
CONNECTIONS

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CONTRIBUTIONS are solicited from members and colleagues; papers of any length, especially news, abstracts, reviews of applications of networks in different fields, critiques, problem areas etc. If acknowledgement of a manuscript is desired, please enclose a self-addressed postcard (NOT stamped). In order to keep costs down, we prefer not to return manuscripts, please retain a copy for yourself.

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Instructions on how to prepare camera-ready copy for Connections will be found elsewhere in this issue.

THANK YOU TO: Marja Moens for typing and to Peter Carrington, June Corman, Olga Kuzmochka and Edward Lee for proofreading this edition of Connections.

NETWORK NOTEBOOK

Connecting with This Issue

We are delighted that we can bring you MULHERIN-KAWABATA-SONQUIST'S informative guide to the computerized handling of network data through SAS. No IBM home should be without it...RON RICE has presented us with an extensive annotated bibliographic guide to studying networks over time...Among the theses summarized here, PETER CARRINGTON'S neatly shows that the structure of corporate interlocks really has some meaning for the rate of corporate profits (seems as if Levine was onto something after all)...We bring you many useful abstracts --including Sumbelt, Albany and a rare look at what the geographers are up to...Finally, a plug for own own column--more network oddities appear here than in any other source!

This is a Reflexive Sentence

"We all steal ideas, dear, but in the end we are judged on who we stole them from and what we did with them". Martha Graham, as quoted by John Fraser in the Toronto Globe and Mail, 23 February, 1981.

WORLDNET 1980: Worldwide Corporate Interlock Data

WORLDNET 1980 provides corporate interlock data on microfiche for 400+ major corporations, worldwide. It comes in two volumes, updated from primary and secondary sources current in January, 1980.

Vol. I. Basic Data (4 fiche, 416 double pages, \$75): Alphabetized tables of persons, corporations and links, plus an alphabetized table of corporation-to-corporation interlocks.

Vol. II. Indirect Links (5 fiche, 1025 double pages, \$75). Alphabetized table of indirect links, person-corp.-person-corp., used for finding paths to target corporations and individuals.

The data are usable for research analysis of corporate networks or for locating the next patron for your research. The corporate data is based on an "assets 400+" from Fortune's world list and Forbes' U.S. ranking. The list has been supplemented in some cases by corporations that are missed by the Fortune and Forbes lists. (In some cases, some elements of the data were unavailable.) The fiche include basic data as well as computations of the data that eliminate much of the need for computer-generated searches through the network.

Available (prepaid only) from WORLDNET, Box A-201, Hanover, New Hampshire 03755, U.S.A.

Sounds as if no Marxist, capitalist or conspiracy theorist should be without it.

Could We Look Him/Her Up in Worldnet?

Ad in the New York Review of Books, 14 May, 1981:

"Manhattan oil millionaire, 36, handsome, creative, cultured wants to meet sensitive, objective (maybe analyzed) nymphomaniac Harvard professor or equal. NYR Box 5923."

Call for Support Papers

The Journal of Prevention will devote its Fall 1982 issue to the theme of support and risk reduction (guest editor, Benjamin Gottlieb). Authors are requested to submit papers which present empirical data illuminating the role of social support in health maintenance and health promotion. Both basic and action-research studies will be considered. Authors should provide a rationale for the measures of support used and a clear exposition of how the study's findings bear on the design of preventive interventions on behalf of specific populations. Send manuscripts (15 pages or less of text) by 15 November, 1981 to the Editor, Thomas Gullota, Clinical Director, National Association of Prevention Professionals, P.O. Box 284, Glastonbury, Connecticut 06033, U.S.A. (use APA style).

Ford Funds for Humanists

The Ford Foundation invites applications for grants to finance the writing of non-fiction books that offer humanistic perspectives on major issues and trends in contemporary society. Grants from \$10,000 to \$50,000 (totalling \$500,000). Apply by 5 June, 1981 to Committee on Public Policy and Social Organization, Ford Foundation, 320 East 43rd. Street, New York, New York 10017, U.S.A.

Hard-Core Stuff?

"[T]he strength of positions proposition and the strength of ties proposition were...confirmed for the female sample. In fact, such effects are even stronger for females than for males because the reaching up... requires crossing the sexual boundary". [Excerpt from paper presented at the SUNY-Albany conference.]

Stein Rokkan Prize in Comparative Research

The International Social Science Council will award an annual \$3,000 prize to crown a pathbreaking contribution in comparative social science research. To be considered, the work must be a manuscript, printed book, or collected works published after 1979. It must be written in either English, French, or German, by a scholar under 40 years of age on 31 December, 1981.

For information, write to The Secretary General, ISSC, UNESCO, 1 rue Miollis, F-75015, Paris, France.

