities of 7 RBOC's since divestiture.) (Evolution)

"Captain Courageous and the Albatross; It Isn't Clear Sailing Anymore for Ted Turner and Co.," Barrons, 11 JUL 88. (Speculative acquisition attempts have forced TBS \$200 Million into debt. Turner has reduced personal holdings to 62%, lost long range control and accepted curtailed spending authority. Mallone engineered Turner's bail out. (Mallone's) Telecommunications Inc. has acquired more than 150 cable cos. nationwide and controls 20% of the cable market, reaching "levels that warrant investigation and, perhaps, action by the FCC.")

"Top Cable Execs Stress Need for New Technology", Multichannel News, 25 JUL 88, p. 48. (Leaders in the cable industry agreed that the mood in Washington is tilting against cable and that in order to regain favor, cable players must make a concerted effort to develop and deploy new technologies.) (Regulations)

"Fiber Venture Targets Cable TV", Communications Week, 5 SEP 88, p. 8. (General Instruments and Alcatel NV have entered a joint venture to manufacture and market fiber for the cable industry.) (Fiber)

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"GI Makes Major Moves into Fiber", Cablevision, 12 SEP 88, p. 12. {General Instrument's Jerrold Division has been conducting R&D and consolidating staff for fiber optic products aimed at the cable market for the past year. Work is split between an AM trunking system, which would obviate the need to convert from FM, which most single mode fiber now uses to AM, which is the format used by cable companies currently, and an FM supertrunking system. Jerrold is also working with Corning to develop a fiber distribution system that would terminate either at the home or at the tap, capable of distributing video one-way as well as two-way voice and data.}

"Keeping Cable Technology a Step Ahead with Cable Labs," Broadcasting, John C. Malone, 5 SEP 88, p. 24. {Cable Television Laboratories, Inc. was formed in JUN 88 by a consortium of cable companies and charged with: (1) "Providing a central source of timely, evaluated information about technological developments of strategic importance to the cable industry; (2) Plan(ning) and fund(ing) critical R&D projects that can likely be supported only on a cooperative basis; (3) facilitating the transfer of relevant technology to member companies and suppliers."} (Technology)

"Audio/Video Agrees to \$98 Million Bid From Citicorp," Wall Street Journal, 20 SEP 88, p. 46. {Citicorp continues its expansion into the telecommunications and technology industries with acquisition of the specialty retailer of consumer electronic products and appliances.}

"Zenith Electronics Discusses Venture to Mend Consumer Electronics Unit," Wall Street Journal, 20 SEP 88, p. 74. {Zenith is seeking avenues to limit the damage that the consumer electronics division can do to the company's profitability. Zenith is not discussing details, however, it did disclose plans to develop an HDTV system, indicating that it may plan to stay in the business over the long haul. Zenith is the only US firm currently making televisions.} (Applications, Economics)

"...Worldwide Marketing Plans," Fiber Optics News, 26 SEP 88, p. 2. {QPSX, the firm that originated the dual, anti-parallel ring architecture that forms the heart of IEEE's pending 802.6 standard, plans to market the architecture outside of native Australia. The US market is being targeted because of its high concentration of metropolitan areas, which are seen as likely implementation sites for the MAN technology.} (Architecture, Standards)

"Infotron Steers Toward T3, ISDN and LAN's for Future Growth",

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Telecommunications, OCT 88, p. 12. (With a new president, James Castle, and two new board members, Infotron is newly dedicated to providing networking solutions to industry in the future. Infotron expects the T3 market will recapitulate the phenomenal and unexpected growth of the T1 market.) (Demand)

"Telcos" The Washington Connections", Broadcasting, 3 OCT 88, pp. 39-47. (Report on the efforts and resources that the 12 biggest telcos have devoted to lobbying in Washington.) (Regulations)

"The King of Cable TV", Business Week, 26 OCT 88, pp. 88-96. (Profile of John Malone, CEO of TCI.)

"If Not the US, Why Not the UK?", Telephony, 31 OCT 88, p. 15. (US West has acquired up to 25% interest in two cable companies in Great Britain, one in London, the other in Birmingham. In the UK cable companies are licensed as telecommunications companies, thus, US West will be able to engineer, construct, maintain and provide value added services over the networks, gaining valuable experience that it hopes to apply once telcos are allowed to provide video services in the US.) (Great Britain)

"Goddard Also Mentioned NAB Pres. Edward Fritts," Common Carrier Week, 17 OCT 88. (If Telcos can carry TV signals, then what good is a broadcasting license?) (Regulation)

"The CATV Industry: Statistics, Issues and Current Controversy," CWA Information Industry Report, 19 OCT 88, p. 2. (Cable industry continues to grow aggressively, although it is slowing down, due to maturation of the industry. Many quarters are seen as favoring lifting the ban on telco-cable cross ownership. Ralph Nader was quoted as saying that telcos should be able to "enter the cable TV business, provided they do not buy up cable TV properties but instead go "competitive"." Some cable companies are seen as trying to go the other way, experimenting with provision of telephone service.) (Regulation)

"AT&T Entering Field to Build New Networks," Wall Street Journal, 19 OCT 88, p. B4. (AT&T announced a new Systems Integration division. Initially it will sell telemarketing, data networking and network management applications. The initial target industries will be financial, manufacturing and distribution.)

"Tele-Communications Raises Stake in CVN and May Seek Control of Firm," Wall Street Journal, 3 NOV 88, p. B5. (Tele-Communications Inc paid \$7 Million to increase its holdings in CVN from 14% to 17.24%. Mr. Malone (of Tele-Communications)

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expressed interest in CVN and the home shopping industry.)

"Just Say When", Telephony, 7 NOV 88, p. 53. {Senior RBOC officer advocates telco provision of residential broadband service on common carrier basis. Also mentions ONA.) (Regulations)

"Cable Labs Elects Board Members", Multichannel News, 21 NOV 88, p. 47. {John Malone was elected chairman of board, James Doolittle was elected treasurer and Brian Roberts was elected secretary. Cable Labs reported that its membership now represents cable systems serving 75% of US cable subscribers. Richard Green, Cable Labs' president and CEO will serve on the board in an ex-officio capacity.}

"CBS Executive Predicts Cable-Dominated Future", Multichannel News, 21 NOV 88, p. 50. {See title.}

"Wielding Power in the Distribution Arena", Communications Week Closeup, 28 NOV 88, p. C6. {RBOC's are acquiring international companies that sell CPE.} (Economics, Regulations)

"More Cable, Broadcast TV Stations are for Sale, Raising Fears of a Glut," Wall Street Journal, 8 NOV 88, p. B7. {Cable franchises are selling at rates of \$2000 to \$2500 per subscriber, causing some buying resistance. In the broadcast station market, high asking prices are also slowing down sales.} (Economics)

"Viacom to Join Pay-Per-View Network Rival," Wall Street Journal, 14 NOV 88, p. B6. {In an earlier than expected market shakeout, Viacom merged with Viewer's Choice, reducing the number of players to two. The new entity will offer two pay-per-view channels to eight million customers, an estimated five million of whom are equipped to receive pay-per-view service.} (Economics)

"AT&T Bell Laboratories Opens Its New Solid State Technology Center," Fiber Optics News, 21 NOV 88, p. 8. {AT&T is opening a new facility devoted specifically to photonics research. The new facility will bring together 800 scientists, engineers and marketing experts under a single roof.} (Economics, Technology)

"Transamerica Energy Associates Makes INC Magazine's Fastest Growing 500 List," Fiber Optics News, 28 NOV 88, p. 8. {Revenues of \$12 Million, growing at 200% for the past two years. TEA has done long haul work for MCI, AT&T, outside plant engineering for New England Telephone and a cable design for Storer Cable. TEA stresses planning and concern for and training of employees.}

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"MGM/UA Talks Over Sony Plan to Buy Movie Studio Fail, Some Executives Say," Wall Street Journal, 29 NOV 88, p. B6. {As part of its plan to expand into the content side of the electronics business, Sony had been engaging in talks with MGM/UA Communications Inc involving plans for the Japanese firm to buy the US movie studio. However, talks broke down when executives couldn't agree on terms. Sony has indicated interest in the home video rights to the MGM library that Turner Broadcasting bought two years ago as well as "a movie company with experienced management already in place, a strategy employed with CBS Records".} (Applications, Japan)

"QPSX Licenses AT&T Network Systems to Manufacture the QPSX MAN," Fiber Optics News, 5 DEC 88, p. 6. {QPSX, the Australian telecommunications group that developed the concept that the forthcoming IEEE 802.6 MAN standard is expected to be based on, has made an agreement with AT&T for AT&T to manufacture their MAN in the US. Pennsylvania Bell will begin trials in late 1989.} (MAN-LAN)

"FCC Asks TCI to Demonstrate 'Rehabilitation'", Multichannel News, 5 DEC 88, p. 143. {Before ruling on a TCI request, FCC requested that TCI prove that positive steps had been taken to address the deficiencies that lead to TCI losing a Jefferson City, MO civil case in 1985.}

"BellSouth Sets a New Service for Cable TV," Wall Street Journal, 7 DEC 88, p. B6. {BellSouth announced a new service for cable companies, called "TicketTaker." Under the new service, BellSouth would act as an answering service, taking orders from cable subscribers regarding pay-per-view requests and relay the orders to the cable provider. It is expected that the new service will allow BellSouth to learn more about the cable business and customer viewing habits.} (Evolution)

"Cable Executives Discuss Threat of 'Telco Television'", Broadcasting, 12 DEC 88, p. 46. {During the opening session of the Western Cable Show James Smith, senior VP of Times Mirror and chairman of the California Cable Television Association, made a call to arms to the cable industry, warning that the telcos are waging a "grass roots" campaign to allow them into video delivery. He criticized the National League of Cities for being one of the first to be "seduced by the telcos' blue sky promises".} (Regulations)

"Fiber Optics Technology Gets PR Push", Broadcasting, 12 DEC 88, p. 50. {Opt in America is the PR group, operating out of Washington DC.}

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"PacTel's Bright Prospects", Telephony, 19 DEC 88, pp. 20-22. {Beleaguered at the time of divestiture with a high debt ratio and poor relations with the California Public Utilities Commission (CPUC), Pac Tel has since rebounded well. 80% of its facilities are digital and the work force has been trimmed by 31%. CPUC seems to be warming to Pac Tel, as recent announcements indicate and Pac Tel is generally well placed to offer enhanced services.)