Community Organization Buffs Organize

A Yale-based conference this Spring brings together researchers involved in undertaking community organizational censuses, in the hope of cross-fertilization between students of communities and of formal organizations. They hope to "establish a network of researchers who can interact over time around core theoretical and methodological issues in both of these fields, and develop methods of conducting community organizational censuses that will optimize the comparability of data collected in different locations and the utility of such data for the widest possible variety of purposes and perspectives". Proceedings will be published and also presented at the ASA Toronto meetings, August 24-28, 1981.

Conference organizers are Carl Milofsky and Paul DiMaggio (Yale, Sociology) and Barbara Heyns (Sociology, New York University). Among the score attending are Scott Boorman (Yale), Joseph Galaskiewicz (Minnesota), Michael Hannan (Stanford), Albert Hunter (Northwestern), and John Padgett (Harvard). (*Source: ASA Footnotes, January 1981*)

NSF Grant-Getters

In what may be the last such announcement before the Reagan/Stockman budget slashes, lots of sociological network folks have been awarded U.S. National Science Foundation research grants (accounting for 30% of the total):

- William Bielby (California-Santa Barbara), "Jobs, firms and industries: 'Dualism' and the organization of work; \$153,145.
- Phillip Bonacich and Oscar Grusky (UCLS), "The role of children in family coalition formation", \$35,982.
- Scott Boorman (Yale), "Mathematical models of social networks: matching, efficiency and structure", \$71,694.
- Ronald Burt (California-Berkeley), "Medical innovation and social network position", \$46,179.
- Jere Cohen (Maryland-Baltimore), "Peer influences on aspirations", \$12,115.
- James A. Davis (NORG), "A pilot study of inter-generational transmittances in America", \$124,998.
- Joseph Galaskiewicz (Minnesota), "The resource markets of non-profit service organizations", \$69,989.
- Fred Goldner (CUNY-Queens), "Organizational processes in the political economy of health care", \$31,139.
- William Gamson and Andre Modigliani (Michigan), "Political culture and political cognition", \$146,202.
- Michael Hannan and Nancy Tuma (Stanford), "Selection and competition in the life-cycle of organizations", \$117,038.
- Barbara Laslett (Southern California), "Demographic and economic determinants of family form and function", \$43,272.
- Robert McGinnis (Cornell), "Networks of basic and applied research communities in agricultural science", \$71,087.
- Harrison White and Ronald Breiger (Harvard), "Markets and organizations: Applying mathematical models to social structures and processes", \$92,022.
- Elinor Ostrom (Political Science, Indiana), "Urban resources, institutions and outcomes", \$90,632.
- Stanley Wasserman (Statistics, Minnesota), "Structural models for multiple sociometric relations", \$39,071.
- Harriet Zuckerman and Jonathan Cole (Columbia), "Career patterns in scientific research performance", \$118,190.
- Richard Emerson and Karen Cook (Univ. of Washington), "Experimental studies of exchange networks and corporate groups", \$112,547.
- Nicholas Mullins and Lowell Hargens (Indiana), "The social structure of scientific specialties", \$20,153.
- Christopher Chase-Dunn (Johns Hopkins), "World division of labor and the development of city systems: A longitudinal cross-national study", \$36,888.
- Richard Ratcliff (Washington Univ.), "Networks of economic and social prominence: A community study", \$7,539.

In addition, dissertation grants were made to the following faculty/student teams: Richard Emerson/Toshio Yamagishi; Edward Laumann/James Burke; Charles Tilly/Richard Hogan; Michael Useem/David Swartz; Immanuel Wallerstein/Kenneth Barr; Murray Webster, Jr./James Driskell.

He Did It All For Us

Ivan Chase's (SUNY-Stony Brook) paper, "Social Process and Hierarchy Formation in Small Groups" of chickens, etc., appears in *American Sociological Review*, December, 1980 (abstract in CONNECTIONS 3, 2).

Ivan writes INSNA that success is a result of "spending all my time cooped up doing research".

California-Irvine Network Programme Begins

The School of Social Sciences, University of California, Irvine has just started an interdisciplinary Ph.D. programme, co-ordinated by a Networks Group. The Group "focuses on relations among social units. These units may be individuals, organizations, or collectives, but in every case, stress is placed on the patterns of relationships among them. The Group emphasizes mathematical and computer techniques in data analysis and modelling. Although no single mathematical tool can be said to dominate the field, its practitioners frequently use the theories of graphs, automata, semigroups, and stochastic processes. Computers are used for multidimensional scaling and statistical analysis, as well as for simulations". Doctoral candidates work for an individually-directed course of study leading to a Ph.D. in Social Sciences.

Faculty members of the Irvine Network Group include: A. Kimball Romney - Social Science, Social Anthropology, Cognitive Anthropology; William Batchelder - Mathematical Models, Measurement, and Cognitive Processes; Duran Bell - Formal Models, Labor Economics; John Boyd - Mathematical Anthropology; Michael Burton - Cognitive Anthropology, Economic Anthropology, Social Organization; Douglas Chalmers - Social Psychology; Linton Freeman - Social Networks; Tarow Indow - Mathematical Psychology and Perception; Jerry Kirk - Sociology, Social Anthropology, Social Psychology, Social Control and Politics; Craig MacAndrew - Psychology, Personality Theory; Duane Metzger - Cognitive Anthropology, Belief Systems, and Semantic Analysis; Louis Narens - Measurement and Logic; Rein Taagepera - Mathematical Models and Quantitative Analysis of Election; Douglas White - Anthropology, Social Networks and Relations, Cross-Cultural Comparisons.