"AT&T and Wang: A Tale of Two Companies", Telecommunications, JAN 89, pp. 15-16. {Review of some of the strengths and weakness that both AT&T and Wang are bringing to their newly announced partnership to develop office applications. Foremost in AT&T's favor is a new understanding of the necessary direction to take ISDN for success.} (ISDN, MAN-LAN)

"Anixter Cable TV Committed to Fiber Optics Implementation", Fiber Optics News, 2 JAN 89, p. 1. {Brief on early history of Anixter Bros.' drive into the fiber market.}

"Fiberlan Will Build Fiber Optic Metro Project in Houston", Fiber Optics News, 2 JAN 89, pp. 7-8. {Initial phase will serve more than 30 buildings in the city's central business district and surrounding areas. The project will provide "a total bypass network for Houston and outlying areas" by completion. The project is 50% ahead of forecasts.} (MAN-LAN)

"Opt in America Formed to Push Fiber Optics to the Home:", 2 JAN 89, p. 8. {A not-for-profit educational and advocacy group working for switched fiber in the public network. Address: Opt in America, PO Box 18958, Washington DC 20036, 202-659-5212}

"TCI : Transforming Corporate Image", Broadcasting, 9 JAN 89, pp. 64-66. {In order to gain and maintain the good will of the public and regulators, TCI is engaging in a multi-level drive to shed its "Darth Vader" image.} (Regulations)

"Dear Executive: Anixter Cable TV committed to Fiber Optics Implementation," Fiber Optics news, 2 JAN 89, p. 1. {Tele-Communications Inc co-sponsored a test of transmission of cable TV over fiber and has committed to installing 20 of Anixter's fiber optic systems over the coming year. Anixter has an exclusive licensing arrangement with AT&T for use of AT&T fiber and laser driver products.} (Architecture, Economics, Evolution)

"Fiberlan Will Build Fiber Optic Metro Project in Houston," Fiber

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Optics News, 2 JAN 89, p. 6. (Fiberlan was awarded the contract to construct Phase I of a high speed telecommunications network by Network Communications that will ultimately provide total bypass for Houston and outlying areas.) (Evolution, MAN-LAN)

"OPT in America Formed to Push Fiber Optics to the Home" Fiber Optics News, 2 JAN 89, p. 8. (A new advocacy organization of educators, scientists, public officials, business executives, leaders of public interest organizations and citizens was formed to educate the US public about the potentials and technologies of IBN and to lobby to have the legal and regulatory roadblocks to implementation removed.) (Regulation)

"IBM Takes Stake in FO Electronics", Telephony, 16 JAN 89, p. 13. (IBM acquired a 25% stake in PCO Inc., a subsidiary of Corning Glass Works in order to explore the use of fiber optics in its computer and data communications products. The cost of the acquisition was not made public.) (Fiber)

"Cable Labs Plans Relocation", Multichannel News, 23 JAN 89, p. 32. (Cable Labs' current location in Cambridge, MA is slotted to become a satellite facility as the main headquarters is moved to Denver.)

"Fujitsu America", Fiber Optics News, 6 FEB 89, p. 7. (Fujitsu has been awarded the contract to provide a fiber link for PTAT which will span 140 Km without a single repeater, with the capacity to carry 6,048 channels, upgradable to 810 Mbs or 12,096 channels. This link will be the first of its kind in the world. The link was designed by Lightwave Spectrum, the general contractor. PTAT is owned jointly by Britain's Cable and Wireless and PTAT Systems.)

"MCI Will Provide Cray Research", Fiber Optics News, 27 FEB 89, p. 7. (A multiple combination of T1 links will be built by MCI to interconnect Cray's 40 supercomputer sites around the world. The private network will allow Cray to improve its supercomputer-to-supercomputer communications.) (Evolution)

"Fujitsu Joins University's Ranks", Communications Week, 3 APR 89, p. 22. (Fujitsu and California State University at Fresno have formed a partnership whereby the university will serve as a test site for ISDN and IBN communications products.) (ISDN, Japan)

"US Sprint Buys PTAT Systems -- And Partners With C&W in Trans-Atlantic Cable", Fiber Optics News, 3 APR 89, p. 3. (The acquisition will be used by US Sprint to offer an "all-fiber

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network" that extends through Cable and Wireless' subsidiary, Mercury, into Europe. US Sprint also has an option on the PTAT-2 and an interest in the North Pacific Cable. Eventually, Sprint plans to tie all of its international cables through its domestic network, offering ISDN precursors, 7 digit dialing and call forwarding internationally. Sprint plans to begin selling capacity in June.) (Evolution, ISDN)

"The Soviet Union", Fiber Optics News, 12 APR 89, p. 7. {Plans to lay a trans-Siberian fiber cable linking Japan and Europe. Moscow has asked KDD and European telecommunications firms for technical and financial support.} (Evolution, Players, Japan)

"Building a Capitol Hill Consensus", Telephony, 17 APR 89, pp. 20-29, Charles Mason. {Determined lobbying by RHC's and AT&T is partly responsible for a growing consensus that Congress should step in on issues affected by MFJ. Opponents to changing MFJ are well organized, although not as wealthy. Independent telcos have yet to join the fray.} (Regulations)

"PacTel Close to Cable TV Buy", Telephony, 17 APR 89, p. 13. {PacTel is nearing completion of a deal to acquire not less than 50% but not more than 75% of Group W cable of Chicago, which serves 95,000 subscribers. PacTel will request a special waiver of the crossownership ban.} (Regulations)

"BellSouth Seeks Irish CATV Firm", Telephony, 24 APR 89, p. 1. {BellSouth is bidding to gain control of Cable Link in Ireland, the world's largest cable TV company. If successful, BellSouth plans to upgrade the network with optical fiber technology and expanded programming.} (Great Britain)

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"A View of the Emerging Photonic Network," IEEE Globecom '86 (CH2314-3/86/0000-1730), p. 1730, **C.A. Brackett.** {Future networks will be vastly different from today's. Optical technology is moving away from one-for-one replacement of electronic network technology and towards new capabilities and flexibilities. Specifically, wave division multiplexing will be used more frequently, and optoelectronic integration will provide lower cost optical network making distribution into local loop feasible.} (Evolution)

"Experimental Approaches to Video Services and Technologies," IEEE GlobeCom '86 (CH2298-9/86/0000-0901), p. 901, **Howard Bussey.** (Description of Bellcore B-ISDN prototype. Covers architecture, switches, RE, IC's, and synchronization.) (Applications, Switching)

"Realization of Broadband ISDN in a Modern System Structure," IEEE ISS (CH2431-5/87/0000-0602), 1987, p. 302, **H. Bauch, K. Brueninhaus & B. Schaffer.** (Description of broadband network from German point of view. Covers transmission, switching and user interface.) (Germany, Switching)

"Fiber in the Subscriber Loop," UTI Technology Planning, Westwood Kansas (United Telecom Planning Unit). 1987, **Jim Mcnaughton.** (Comprehensive review of alternative fiber loop architectures.) (Economics)

"Network Architects Plan Broadening of Future ISDN," Data Communications, JUL 87, p. 129, **Steven Sazegari.** {Among other things the following are needed to realize a broadband network: (1) VLSI for line transmission circuits, switches, protocol converters, rate adapters, lasers; (2) standards; (3) circuits for A/D and D/A converters.} (Switching)

"The Evolution of Telecommunications Technology," IEEE Communications Magazine, JUL 87, vol. 25, no. 7, p. 6, **R. Vickers & T. Vilmansen.** (Overview of issues in evolution of network. In current network, multiplexing costs now dominate. Optical switching is not likely to be a factor any time soon.) (Evolution, Switching)

"Fiber Optics: Rewiring the Wired Nation?," Broadcasting, 9 MAY 88, p. 34-35. {Spokesmen at recent NCTA (National Cable Television Association) convention urged cable cos. to think of fiber more as an opportunity than as a threat. American Television and Communications (ATC) reported the results of a study showing that a "fiber backbone" combined with coaxial drops could allow cable cos. to more than double their channel capacity at a lower cost than a total rebuild. Scientific Atlanta

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demonstrated a 15 kilometer AM fiber link that had considerable degradation (details of the demonstration were not included.) (Evolution)

"FCC Sets Technical Guidelines for High-Definition TV in 1990's," New York Times, 2 SEP 88, Calvin Sims. {FCC released guidelines stipulating that HDTV standards would have to be backward compatible, allowing current televisions to receive HDTV broadcasts and display NTSC quality images. It is expected that these new standards might allow American manufacturers to re-enter the consumer electronics market. There is a 60-day period for comment, which will be followed by a 30-day period for replies.} (Applications, Evolution, Regulation)

"Bell Communications Research," Communications Daily, 29 AUG 88, p. 6. {Bellcore reported compressing 1125 line HDTV signal into a single 120 Mbs channel of B-ISDN. Bellcore claimed a 10-to-1 compression ratio.} (Applications, Players)

"Siecor Cable Survives University Fire Keeping Communications Network Alive," Fiber Optics News, 3 OCT 88, p. 3. {A conduit fire which caused over \$2 Million worth of damage failed to interrupt transmissions over Siecor's 4-fiber loose tube cable. A 35 foot section of the cable had to be replaced because of the sheath was charred. Parallel cooper plant was completely destroyed.}

"Flowmole's New Flowcator Locating Device Doubles Depth of Underground Cable Placement," Fiber Optic News, 10 OCT 88, p. 8. {Advances in trenchless technology are allowing fiber cables to be laid at depths twice as great as previously possible. Several projects have already used the new technology to tunnel underneath bodies of water without disturbing them.} (Evolution)

"The Puzzle of Photorefractive Crystals is Studied for a Wide Variety of Uses," Wall Street Journal, 26 OCT 88, p. B6. {A crystalline substance whose atomic structure is highly coupled to its optical behavior is the subject of growing interest in switching and memory technology research.} (Architecture, Switching)

"Vitesse Semiconductor Develops Gallium Arsenide MUX Family," Fiber Optics News, 31 OCT 88, p. 2. {Vitesse's VS8010 is a mux/demux chip set that can take 8 parallel 155 Mbs and convert it to a single 1.24 Gbs stream and back again. The VS8004 is a 4-to-1 mux designed to operate at 2.5 Gbs clock speed.}

"Kodak Develops Sensor That Will Make Much Clearer Electronic

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Camera Images," Wall Street Journal, 6 DEC 88, p. B5. (Kodak announced development of a camera sensor with 4 million pixels, allowing production of electronic images with resolution comparable to standard chemical photography.) (Applications)

"The Aging Young Pretender", The Economist, 3 DEC 88, pp. 97-98. (Article reviews the "pros and cons" of Gallium Arsenide (GaAs) semiconductor technology.)

"Telecommunications Technology in the 1990's" Telecommunications, JAN 89, pp. 37-38, Eric E. Sumner. (Overview of three key technologies: Integrated Circuits, Photonics and Software.) (Fiber)

"Has Japan found the 'Brains' For the computers of the Future?", Business Week, 13 MAR 89, p. 77. (Both Hitachi and Fujitsu are working on cryogenically cooled superconducting computers. The Hitachi machine, though bulky and in need of special refrigeration, can perform 250 million operations a second, which is five times faster than the fastest room-temperature Reduced Instruction Set Computing (RISC) chips.) (Evolution, Players, Japan)

"Taming Space and Time to Make Tomorrow's Chips", Business Week, 13 MAR 89, p. 68. (Discusses new semiconductor design philosophies such as vacuum microelectronics and quantum effect circuit design that could move electronic design to new levels of efficiency, speed and power.) (Evolution, Players)

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"The World Fibre Industry," Annex I from Telecommunications: Pressures and Policies for Change, OECD, Paris, 1983. (Review of the world markets for fiber optics in terms of suppliers and users.) (Economics, Canada, Germany, Japan)

"Fiber Optic Technology for CATV Supertrunk Applications," National Cable Television Association Technical Proceedings, 1985, James Chiddix. (Applications for fiber in CATV include system hub interconnects, advertising interconnects and earth station links. Optical fiber can be cost competitive with RF transmission depending on distance, number of channels, performance requirements and system configuration. Author compares three alternatives: FM video over coax; analog video over fiber; digital video over fiber.) (Economics)

"Trends in US Broad-Band Fiber Optic Transmission System," IEEE Journal on Selected Areas in Communications, vol. SAC-4, no. 4, JUL 86, p. 488, Leonard G. Cohen. (There are three challenges in bringing fiber into the home. (1) Costs of laying fiber. (2) Switches that can accommodate high bit rates. (3) Costs of subscriber receivers and transmitters.) (Economics, Switching)

"Optical Fiber Facilities for Subscriber Loops," IEEE Journal on Selected Areas in Communications, vol. SAC-4, no. 5, AUG 86, p. 714, Hiroshi Ishihara. (NTT is introducing fiber into the loop, but the fiber itself and related components are still very expensive.) (Applications, Economics)

"Optical Fiber Supertrunking -- A Performance Report on a Real-World System," IEEE Journal on Selected Areas in Communications, vol. SAC-4, no. 5, AUG 86, James Chiddix. (Author describes hybrid video system where fiber is used in trunking part of network.) (Evolution)

"Fiber-Optic Uses Will Still Grow and Keep Fueling the Market," Communication News, MAY 87, p. 14. (Kessler Marketing Intelligence reports that fiber market will grow from \$774 Million in 1986 to \$2.9 Billion in 1992. The fiber feeder segment will grow from \$9 Million in 1986 to \$1.45 Billion in 1992.) (Economics)

"A Technical Analysis of a Hybrid Fiber/Coax Cable Television System," ATC, 1987, Perry Rogan, Raleigh B. Stelle & Louis Williamson. (Placing fiber into the system backbone increases quality and performance, and is cheaper than a total retrofit of the entire system.) (Evolution)

"What's Hot in Fiber," Telephony, 31 AUG 87, Ellis Booker. (Off the self fiber trunking systems are now capable of supporting 10

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Mbs.)

"AT&T Under the Sea," Communications Consultant, NOV 87, p. 48, **Bob Violino**. {AT&T plans to lay 20,000 miles of undersea cable by 1990.}

"AT&T Escalates Digital Network Expansion Plans," Communications Daily, 13 NOV 87, p. 3. {AT&T will expand current 45,000 route digital network to 60,000 miles by 1989 and 67,000 miles by 1990. By 1990 70% of calls will go over digital lines, compared with 35%, currently.} (Players)

"Plastic Replaces Glass in Demo of Fiber Network," Management Information Systems Week, 16 NOV 87, p. 22, **Lois Bruu**. {Codennoll is building plastic fibers, which it expects to be half as expensive as glass.}

"Bellcore Achieves New Fiber Optic Transmission Speed," Communications Week, 23 NOV 87, p. 65. {Team at Bellcore recently achieved rate of 27 Gbs.}

"Fiber Optics Market Growth Slows," CWA Information Report, DEC 87, p. 9. {Despite falling price, demand among long distance carriers for fiber should remain flat in the next two years.}

"Optical and Optoelectronic Devices for Optical Fiber Transmission Systems," IEEE Communications Magazine, JAN 88, vol. 26, no. 1, **Takakiyo Nakagami & Teruo Sakurai**. {Transmission technology is very far ahead of optical and optoelectronic devices.}

"The US Fiber Optics Market Will Experience an Average Annual Growth of 25% Between 1987-1992," Telecommunication Surveys and Forecasts, JAN 88, p. 4-17. {Predictions about fiber growth in future.}

"US Global Competitiveness: Optical Fibers, Technology and Equipment," United States International Trade Commission, Publication number 2054, JAN 88. {Among other things, USTIC found that: (1) US currently dominates world fiber production market; (2) US optical fiber industry is concentrated with 2 firms accounting for over 80% of total production; (3) the optoelectronics side of fiber optics industry is currently in a greater state of flux than the fiber and cable portion of the industry.} (Players)

"AT&T Completes TAT-8 -- Plans for TAT-9", Communications Week, 15 AUG 88, p. 7. {AT&T completed its part of TAT-8, reaching the

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branching point on the European continental shelf in the mid-Atlantic. The fiber cable is expected to become operational when England and France reach the branching point from their respective shores. AT&T immediately applied to begin building TAT-9, which will have double TAT-8's capacity.)

"Ohio Bell Expanding Its Fiber Optic Network," Fiber Optic News, 29 AUG 88, p. 3. (Ohio Bell projects approximately 65,000 miles of fiber in service by 1993. With trunking mostly converted to fiber currently, new efforts are being directed toward the local loop.)

"Broadband Services: Uncertainties in the Market and Policy Environments," Martin Elton, NCF Meeting, Chicago, 3-5 OCT 88, p. 456. (It is not possible to forecast the future demand for a service which does not yet exist with any reliability. This makes the analysis of the economic attractiveness of IBN uncertain at best. Public policy regarding development of IBN should be structured to allow those willing to take the risks to do so, provided certain safeguards are in place.)

"Digital Loop Carrier Alternatives -- Traditional Assumptions Revisited," Gary A. Nelson, NCF Meeting, Chicago, 3-5 OCT 88, p. 470. ("In a competitive environment, successful products are cost effective at the time of introduction" is the theme of Dr. Nelson's paper. He uses it to explore the likely routes to IBN. He concludes that a pedestal would be an appropriate location for the optical interface unit (OIU) with coax drops to the home, as an interim solution. Fiber drops to the home do not seem a viable solution. Also, the DQDB (forthcoming 802.6 IEEE standard) might provide a powerful interconnect architecture between the OIU and the network.) (Architecture)

"The Lightning Threat: Fiber's Up to the Test", Telephony, 31 OCT 88, pp. 22-24. (There are three dangers due to lightning: (1) Magnetic crushing, which occurs in an indirect strike which induces powerful fields in the metallic sheath; (2) Arc Discharge, which occurs when the conductivity of the surrounding soil is lower than the cable, causing an arc; and (3) Longitudinal Current, which occurs after a strike, as the lightning current is dissipated along the cable sheath. The arc damage is the most difficult. Single and double armored cable designs were found to meet Bellcore standards.)

"FCC Accepts Bell Companies' Proposals on Networks for Computerized Services," Wall Street Journal, 18 NOV 88, p. B5. (RBOC proposals for Open Network Architectures (ONA's) have been accepted by the FCC in a 3-0 vote. Certain revisions will be

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required by May 19, 1989. The plans will become final late in 1989. ONA is designed to allow the RBOC's to provide enhanced services under the condition that they charge themselves and their competitors the same rates for access to the basic service elements.) (Architecture, Players, Regulation)

"Now, That's Speed-Reading", Communications Week, 21 NOV 88, p. 6. (David Lang, director of solid state electronics at AT&T Bell Labs announced that Bell Labs is working to perfect a fiber that can reliably transmit up to 3.4 Gbps (billion bits per second). One Gbps was reportedly roughly equivalent to the amount of information in an average encyclopaedia.) (Players)

"AT&T Accelerates Pace of Network Digitization," Fiber Optics News, 28 NOV 88, p. 3. (It is expected that by 1991, AT&T will be fully digital. Currently, the network is 98% digital. In addition, AT&T reported advances that would allow doubling the transmission rate over fiber to 50,000 simultaneous voice circuits without having to pull cable.) (Architecture, Technology)

"Corning Builds More Resilient Fiber", Communications Week, 28 NOV 88, p. 33. (The addition of a titanium dioxide dopant produces a more abrasion-resistant optical fiber which is more suitable for handling in the field than conventional fiber. Commercial deliveries will begin in Mar 89.) (Players)

"IBM Buys Into Fiber Company", Communications Week, 16 JAN 89, p. 20. (Report on IBM acquisition of 25% stake in PCO, a "patent-rich optoelectronics subsidiary of Corning Glass Works".) (Players)

"ABB HAFQ Offers", Fiber Optics News, 27 FEB 89, p. 7. (Company announced a new combined emitting/receiving diode for use in half-duplex fiber connections.) (Players)

"The National Telecommunications and Information Administration", Fiber Optics News, 27 FEB 89, p. 7. (NTIA has recently completed a multi-tier specification for optical fiber cable survivability of "essential long-haul links". The development of the specifications was sponsored by the National Communications System (NCS).) (Standards)

"AT&T Develops New Generation of Fiber Coatings", Fiber Optics News, 27 FEB 89, pp. 5-6. (AT&T announced the development of a new generation of acrylate coatings for optical fibers that impart improved spool-to-spool quality and consistency, reduce microbending losses and enhance temperature and fatigue

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performance.) (Players)

"TAT-8 Suffers Electronic Failure: Repair Causes 4-Day Power Down", Fiber Optics News, 27 FEB 89, p. 5. {A fishing trawler accidentally cut through the armor on the French leg of the cable, shorting out the repeater power feed. The French cable ship completed repairs in four days. Traffic was routed through the British leg during the outage.}

"TAT-8 Down Again: Electronic Failures on French and British Legs", Fiber Optics News, 3 APR 89, p. 4. {TAT-8 has been powered down for repairs. Service continues over a satellite backup. It is as yet unknown whether the faults were caused by repeater failure or trawler damage.} (Complementary Technology, Players)

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"Implementation of Broadband ISDN with the Siemens Switching System EWSD," IEEE Globecom 1986 (CH2314-3/86/0000-0766), p. 766, Karl Lutz. (Claims it is more practical to develop separate switching networks for higher bit rate applications.) (Evolution, Germany)

"Synchronous Composite Packet Switching for Broadband ISDN," IEEE Globecom 1986 (CH2314-3/86/00001715), p. 1715, H. Niwa, H. Suzuki, S. Hayano, T. Takeuchi & T. Yamaguchi. (The advantage of synchronous over asynchronous packet switching is that the former is compatible with existing networks.) (Standards)

"Optical Switching and Computing," Telecommunications, DEC 86, p. 32, Martin Pyykkonen. (Discusses research and development efforts in optical technology. Optical computers will be built first. Optical components will be used to increase speed of existing digital chips. Researchers are still working on the first optical transistor.)

"Architectural Considerations for Photonic Switching Networks," AT&T Bell Laboratories, H.S. Hinton. (Comprehensive overview of strengths and weaknesses of photonic technology.)

"Integrated Wideband Networks Using Asynchronous Time Division Techniques," IEEE (CH2314-3/86/00001720), H. Le Bris & M. Servel. (French model of fast packet switch capable of 4.5 Gbps throughput.) (France)

"Toward a Next Generation Switching System," IEEE ISS (CH2431-5/87/0000-0404), 1987, p. 404, P.E. White & J.E. Holcomb. (New switches should provide a wide spectrum of bandwidth (0-150 Mbs) uniformly. New switches will initially be adjuncts to ISDN switches.) (Applications, Evolution, Standards)

"Update on Photonic Switching," IEEE ISS (CH2431-5/87/0000-1009), p. 1009, S.D. Personick. (Simple optical cross-connects have been built. Using them to build a large circuit switch is currently not practical.) (Technology)

"Broadband ISDN Switching Capabilities from a Services Perspective," IEEE Journal on Selected Areas in Communication, vol. SAC-5, no. 8, OCT 87, p. 1222, Dan Spears. (Various broadband services are discussed. Argues for circuit switch for video and ATM for voice and data.) (Applications, Standards)

"French Composing Asynchronous Prelude to Broadband ISDN," Data Communications, OCT 87. (CNET lab has built prototype central office switch operating at 9 Gbps. Switch uses ATM.) (France, Standards)

SWITCHING

"Switching for Broadband Communication," IEEE Journal on Selected Areas in Communication, vol. SAC-5, no. 8, OCT 87, p. 1217, P.E. White. et. al. (A broadband switch will most likely involve two fabrics: (1) a 150 Mbs circuit switch, (2) a 150 Mbs packet switch.) (Standards)

"Self-Sorting Networks May Help Switches Catch Up to Signal Speeds," Data Communications, DEC 87, p. 68. (Batcher-Banyan switches are being developed at Bellcore. The advantage of such networks is that packets entering switches need not rely on switch's processor to reach its destination. ATM is used.)

"High-Speed Multimedia Packet Switching: A Revolutionary Communications System for the 21st Century," Electronic News from Fujitsu, vol. 10, no. 2, FEB 88. (Experimental system on the outskirts of Tokyo. Operating at 2 Mbs, therefore cannot broadcast quality TV.) (Japan)

BNR Press Release, BNR, 29 FEB 88, Tom Bickford. (BNR announces the development of an exploratory gallium arsenide circuit operating at 5 Ghz. Space switch can accommodate 2.4 gigabits per second.)

ISDN

"ISDN Business Services," IEEE Globecom 86 (IEEE CH2314-3/86/0000-0018), p. 18, **John Swart**. {Swart lists five ISDN services: multiple call appearances; multibutton feature activation; electronic directory; message services; integrated services local area network.}

"Bell Canada Trial Plans for Optimal Exploitation of ISDN," IEEE 1987 ISS (CH 2431-5/87/0000-0088), p. 88, **D.F. Barr, D.S. Bhalla & C.D. de la Plante**. {Bell Canada to embark on 3 ISDN trials with eye toward gradually phasing in ISDN.} (Canada)

"A Strategy for ISDN Deployment," IEEE ISS (CH2431-5/87/0000-0006), p. 6, **R. Kenedi & E.R. Turnquist**. {A brief description of Northern Telecom trial in Phoenix with Mountain Bell.} (Players)

"Implementing the Illinois Bell/McDonald's Trial: A Technical Overview," IEEE 1987 ISS (CH2431-5/87/0000-0014), p. 14, **K.E. Martersteck, B.R. DeMaeyer, P. Krause, F.C. Iffland & W. Heinmiller**. {McDonald's chose to participate in an ISDN trial because it offered flexible and robust architecture. The article is primarily a technical description of trial, especially switching.} (Switching, Technology)

"Evaluation of ISDN Field Trial in Japan," 5th World Telecommunications Forum, 1987, p. 329, **T. Takahashi**. {NTT, having run numerous ISDN "tests", will now devote much research to: (1) ATDM; (2) packetized voice; (3) bit based tariffs.} (Economics, Standards, Switching)

"14 Things You Should Know About ISDN," Telecommunications, DEC 87, p. 37, **Tom Valovic**. {Actually, 3 things: (1) almost half of existing lines are analog; (2) recent testing by Nynex has revealed problems with narrowband ISDN in local loop; (3) if ISDN does develop it will almost certainly be in "islands" with little connectivity between them.} (Evolution)

"Are Analog Local Loops Too "Dirty" for ISDN?," Data Communications, JUL 87, p. 53. {Nynex test of copper local loops found that only 12% of the loops could be characterized as quiet. Implementation of ISDN basic rate may take longer than expected.}

"ISDN's Built in Problems," Telecommunications, OCT 87, p. 55, **Kenneth L. Phillips**. {Two problems with current ISDN design: (1) static channel capacity; (2) ISDN is basically two networks, circuit and packet. Circuit-switched fabric should be dropped for 3 reasons: (a) cannot provide adaptive bandwidth; (b) unitary architecture not possible; (c) packetized voice yields traffic engineering efficiency.} (Evolution, Standards)

ISDN

"ISDN in Europe: Different From in the United States," from Strategies in Telecommunications Services, **The Gartner Group, Inc.**, 22 DEC 87. (Paper argues that Europe increasingly needs standards for international data communications. This will push ISDN. In the US, by contrast, fragmented policy will slow ISDN.)

"Semiconductor Unit to Make New Computer Chip Device," Wall Street Journal, 20 Sep 88, p. 42. (AT&T's semiconductor unit plans to make a new chip that will allow one phone line to handle two voice circuits simultaneously, promoting the prospects for ISDN applications.) (Evolution, Technology)

METROPOLITAN AND LOCAL AREA NETWORKS

"Fiber Optic Regional Area Networks in New York and Dallas," IEEE Journal on Selected Areas in Communications, vol. SAC-4, no. 5, AUG 86, p. 750, John Prisco. (Summary of two MANS. (1) In New York, MAN used to connect Warner hub with distribution site. (2) In Dallas MAN used for fax transmission of Dallas Morning News.) (Applications, Evolution)

"Looking For a Good MAN," Telephony, 30 NOV 87, p. 38, D. Waring & Y.C. Lee. (Description of two MAN trials. (1) Nynex trial connecting four Harvard University sites. (2) US West trial connecting 3M corporate campus.) (Applications, Evolution, Trials)

"Voice, Data and Video Integrated Broadband Metropolitan Area Network, Toshiba Corporation, 1987, H. Koayashi & H. Haruyama. (A "tree-shaped" topology using two-way coaxial cable technology wherein a subscriber must transmit via the head end, which performs all switching and controls all content.) (Japan)

"Illinois Bell Receives Order for 9,500 ISDN Lines for New Network", Communications Week, 4 JUL 88, pp. 10-11. (The customer is AT&T Bell Labs Inc. The sale is the largest to date.) (Players)

"DoD Takes First Step Toward Three Nets in One", Communications Week, 6 JUL 88, pp. 21-22. (DoD plans call for eventually linking the Defense Data Network, the Autodin data messaging system and the voice-oriented Defense Switched Network into a single integrated ISDN. ISDN implementation could begin as early as the mid- to late 1990's but is not expected to become a "reality" for the department "until the 2000-2008 time frame".) (Evolution)

"Port Authority Weighs Bids For Integrated Net", Communications Week, 15 AUG 88, p. 1. (Port Authority of New York, which maintains and operates various ports, bridges and tunnels in the metro New York area, invited bids for an integrated network to connect eight locations including three airports and the World Trade Center.)

"Bell Atlantic Test", Communications Week, 19 SEP 88, p. 26. (Bell Atlantic and QPSX Communications of Reston, VA. will work together to test a queued packet, dual token ring system in Philadelphia next year.) (Players)

"Teleport Communications-NY Providing Fiber Transmitter Link for Fox Channel 5," Fiber Optics News, 3 OCT 88, p. 5. (Teleport is providing an all-fiber link from the Fox studios to the transmitter on the 110th floor of the World Trade tower.)

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(Applications)

"Teleport Boston Cabling Boston Area With a 100-Mile Fiber Optic Network," Fiber Optic News, 10 OCT 88, p. 2. {Planning to meet the future needs of Boston over the next 25 years, Teleport Boston is installing a network with a 144 fiber backbone which will extend from Government Center through Cambridge and Waltham to Burlington then back to Boston. Each fiber will accommodate 565 Mbs and Teleport anticipates graceful upgrades to higher rates as technology and network demand evolve.}

"Teleport Communications-NY Offering Private Line and European Standard Services," Fiber Optics News, 31 OCT 88, p. 5. {In addition to DS1 and DS3 services, Teleport is now offering DS0, rates intermediate between 56 Kbs and 1.544 Mbs in addition to 2.048 Mbs.}

"T1 for LAN/WAN Links", Telecommunications, OCT 88, pp. 39-42. {T1 is emerging as an ideal technology for providing inter-LAN connections with a high degree of transparency, allowing users to access data and programs stored on computers at remote locations. T1 is also seen as providing a graceful evolution to ISDN.} (Evolution, ISDN)

"Users speak out on ISDN issues", Telephony, 31 October, 88, pp. 12-13, Carol Wilson. {At ISDN Insights '88, an industry forum sponsored by AT&T, Jerry Campeau, the director of ISDN for US West was quoted as being concerned over the slow rate of standards development in ISDN. The possibility of ISDN becoming "obsolete before we get it finished" was raised. Campeau and several other conferees called for an end to proprietary systems in favor of standardized solutions. The Japanese MPT has decreed that X.75 would be the standard in that country.} (Standards, Japan)

"The Challenge of Enterprise-Wide Interworking", Telecommunications, OCT 88, pp. 31-37, Robert Craven. {Article reviews the problems involved in interworking the LANs within a single large organization. It defines "bridge", "router", "brouter", and "hub". All terms for devices used to connect different LANs with different degrees of intelligence.}

"Local Area Network Industry Trends", Telecommunications, OCT 88, pp. 21-29, Martin Pyykkonen. {Article discusses industry trends toward consolidation and standardization. It concludes that the LAN industry is "locally" displaying signs of maturing and predicts that standardization will ultimately lead to functional systems integration over wide areas.} (Players, Standards)

METROPOLITAN AREA NETWORKS

"Mid Atlantic: MAN Trials to Start Soon in Philadelphia", Data Communications, NOV 88, p. 41. {Test of QPSX's 45 Mbs MAN by Bell Atlantic.} (Field Trials, Standards)

"Pac Bell Makes First ISDN Sale", Telephony, 21 NOV 88, p. 1. {The city of Fresno will be the first commercial ISDN customer in California. The agreement will cost \$2.9 Million over 10 years.} (Evolution, Players)

"NEC's Awesome OAI", Teleconnect, DEC 88, p. 24. {Open Application Interface (OAI) is an interface into the routing computer that runs a PBX. It allows a telephone with a keypad to be used for data entry or output requests even while talking on the same line. NEC hopes to stimulate third party interest in developing applications software for their system.} (Players, Japan)

"AT&T Speeds Up ISDN Intro:", Telephony, 5 DEC 88, p. 11. {Customer demand has caused the acceleration of introduction of ISDN into AT&T's long distance network. Current plans call for reaching 62 cities with ISDN service by mid-1989.} (Players)

"Teleport Boston Cabling Boston Area With a 100-Mile Fiber Optic Network," Fiber Optic News, 10 OCT 88, p. 2. {Planning to meet the future needs of Boston over the next 25 years, Teleport Boston is installing a network with a 144 fiber backbone which will extend from Government Center through Cambridge and Waltham to Burlington then back to Boston. Each fiber will accommodate 565 Mbs and Teleport anticipates graceful upgrades to higher rates as technology and network demand evolve.}

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"Mid Atlantic: MAN Trials to Start Soon in Philadelphia", Data Communications, NOV 88, p. 41. {Test of QPSX's 45 Mbs MAN by Bell Atlantic.} (Field Trials, Standards)

"Teleport Communications: Its Mission is to Develop Local Competition," Fiber Optics News, 19 DEC 88, p. 8. {Douglas Beardsley, VP of Merrill Lynch Teleport Technologies Inc, stated that the development of alternatives to the RBOC's for local service is of "vital" importance. Teleport's strategy is to combine aggressive pursuit of opportunities with conservative

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public statements of intent. Beardsley was quoted as saying, "The development of a truly competitive environment revolves around interconnection of the dominant Local Exchange Carrier to the new alternative local companies." (Architecture, Evolution, Players)

"Inside Token Ring Version II, According to Big Blue", Data Communications, JAN 89, pp.117-125. (Technical overview of the new 16 Mbs LAN which operates over multimode optical fiber.) (Evolution, Players)

"...Telcos Starting to Feel Competition From Bypass", Fiber Optics News, 2 JAN 89, pp. 4-5. (The price of DS3 is falling as a result of competition for subscribers. Bypass providers are building private networks that offer "high-performance LAN applications... [that] drive the architecture of the network... point-to-point data and voice traffic becomes a subsidiary service in the network.")

"Ex-Telco Exec's Post Not Seen as Big Factor", Multichannel News, 30 JAN 89, p. 6. (Gary Andres, former Southwestern Bell executive director of federal relations, was named President Bush's special assistant for House legislative affairs. - His new role is seen as being broad and not potentially important with respect to the telco/cable debate.) (Regulations)

"Nynex, AT&T Join QPSX in MAN Work", Telephony, 30 JAN 89, p. 10. (The MAN architecture, which is being developed for the forthcoming 802.6 MAN standard is currently being tested in Australia and Bell Atlantic plans to begin testing in the US later this year. The three named in the title have agreed to work to develop the network management and administration system that will be needed to use the MAN in the public network.) (Evolution, Players, Standards)

"Canstar Awarded Contract For NYC Transit Authority fiber Communication System", Fiber Optics News, 20 MAR 89, pp. 1-3. (Canstar Communications, a division of Canada Cable and Wireless, was awarded the contract to build the Transit Authority's new fiber system. The system will be the largest of its type in the world, connecting 107 locations in the Bronx, Brooklyn, Manhattan and Queens using over 800 Km of 565 Mbs fiber cable.) (Canada)

"Move Over, ENE: A Huge ISDN Display May Get on the Road", Data Communications, JAN 89, p. 15. (The North American ISDN User Forum (NIU) is planning an ISDN demonstration for "sometime in late 1990". The show will focus on ISDN but NIU has hopes for

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"something exciting in broadband ... as a kind of 'world of the future' crowd pleaser'".)

"ISDN is New Parisian Style", Data Communications, JAN 89, p. 66. {France Telecom has inaugurated ISDN service in Paris and reports about 600 users in Paris and Brittany. The service costs about \$110 for installation and \$30/month for service. AT&T's ISDN service which offers some digital services, although connecting a call through the Primary Rate Interface (PRI) won't be possible until AT&T completes deployment of its Signalling System No. 7-based interswitch network. No details are available of how rapidly SS7 is being deployed.} (Players, France)

"CO Vendors in Pursuit of Intelligence", Telephony, 17 APR 89, pp. 34-40. {Overview of the players and their technologies.} (Evolution, Players, Switching, Technical Overview)

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"Will Satellites and Optical Fiber Collide or Coexist?", Roy A. Layton, from Tracing New Orbits, edited by Donna Demac, Columbia University Press, 1986, p. 19. (Postulates a drop in price of connection services of all types (whether over fiber or satellite links) due to an expected overabundance of transponder capacity.)

"Geostar Hopes To Develop 'Switchboard In The Sky'", Communications Week, 27 JUN 88, p. 36. (Geostar Inc. has applied to FCC to develop a satellite system to provide land mobile digital communications. The new service would be ISDN and OSI compatible.) (ISDN, Players)

"TV Answer Demonstrates Prototype Device at FCC", Multichannel News, 11 JUL 88, p. 43. (TV Answer Inc. is developing a device that will communicate viewer responses to the broadcast origination spot, either the cable head end or the broadcasting station using 1/2 MHz of bandwidth in the RF spectrum. Currently the prototype has expected production costs of about \$150. Ultimately, this cost could be reduced to \$25.)

"AT&T to Offer Dial-Up Video", Communications Week, 12 SEP 88, p. 26. (Jointly with Touchstone Video Network and Uniden Corp. of America. AT&T will accept orders and provide satellite delivery over Telstar 303. Touchstone will provide programming. Uniden will provide home DBS receivers. The service will offer 10 movies simultaneously before their distribution over regular cable or video cassette.) (Applications, Players)

"GTE Satellite's Flawed Orbit May Bring Rise in Cost of TV, Data Transmission," Wall Street Journal, 15 SEP 88, p. 12. (GTE's GSTAR III failed to reach geosynchronous orbit aboard an ArianeSpace SA launch vehicle. This failure points out the impending shortage of orbital transponders after 1990, due to rising demand and current satellites reaching the end of their useful lives.) (Evolution)

"Superconductor Licensing Accord Set by Argonne Lab," Wall Street Journal, 21 SEP 88, p. 10. (American Superconductor Corp has signed an agreement to work with Argonne National Laboratory to develop wire-making techniques using superconductors. Du Pont Co has reached a similar agreement with C.W. Chu, a prominent superconductor researcher at the University of Houston.) (Architecture, Players, Switching)

"Room Temperature Superconductors Face Severe Limits, New Theory Says," Wall Street Journal, 26 SEP 88, p. 38. (William Goddard and his team at California Institute of Technology have proposed a new theory to explain the recently discovered family of new superconducting materials. If correct, the new theory may

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suggest ways in which to engineer the new materials to gain significant increases in superconducting temperatures.) (Architecture, Switching)

"VSAT Technology -- Exploiting the RF Link for User-Driven Innovation", Telecommunications, OCT 88, pp. 51-57. (Overview of the capabilities and potential of VSAT technology. Work at Scientific Atlanta is discussed at length.) (Players, Technology)

"Recent Contracts Demonstrate User Commitment to VSAT Technology as Private Network Tool", Communications Week, 7 NOV 88, pp. 28-29. (See title.) (Economics, Players)

"Getting T1 Speeds Via Satellite", Data Communications, NOV 88, p. 236. (GTE Spacenet is offering "SuperT-1". It is a distance-insensitive, full-duplex service that uses 4.5 or 3.7 meter dishes.)

"UK to Try Radio for Deliver of Broadband Interactive Services" Data Communications, NOV 88, p. 16. (Called CT2 or Telepoint, the proposal is being considered by Britain's Office of Telecommunications. CT2 would involve delivery of interactive broadband services over a cellular telephone network.) (Great Britain)

"Space WARC Truce Between West and the Third World", Data Communications, NOV 88, p. 26. (The 1988 Space WARC adjourned with several compromises including an allocation plan for the slots in the geosynchronous orbit that are still unused.)

"Researchers Discover New Materials for Use in Superconducting Electronics," Wall Street Journal, 3 NOV 88, p. B4. (Robert Sandstrom and Edward Giess of IBM have made substantial progress in designing materials suitable for use in substrates for superconducting electronic components. The new materials are undergoing tests at MIT's Lincoln Labs.) (Architecture, Switching)

"MIT is expecting to Receive Patent of Superconductor," Wall Street Journal, 30 NOV 88, p. B5. (A patent of a technique to fabricate wires and other objects out of "high temperature" superconductors has been allowed by the Patent Office. The new technique would allow wires to be bent through a much smaller radius than previously possible, however, it consumes precious metals. The new patent rights will be leased exclusively to American Superconductor Corp.) (Architecture, Switching)

"Bell Labs Invents Radio LAN, But FCC Won't Put It on the Air",

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Data Communications, JAN 89, p. 15. {The AT&T system is capable of handling the full 10 Mbs called for in the Ethernet standard and AT&T holds a patent on the technology, but FCC is unwilling to lease the spectrum that its use would require. Although interested in radio LANs, FCC is not prepared to cut into the frequencies currently allocated for the US Meteorological Service.} (Evolution, ISDN, MAN-LAN, Players, Regulations)

"Cable Operators Considering KU", Broadcasting, 9 JAN 89, p. 67. {KU band would be used for DBS services. At the present time, DBS is considered to be an unlikely development for the near future.}

"The Dishing of Satellite TV", The Economist, 21 JAN 89, pp. 57-58. {The new DBS ventures in Britain, including Rupert Murdoch's Sky Channel, will rely on advertising revenues, not viewer charges to pay for programming. Slimmed down independent channels and a strongly government-backed BBC promise stiff competition.} (Economics, Great Britain)

"Cellular Group to select Access System", Communications Week, 23 JAN 89, p. 33. {the Cellular Telecommunications Industry Association will specify standards for the next generation of cellular telephony.} (Standards)

"Comsat Holds Pacific ISDN Demonstration", Communications Week, 23 JAN 89, p. 32. {Comsat's World Systems division held a one hour ISDN demonstration between Washington DC and Honolulu. The demonstration featured simultaneous transmission of digital voice, full-color videophone, high-resolution fax, high-speed file transfer and slow-scan video over a 2.048 Mbs satellite link.} (ISDN, Players)

"Wireless Cable", Broadcasting, 23 JAN 89, p. 38. {Plagued by an inability to secure cable programming at equitable rates, the wireless cable industry is planning to bring charges against conventional cable operators and broadcasters of anti-competitive behavior.} (Evolution, Players, Regulations)

"Direct Broadcast Satellites", Broadcasting, 23 JAN 89, p 34. {Hughes Communications joined Dominion Satellite and Continental Satellite in opposing an FCC proposal to assign separate orbital slots to serve the eastern and western portions of the country. A Hughes spokesperson was also quoted as saying that a "true" high-power (200 watts or more) DBS delivery system will become a reality in the US "in 1992 time frame".} (Players, Regulations)

"Carriers Test Digital HDTV", Telephony, 17 APR 89, p. 1.

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{Comsat, Intelsat, AT&T and KDD participated in an international trial of digital HDTV transmission. The signal originated from AT&T's Triunfo Pass, CA earth station and was relayed by satellite to two antennas, one of which was a 2.6 meter portable van-mounted dish. A single 72 MHz transponder was used. Special 140 Mbs modems were used.} (Applications, Players, Japan)

"Murdoch and Maxwell Link TV From Cable and Satellite", New York Times, 17 MAY 89, p. D1. {Maxwell Cable Systems will distribute programming from Murdoch's Sky Channel DBS service for five years in a contract worth an undisclosed amount. Sky Channel has suffered a much cooler response than was originally anticipated.} (Players)

ARCHITECTURE

"Standards for Metropolitan Area Networks," James Mollenaure, NCF Meeting, Chicago, 3-5 OCT 88, p. 464. {A new interconnect standard is being developed by IEEE (802.6) that is based upon the Distributed Queue Dual Bus (DQDB) protocol originated by Telecom Australia. It uses a dual ring structure each ring of which transmits in opposite directions. It features extremely efficient (near 100%) operation under heavy loads.} (Evolution, MAN-LAN, Standards)

"Resisting the "Synchronous Revolution", "Telephony, 17 OCT 88, p. 50. {As network usage evolves toward higher and higher levels, high volume users (for example of DS3) are finding a need for a new type of "drop-and-insert" multiplexer that will simplify the insertion and removal of portions of the digital stream that have varied bandwidths, in accordance with different uses.} (Evolution)

STANDARDS

"A Protocol and Prototype for Broadband Subscriber Access to ISDN," IEEE ISS (CH2431-5/87/0000-0462), 1987, p. 462, M.Wm. Beckner, T.T. Lee & S.E. Minzer. {Argues for Dynamic Time Division Multiplexing (DTDM) as a suitable access for broadband networks.} (Switching)

"Europeans Don't See a Sonet in Broadband ISDN Future," Data Communications, OCT 87, p. 16. {Trouble in adopting interface standards between Americans, Japanese, and Europeans.}

"Toward an International Broadband ISDN Standard," Telecommunications, OCT 87, p. 94, Stephen Minzer. {Discusses two possible broadband standards: STM (synchronous transfer mode; ATM (asynchronous transfer mode).} (Evolution)

"US Forging Ahead with Sonet Despite B-ISDN Standard Setback," Data Communications, DEC 87, p. 64. {US Sonet (Synchronous Optical Network), a transmission rate hierarchy, was rejected by the Europeans, particularly the French and the Italians. The French are interested in ATM.} (France, Italy)

"TV Codec Costs, Missing Standards Delay Use of DS-3 Fiber Optic Links," Data Communications, DEC 87, p. 70. {Codec capable of 45 Mbs cost \$50,000. Vendors include NEC. The price is about \$30,000 to high for local affiliates, and there are no standards among vendors.}

"SONET: Optical Highway of the 1990's and Beyond," Bellcore Exchange, H. Sabit Say and Richard A. Young, JUL/AUG 88, p. 3. {Summary of the development of the SONET protocol (originally proposed by Bellcore) into an international standard. Briefly discusses some of the details of the proposed standard.}

"Networking in the Open Systems Environment", Telecommunications, OCT 88, pp. 59-63. {The growth in data traffic has forced network managers to integrate voice and data traffic onto a common network. Customers are demanding that communications suppliers develop and adhere to a consistent set of industry standards to allow interworking across machines supplied by several vendors. Article discusses the basic requirements for creating an open systems environment.} (Evolution, Technology)

"IEEE 10BASE-F Task Force Standardizes Fiber for Ethernet and Token Ring," Fiber Optic News, 12 DEC 88, p. 5. {IEEE 802.3 committee established a task force to set up standards for optical fiber interconnections. The proposal will deal with active stars, passive stars and media. It is expected that the new standards will allow universal cabling over which many (or all) different network protocols may operate.} (MAN-LAN)

STANDARDS

"Multivendor Connectivity and the Role of Standards", Telecommunications, JAN 89, pp. 49-52. {Historical overview of the development of standards beginning with ARPANet.}

"Rosy Picture Painted for Video-Codec Standards", Data Communications, JAN 89, p. 16. {Lack of an industry standard is a major stumbling block preventing videophones from different vendors from communicating to one another, which in turn, restricts videoteleconferencing to internal communications. The Specialist Group for Coding of Visual Telephony, which reports to the CCITT Study Group XV, met in Orlando, FLA and resolved to finish a draft proposal for such a standard by the end of the year. The draft proposal is expected to be based on motion-compensated transform coding, which eliminates the redundancy in images.} (Applications, Demand)

"Nynex to Update ONA Plan With Eight New BSE's:", Telephony, 17 APR 89. {Rather than addressing only those parts of their ONA plan that FCC indicated, Nynex plans to substantially update the entire plan and add new BSE's including DS3 to DS1 mux.} (Players, Regulations)

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"Forces of Change in the United States Telecommunications Industry," Ameritech Services, 1986, Bruce DeMaeyer. (There are three forces for change: (1) in technology, digital switching, fiber, ISDN, intelligent network; (2) in regulation, regulatory bodies moving toward market driven regulation; (3) concerning market forces, intelligent networks and terminals need not compete, the future will see both.) (ISDN, Regulation)

"Integrated Voice, Data, and Video in the Local Loop," IEEE Globecom '86, SEP 86, p. 915, Neale C. Hightower. (Economics dictate that fiber loop be functionally a star, but electrically a bus.) (Economics)

"Fiber Optic Network Design for Integrated Services in Intelligent Buildings," IEEE Communications Magazine, DEC 86, vol. 24, no. 12, p. 29, Elmer Hara. (Considers fiber deployment in-office buildings to provide range of services, usually at bit rates of 1.5 Mbs.) (Applications)

"The Broadband-ISDN, An Upward-Compatible Evolution of the ISDN," IEEE, 1987, p. 609, Peter Kahl. (DBP sees broadband introduction in 1992. ISDN network will be upwardly compatible to BISDN. Initially circuit switched, BISDN may use fast packet switching functions in the future.) (Applications, Germany, ISDN)

"The Development of UK Communication Systems." British Department of Trade and Industry, 9 APR 87. (UK government formulation of IBN issues. Suggested criteria for policy are: implications for competition; practicability; technological flexibility; implications for existing participants; user needs.) (Britain, Players)

"Evolution from Digital Systems to a Broadband ISDN in the German Network," IEEE ISS, MAY 87, p. 325, R. Ertelt & D. Illi. (Germans see gradual evolution from ISDN to B-ISDN similar to evolution from digital network to ISDN. First broadband applications will be videoconferencing, videotelephony, and fast data transmission.) (Applications, Germany, ISDN)

"Extending the ISDN Horizon," IEEE ISS, MAY 87, p. 330, P.D. Fenner, T.J. Herr & D.J. Leonard. (Sets forth objectives for next network including: network resources on demand; adaptive; logically provided services; architectural freedom; wideband access. They say that the network will evolve gracefully from narrowband ISDN to a broadband network.)

"Interconnection of Private Networks," Telecommunications Policy, SEP 87, p. 247, Deborah Estrin. (The rise of inter-organization networks (IONS), e.g., those between banks or between airlines

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and travel agents, raise critical policy issues as to who will own, operate, and have access to advanced communications facilities and services which are essential to growing numbers of business activities.) (Players)

"Broadband ISDN: With Computers, The Sum is Always Greater Than the Parts," International Networks, vol. 5, no. 2, 15 SEP 87, Richard Solomon. (Solomon looks to a technologically, highly sophisticated IBN. It would represent a revolutionary change in network architecture and functions.) (Standards)

"Broadband Communication and Its Realization With Broadband ISDN," IEEE Communications Magazine, vol. 25, no. 11, NOV 87, p. 8, Heinrich Armbruster & Gerhard Arndt. (Article considers various means of realizing broadband applications: (1) private networks, individually user scrambled; (2) MAN's; (3) upgrading cable networks; (4) installing fiber in the network; (5) implementing ISDN and upgrading from there. No comment on which is best.) (Applications)

"In the Matter of Telephone Company-Cable Television Cross Ownership Rules: Comments of Corning Glass Works," Corning Glass Works, CC Docket No. 87-226, 2 NOV 87. (Comments argue for what now is CATV infrastructure. Provides some cost projections, different from BellSouth's, but beneficial to fiber. However, does not provide details of the model, nor data, necessary for assessing validity. Emphasizes importance of learning curve effects.) (Economics, Players, Regulation)

"Fiber Backbone: A Proposal for an Evolutionary CATV Network Architecture," ATC, 1988, James Chiddix, David M. Pangrac. (There are three advantages to a fiber-coax hybrid over a coax system: (1) it is more reliable; (2) it has improved signal quality; (3) it yields more channel capacity.) (Fiber)

"Implementation of a Broadband Integrated Services Hybrid Network," IEEE Communications Magazine, vol. 26, no. 1, JAN 88, p. 34, M.F. Mesiya. (Paper considers the issues and alternatives for an interim Broadband Integrated Services Hybrid Network which uses optical fiber in the local loop. "Hybrid" means integrated access to broadband network by delivery of voice/data digitally and video through analog drops.)

"Making the Transition: Fiber Winds Its Way Home," Telephony, 15 FEB 88, p. 6, Les Hewitt and Mark Pitchford. (Advocates and illustrates a step by step approach from today's copper local loops to future optical fiber ones.)

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"PacBell Plots a Course Over the Enhanced Services Terrain of the Future", Communications Week, 20 JUN 88, p. 11. {Pacific Bell released an 18-page report summarizing the company's plans for growth and expansion. Points of concern included the cost and pricing structure and California PUC rules.} (Economics, Players, Regulations)

"Cable Penetration is 51.7%: Arbitron", Multichannel News, 15 AUG 88. {VCR penetration was also reported at 60.3%.} (Players)

"Impulse Electrifies Age of Interactivity", Cablevision, 29 AUG 88, pp. 40-42. {True impulse, the ability to respond by simply pressing a key on a remote control, promises to revolutionize PPV. Called IPPV (for Impulse Pay-Per-View), several manufacturers, including Scientific-Atlanta, General Instruments and Zenith are marketing converter boxes with impulse capability. Impulse is expected to treble or quadruple the PPV market.} (Economics, Players, Technology Overview)

"Emerging Fiber Networks: Common Carriers by Default?", Cable TV and New Media, Leander Publications, New York Law Publishing Company, NY, SEP 88, p. 8. {Raises questions as to how best to regulate future IBN.}

"Independent Telcos Edge Bells in Digital Switching", Communications Week, 12 SEP 88, p. 38. {Due to lower capitalization costs and depreciation schedules, the 75 independent telcos are as a group converting to digital switching faster than the 7 RBOC's. Most major non-Bell telcos predict 95% digital switching by the early 1990's, ten years before the RBOC's.} (Switching)

"Peanuts Won't Do!", Telephony, 21 NOV 88, pp. 26-29. {Deals with ONI: (1) Powering; (2) Ownership (cannot be CPE in bus configuration); (3) Fiber-to-the-pedestal configurations.}

"TCI to Install Fiber Trunk", Multichannel News, 28 NOV 88, p. 1. {TCI plans to install 20 optical fiber supertrunk systems, replacing current microwave links in San Francisco, Washington DC and Dallas.} (Fiber, Players)

"Bells Ring Out Year of the Info Gateway", Communications Week, 26 DEC 88, p. 20. {Bell by Bell account of the information gateway and enhanced services that the RBOC's are offering on trial or commercial bases.} (Players)

"Gates Open on Voice Offerings", Communications Week, 26 DEC 88, p. 24. {Article summarizes the many responses in 1988 to Judge

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Greene's decision to allow RBOC's to offer computerized transmission and related services.) (Players)

"Mid Atlantic: Gateway Mania Hits NY, Too", Data Communications, JAN 89, p. 41. {New York Telephone plans to offer Info-Look, which features the same E-Mail and chat software that was developed in France for Minitel. Bell Atlantic plans to introduce a gateway service in the Washington DC area as well.} (Players)

"Wideband Fiber-Optic Transmission", Telecommunications, JAN 89, pp. 63-64. {Article covers the high points of the past five years in the United States with regard to the development of IBN. It also mentions the "deliberate pace" with which RBOC's are installing fiber, absent competition.} (Economics)

"More Users Opting for Integrated Voice/Data", Communications Week, 16 JAN 89, p. 26. {Results of a Computer Intelligence survey of Fortune 1000 companies. - 44% said they use or plan to use T1. Of those who do, 27% use T1 for integrated voice/data. One year ago, over 80% of T1 users transmitted voice only.}

"Contel Reveals First Fiber Call", Telephony, 6 FEB 89, p. 18. {Contel's Ridgecrest, CA fiber-to-the-home trial is "up and running". Later this year, Contel of New York will also conduct a fiber trial in Sidney, NY. The trials are expected to generate intelligence on how to cost-effectively deploy fiber, customer benefits from fiber-based services and how to reduce operating costs associated with fiber networks.} (Evolution, Players)

"Dear Executive", Fiber Optics News, 20 FEB 89, pp. 1-2. {Report on the Optical Fiber Conference (OFC '89). Richard Snelling, executive VP of BellSouth spoke of plans to have an all-fiber IBN in place by 2011. Southern Bell has plans to retire copper at a massive rate over the next decade due in part to a 22% rise in copper prices. Marvin Sirbu of Carnegie Mellon University indicated that IBN standards won't be implemented in the US until 1996.} (Economics, Players, Standards)

"Bellcore Plots IN Course", Communications Week, 3 APR 89, p. 9. {Bellcore is holding meetings jointly with the regional Bells and switch and computer manufacturers including Ericsson, Siemens Public Switching Systems Inc, AT&T, IBM and Digital Equipment Corp. The goal of the meetings is to draft a schedule for making specifications for an Intelligent Network. An industry-wide consensus on Advanced Network features is expected by the end of 1989 with "generic requirements" for the first generation of IN products due by 1990. Products for the first generation as well

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as specifications for the second generation could be seen by 1993. The second generation of products is expected by 1995.)
(Players, Technology)

"GTE Telecom, Grand Valley State University Plan Video Network",
Fiber Optics News, 10 APR 89, p. 8. {An interactive video
network that will travel over a switched fiber fabric.}
(Applications, Field Trials, Players)

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"Broadcast Fiber Test Eyed," TV Digest, vol. 28, no. 26, p. 5. {Eight network affiliates to participate in Bellcore test to distribute digitized video signals at 45 Mbs. Players include ABC, CBS, NBC, Fox, and PBS. Carriers include CNI, Lightnet, Norlight, SoutherNet, and Wiltel. Codec suppliers are NEC and Telettra.} (Players)

"Wideband Interactive Services Experiment (WISE): A Look Into the Home of the Future," IEEE Journal on Selected Areas in Communication, vol. SAC-3, no. 6, NOV 85, A. de Bosio, F. Melindo, A. Moncalvo & P.G. Ricaldone. {Field trial involved three applications: access to broadcast television; access to telelibraies; and videotelephony. Each user had a multifunction telephone, three TV's, and a video camera. The trial involved three upward video channels and one downward channel all over fiber. Signalling was done over copper. Audio and video signals were switched separately. No data was given about user response.} (Applications)

"Biarritz enjoys Videophone," New York Times, 21 APR 86, p. D12, Paul Lewis. {Users pay only normal POTS fee. Videophone, supplied by Thompson, costs \$3,000. Total costs of services into home is \$7,000/subscriber.}

"Lessons from the DIVAC Experiment," IEEE Globecom 1986 (CH2314-3/86/0000-0376), p. 376, H.B. Groen. {Descriptions of Divac experiment, a project of the Technical Universities of Delft and Eindhoven, Phillips, and Dutch PTT. Consisted of one exchange and two subscribers connected in a star shaped glass fiber network. Describes services, components, and costs.} (Economics, Evolution)

"First Results From Life Operation of the Biarritz Broadband Multiservice Network," IEEE (CH2431-5/87/0000-0229), 1987, P. Touyarot and P. Guillaume. {15000 subscribers, business and residential, with 2 fibers/subscriber. Applications: videotelephony; audiovisual databases; broadcast TV; audio. Subscribers have choice of 15 TV channels and 12 audio channels. In operation since 1979. Since 1984, 15% of residential subscribers have used videotelephone more than 5 times a week, as compared to 30% of business users.} (France)

"Testing Under Way: Fiber Comes Home," Data Communications, JUN 87, p. 47-48. {Brief description of Heathrow and Hunter Creek trials. BellSouth estimates that the costs of fiber into the home will be \$2,280/subscriber.} (Applications)

"Getting Down to Earth: From Satellites to Fiber Optic Landlines," Broadcasting, 31 AUG 87, p. 93. {Bellcore planning 8

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city trial of digital video transmission. Start-up will occur in late 1988 or early 1989.) (Applications)

"Southwestern Bell, AT&T Take Fiber to the Home in First Trial," Telephony, 31 AUG 87, p. 10, Carol Wilson. {Trial will involve transmission of voice only.}

"Southern Bell, NT Eye Fiber Project," Telephony, 7 SEP 87, p. 8, Larry Landon. {Report on Heathrow project. Video will not be switched. Voice and data at ISDN rates.}

"Bellcore Opens FO Networks to TV Signals," Telephony, 14 SEP 87, Carol Wilson. (Trial set for 1989 to provide land broadcast system over fiber at 45 Mbs. Trial will involve broadcasters, and IXC's.) (Applications)

"Cerritos Could Launch Vast Array of New Enterprises for Giant Firm," Cablevision, 14 SEP 87, Fred Dawson. {GTE will spend \$17 million for test. Their goal is to compare three modes of wireline transmission media: twisted pair, coaxial cable and fiber. 16,000 homes will be passed with coax. 5,000 homes passed with fiber. Cable and fiber will offer the same services. The project will be conducted in conjunction with cable company.} (Players)

"Fiber to Home in City of the Future," Telephony, 21 SEP 87, p. 13, Michael Warr. {Brief description of Heathrow, Fla. test involving Southern Bell, Northern Telecom and Heathrow Telecom (Cable company). Voice, data, video and telemetry will be accessed by consumers over single fiber.} (Applications)

"Germany Prepares Trial of Broadband National Network," Data Communications, OCT 87. {DBP will spend DM110 Million on wideband network. 300,000 km will be installed in business local loop in 29 cities. 1000 customers can be supported. The lines will operate at a bit rate of 138.24 Mbs. DBP must attract 3-5% of existing telephone subscribers to switch over to broadband in next ten years to break even.} (Economics, Germany)

"Contel Planning Home Fiber Nets," Communications Week, 19 OCT 87, p. 53. {Contel is planning two fiber to the home projects, one to 600 homes in New York State, and another to 400 homes in California. Contel insists that the projects are "not a trial."} (Players)

"Race/Esprit: Important for Europe," Gartner Group, Inc., T-050-720.1, 22 DEC 87. {Aside from universities and research centers, there are 240 industrial partners now participating in Esprit.}

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"Application for Construction of Facilities for Heathrow Project," Letter to FCC, 22 DEC 87, BellSouth. {Detailed description of BellSouth's Heathrow project. Telco will transport video to a maximum of 256 homes via fiber to provide three TV channels per subscriber from a selection of up to 54 channels. The telco's role as the provider of transport facilities will "not preclude the customer from providing services in competition with Southern Bell."} (Players)

"Fiber Optic Cable to the Home Gets New Jersey Test," Telecommuting Review, 1 MAR 88, p. 5. {New Jersey Bell plans fiber to 104 homes in Princeton. The fiber will carry voice and data lines operating at T-1 rates.} (Players)

"Cerritos Trial Clears 1st Hurdle," Telephony, 18 APR 88, p. 9, Carol Wilson. {NCTA will appeal April 13th ruling by FCC Common Carriers Bureau that GTE involvement is necessary if Cerritos is to have the full service cable system it seeks. NCTA claims that FCC's conclusion that "cable services could not exist in highly populated subscribers' area without financing from the telephone company is preposterous."} (Players, Regulation)

"GTE Plans 4-Phase Cerritos Project With Video Services," Communications Daily, 24 JUN 88. {Article briefly lists the 5 objectives GTE has for Cerritos Project.} (Players)

"Wisconsin Bell Trials ISDN Over Fiber," Fiber Optic News, 29 AUG 88, p. 1. {Alverno College is the site for an ambitious ISDN trial offering a LAN and video transmission serving 25 terminals. The trial is intended to test Siemens' digital switch, customer premises equipment and administrative and repair procedures. Starting with twisted pair, the trial will also attempt to gracefully evolve toward fiber.} (Applications, Economics)

"Bellcore Announces Resolution Reached for Land-Based Digital Television Trial," Fiber Optic News, 1 AUG 88, p. 6. {A national field trial to test multipoint delivery of video over fiber optic land lines is scheduled to begin in AUG 89. The trial will use digitally encoded signals. The programmers include ABC, CBS, NBC, Fox and PBS. The carriers will include CNI, Lightnet, Southernnet, Northlight and Wiltel, connecting Boston, New York, Washington, D.C., Atlanta, Indianapolis, St. Louis, Minneapolis and Los Angeles. A similar trial is due to take place in Canada conducted by Bell Canada and the Canadian Broadcasting Corporation.} (Applications, Players)

"Home, Fiber Home", Communications Week, 22 AUG 88, p. 10. {New

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Jersey Bell began providing POTS to residential customers over fiber that runs from the central office through remote equipment into the home.) (Evolution, Players)

"Cerritos Experimental Co-Build Plans Include Four Suppliers", Multichannel News, 22 AUG 88, p. 36. (In addition to GTE, California, AT&T network Systems Inc., GTE Labs, American Lightwave Systems Inc., and Siecor Corp. would participate in the Cerritos trial, if approved.) (Players)

"Warm Reception for Cable's Arrival", Cablevision, 29 AUG 88, p. 34. {Overview of the situation in Cerritos, CA, where GTE is due to build a cable system in tandem with a fiber test bed, if FCC approves.} (Players)

"NCTA, California Group Clash Over Cerritos Fiber Bid", Cablevision, 12 SEP 88, p. 59. {The National and California Cable Television Associations oppose allowing GTE to install fiber in Cerritos. Such an installation would, they claim, allow GTE to "control potentially competitive broadband capacity".} (Players)

Telcos Experiment With Video", NATOA News, SEP/OCT 88, pp. 9-15. {Survey of telco ventures into PPV waters.} (Evolution, Players)

"Southern Bell Fiber Trial", Communications Week, 7 NOV 88, p. 6. {Based on Governor's Island, NC, the trial will deliver POTS only, in an attempt to compare costs with copper} (Economics, Evolution)

"Fiber-To-The-Home Trial Begins", Communications Week, 14 NOV 88, p. 10. {Southwestern Bell has cut over the first of 132 residences in a fiber trial. Existing wiring and CPE will be used. Fiber will run to a special terminal attached to the exterior of the house which converts the signal to an electronic analog signal. The trial is using gear developed by AT&T specifically for use with optical fiber.} (Fiber, Players)

"NT and Southern Bell Talk Residential ISDN Over Fiber", Telephony, 21 NOV 88, p. 10. {The optical fiber ISDN trial in Heathrow, Fla. became operational 15 NOV as representatives from Northern Telecom and Southern Bell made the first ISDN residential call over fiber. Operation of the network represents the second phase of the project. Phase III will involve IBN.} (Evolution, ISDN, Players)

"SaskTel and Cable Regina Test "Video Jukebox" Access for Elementary School", Fiber Optics News, 12 DEC 88, p. 6. {Over 100

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videos are being made available to teachers and students over fiber, controlled by a touch-tone keypad.) (Applications)

"Southwestern Bell Schedules Voice and CATV Fiber-To-The-Home Trial in Texas", Fiber Optics News, 20 MAR 89, pp. 5-6. (Mira Vista, TX will be the site of the trial. Southwestern Bell anticipates little or no problem in obtaining FCC approval since Sammons Communications will provide the programming. Southwestern reportedly maintains that fiber must be economically justified for POTS, but the trial will provide insight into the impact of video on the network and customers.) (Players)"Southern Bell Adds Third FO Project," Telephony, 17 OCT 88, p. 21. (40 Southern Bell clients in North Carolina will be receiving POTS over fiber. The new system, which is being installed in a new development, will use AT&T's SLC Series 5 fiber-to-the-home transport system.) (Evolution, Economics, Players)

"SouthWestern Bell Cuts Over Customers for Fiber-to-the-Home Trial in Kansas," Fiber Optics News, 14 NOV 88, p. 4. (SouthWestern Bell is conducting a trial with 132 residences involving voice over fiber to the home. This is the first live use of AT&T's off the shelf fiber to the home equipment and unveils the Stand-Alone Midcount (SAM) and Fiber Interconnect Closet (FIC). The former routes the signals to the correct street, the latter is a higher density fiber cross connect facility than previously available which is located in the Controlled Environment Vault (CEV).) (Architecture)

BELGIUM

"Integrated Broad-Band Communication Systems in Belgium," IEEE Journal on Selected Areas in Communication, vol. SAC-4, no. 4, JUL 86, Ronny David. (Paper addresses issues relating to development of broadband test. Two alternatives could be: (1) 2 switched video channels; (2) unswitched TV. One major consideration is that Belgium has the highest concentration of (cable) penetration in the world -- 92.5%.) (Applications, Trials)

"Evolution Towards a Belgian Broadband Experiment," IEEE ISS, p. 380, MAY 87, P. Plehiers. (RTT, Belgian PTT, will use ATM switching fabric. The test will begin in 1992. Paper discusses numerous advantages of using ATM.) (Evolution, Standards, Switching)

CANADA

"Canada -- In the Forefront of Telecommunications," 1987,
W.B. Hewat. {All digital transmission will not arrive until mid
1990's. 100% digital switches will not arrive until 2000.
Network architectures will evolve to dynamic routing; that is,
from 5 tier hierarchy to 2 tier hierarchy.} (Evolution, ISDN)

"Good Bye Cable TV, Hello Fiber Optics," Forbes, 9 SEP 88.
{Saskatchewan Telecommunications is beginning a video-on-demand
trial later this year. Information about Britian, too. No
details are given.} (Economics, Trials)

FEDERAL REPUBLIC OF GERMANY

"Development Strategy of the DBP for the Telecommunication System: The Use of Optical Fibre Systems in the Subscriber Area," IEEE ISS, 1986, p. 776, Alfred Naab. {Brief comments on the BIGFON trial. The trial involved 320 subscribers. Subscribers were provided with 2 digital channels, 2-4 TV channels centrally switched, 24 audio channels, and 1 videophone channel. Only 68 subscribers had access to the videophone. Author feels B-ISDN will develop first with business customers, i.e., video teleconferencing. The network capacity discussed was 140 Mbs.} (Applications, ISDN, Trials)

"Broad-Band Communication Systems in Germany," IEEE Journal on Selected Areas in Communications, vol. SAC-4, no. 4, JUL 86, p. 579, K.E. Kneisel. {Brief description of BIGFON, videophone network, provided free of charge and videoconferencing applications.} (Applications, Trials)

"The Bundespost Plans for 1988 ISDN Debut," Telephony, 23 MAR 87, Peter Purton. {Article traces short-term evolution of German telephony network. DPB plans to have 100 trunk and 100 local digital exchanges in operation by 1990. Upgrade to B-ISDN should occur around 1991.} (ISDN)

"ISDN in Germany: Ambitious Goals, Slow Rollout," Strategies in Telecommunications Services, 29 FEB 88. {Deutsche Bundespost anticipates full B-ISDN by 1995. Driving this is an expectation that videophone service is likely to become and ubiquitous and important as telephone service is currently. Some skepticism was expressed over the prospects of actually achieving these ends, based upon past performance.} (Applications)

FRANCE

"Telecommunications in France: Building a Nationwide ISDN," 1986, Jacques DonDoux. {Considers network evolution from digitalization to narrowband ISDN.} (ISDN)

"Present and Future Wideband Communication Local Networks," IEEE (CH2314-3/86/0000-0771), p. 771, Remy Bouillie (CNET, Lannion). {France is planning to build a star fiber to the home network whose applications would include videotelephony, television, and hifi. Author concludes that at present such a network would be too expensive. Reducing costs would entail sharing transmission fiber between subscribers, and using low cost active components such as LED's and PIN's.} (Economics)

"Introduction of Optical Broad-Band Networks in France," IEEE Journal on Selected Areas in Communications, vol. SAC-4, no. 4, JUL 86, Helga Seguin. {A brief review of French video communication network. Nine cities in France have been wired. Paper discusses strategies for realizing network.} (Applications, Standards, Trials)

"Broadband Networks Integrating Telecommunication Services," IEEE ISS (CH2431-5/87/0000-0614), 1987, p. 614, H. Seguin. {Outline of specifications for a broadband network. One or two switched TV channels, one HiFi channel, one two way data channel at 4800 b/s, one duplex digital channel at 72 or 144 kb/s. Video communication services will be accessed by videotex network and then ISDN.} (ISDN, Trials)

GREAT BRITAIN

"Broad-Band Communication Systems in Great Britain," IEEE Journal on Selected Areas in Communications, vol. SAC-4, no. 4, JUL 86, Wm.K. Ritchie. {Considers broadband from regulatory point of view. In the near term, regulatory framework in Britain will inhibit convergence of cable and telecom; in the long term, after 1995, convergence is likely.} (Regulation)

"Evolution of the United Kingdom Communications Infrastructure. Phase 1. Discussion Paper," PA Consulting Group, SEP 87. {Develops three broadband scenarios related to degree, if any, of government intervention in telecoms with objective of developing IBN. Identifies means by which government could intervene without recreating a BT monopoly. Indicates the potential significance of DBS competition in UK market.} (Regulation)

"Cable in the United Kingdom," Center for Telecommunications and Information Studies, Columbia University (working paper), 1987, Jon Davey. {Description of relatively new cable industry in the UK. Unlike the US, British franchised cable operators automatically become telecommunications operators, and can compete with British Telecom.} (Players)

"Broadband Local Network Developments in the U.K.," IEEE Communications Magazine, JAN 88, vol. 26, no. 1, p. 44, John R. Fox. {How broadband evolution might occur in the U.K. Author is pessimistic about short-term prospects for fiber deployment in the local loop.} (Fiber, Players)

"Good Bye Cable TV, Hello Fiber Optics," Forbes, 9 SEP 88. {British Telecom is offering a dialup laserdisc "video jukebox" service. No details are given.} (Applications, Trials)

"British Telecom Announces Fiber Optic Transmission Breakthrough," Fiber Optics News, 26 SEP 88, p. 3. {BT announced a successful test of coherent transmission of digital signals over a 176 Km route under actual, operating field conditions.}

"PTAT Begins Main Lay of Cable -- Meanwhile NYNEX Files Reply in Support of Waiver," Fiber Optics News, 7 NOV 88, 6. {PTAT systems began laying a transatlantic fiber cable on 30 SEP 88. The cable will stretch from the UK to the US. NYNEX is filing a response to opponents of its waiver request to allow NYNEX to participate in the transatlantic venture as a 50% partner with Cable & Wireless.} (Players, Regulation)

ITALY

"A Strategy for Broad-Band Network Introduction in Italy," IEEE Journal on Selected Areas in Communications, vol. SAC-4, no. 4, JUL 86, p. 605, A. Fausone, A. Montcalvo & F. Tosco. (Paper argues for a smooth, gradual transition from ISDN to broadband ISDN. Cost of broadband, and functional correspondence with ISDN are stressed. Other topics include architecture and network systems.) (ISDN, Trials)

JAPAN

"Telecommunication Networks and Switching Systems in Japan," Nippon Telephone and Telegraph, **Motojiro Shiromizu**. {Brief overview of NTT network and its evolution to ISDN. Concentrates on current state of network.} (Evolution, ISDN)

"Recent Status and Trends of Fiber-Optic Subscriber Communications Systems in Japan," IEEE International Conference on Communications '86 (ICC '86), (CH2314-3/86/0000-0788), 22-25 JUN 86, vol. 2, p. 788-92, **T. Kitami**. {NTT labs has developed an 80 customer trial each of whom has fiber into the home. System includes both analog and digital equipment and transmission.} (Applications, Trials)

"High Speed and Broad-Band Communication Systems in Japan," IEEE Journal on Selected Areas in Communications, vol. Sac-4, no. 4, JUL 86, p. 565, **S. Harashina & H. Kimura**. {Japanese now have 1.6 Gbs trunking systems} (Fiber, Technology)

"INS Model System Operational Experience," IEEE ISS '87 (CH2431-5/87/0000/0021), p. 21, **Takaski Kibuchi, Hideo Wataya**. {Trial involving 2,000 business and residential customers. Voice, data, and video services are offered. Business customers make, on average, 5 videotelephone calls per day. Residential users make less than 1.} (Applications, Demand, Trials)

"An Overview of Very High Capacity Transmission Technology for NTT Networks," Journal of Lightwave Technology, vol. LT-5, no. 10, OCT 87, **K. Nakagawa & K. Nosu**. {Current state of fiber applications, specifically, video conference, video transmission, and high speed circuit systems.} (Applications, Fiber, Technology)

"NTT's Booming R&D", Teleconnect, DEC 88, p. 10. {NTT annual investment in R&D for the year ending 31 MAR 88 grew by 21.8% over the previous year. \$1.5 Billion was spent on four areas: (1) ISDN; (2) Intelligent processing, including natural language processing; (3) Nanoelectronics; and (4) Optoelectronics.} (Players)

"Competition Gaining on NTT", Communications Week, 3 APR 89, p 17, **Robert Poe**. {Long distance traffic handled by NTT between Tokyo and Osaka have fallen by 20% from two years ago. This is mostly good news for NTT, since NTT still controls the local monopoly and its great size is like "an elephant-to-an-ant" in relation to the new competition, but the emergence of competition might forestall a government action to break up the Japanese giant.}

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