Information from Dean Linton Freeman, School of Social Sciences, University of California, Irvine, California 92817, U.S.A.

Irvine/Santa Barbara Preprint Series

Three papers are now available in this new series, edited by A. Kimball Romney (Social Sciences, California-Irvine) and John Sonquist (Sociology, California-Santa Barbara). They are: (no price indicated)

1. "Social Networks: A Beginner's Bookshelf", Linton C. Freeman.
2. "Polyhedral Dynamics and Conflict Mobilization in Social Networks", Patrick Doreian.
3. "Images of Networks: New Perspectives in the Study of Society", Alden S. Klovdahl.

A New Role for Blockmodelling?

"From newer knowledge of the different roles of specialized cell populations and their positive and negative interactions has emerged the view that the immune system is a complex, integrated network requiring a continuous exchange of information among cells. Perturbation at any point of the network may affect all these dynamic interactions. The search for insight into the several ways the body can distinguish self from nonself has made it possible to begin sorting out the language by which the cells of the immune system communicate among themselves and with other cells of the body". From Noel Rose, "Autoimmune Diseases", *Scientific American*, February, 1981, p. 102.

Essex Summer School

The 14th annual Essex Summer School in Social Science Data Analysis and Collection is being held in three sessions, 10 July - 21 August, 1981. Among the courses offered are Graph Theory and Analysis, Diffusion Models, Multi-Dimensional Scaling, Cluster Analysis, and over a dozen more. The courses are aimed at academics and advanced graduate students, varying from little to lots of statistics/math experience. Participants should be aware that the Essex campus is somewhat isolated from town.

For information, write The Organizing Secretary, 14th Essex Summer School, Department of Government, University of Essex, Colchester CO4 3SQ, England.

Voluntary Action

ARVAC, the Association of Researchers in Voluntary Action and Community Involvement, promotes research on voluntary organizations, volunteer involvement, community action self-help and informal caring. It organizes seminars and conferences, produces a newsletter and issues publications. Dues £4 (U.K.), £8 (foreign), (payable to ARVAC) to Pat Marsden, General Secretary, ARVAC, 2 Alma Street, Wivenhoe, Essex CO7 9DL, England, (Tel.: 0206-22-5344).

ARVAC Occasional Paper No. 1 is a Preliminary Report on a Study of Patterns of Neighbourhood Care. (Philip Abrams, Sheila Abrams, Janice Davison, 1979 £1). It is a comparative and evaluative study of the 'success' (or 'non-success') of a variety of Good Neighbour Schemes in mobilizing neighbourliness in different types of setting and through different organizational forms.

Network Analysis: A Subversive Science?

American immigration authorities recently stopped a foreign network analyst from attending a conference. By the time the confusion was sorted out (U.S. computers apparently find it tough to handle two people with the same name), the conference was over. Networkers make the Imperium tremble!

Data Set Available: Protest in 19th Century Germany

A set of all cases of collective social protest, 1816-1919, involving at least 20 persons. It contains analysis of the forms, amounts, origins, consequences of and sanctions against social protest. In addition, it contains time series of population increase, and of urbanization and industrialization, 1816-1919. The data set is drawn from three national newspapers and a number of official statistics and contains 986 protest incidents, 100 towns and 35 districts.

For information, contact Richard Tilly, University of Münster, Münster, West Germany. (Source: *QUANTUM*.)

Prophetic Article Title

"Symptomatic Silence in Althusser", Neil Smith, *Science and Society*, Spring 1980.

"Grassroots Energy"

Luther Gerlach (Minnesota), who has long been interested in the organization and use of networks for social change, has prepared ten 30-minute videocassettes. They analyze the socio-cultural dimensions of energy development, distribution and use, and compare situations in the U.S.A., West Germany, Japan, Iran, Thailand, Jamaica and Africa. The programmes aim to identify various issues and options, trace through likely consequences of different courses of action, and let the viewer work out his/her own judgement.

Programme titles are: Energy transformations and socio-cultural changes; What's for dinner: The social and cultural context of resource development; Systemic smog: Individual decisions and systemic consequences; Sprawl: The interaction of autos, energy and land use; Energy use and the growth debate; Global growth and energy de-localization; Global interdependence; Citizen protest of the development, distribution and pricing of energy; Grassroots energy; Imaging our energy future.

Information and programmes from the University of Minnesota Extension Independent Study, 77 Pleasant St. S.E. Minneapolis, Minnesota 55455, U.S.A., attention D. Horgan. Costs vary. (From *Social Impact* 57/58)

Info Flows

Leslie Howard appointed Associate Professor at Whittier College, 9/81...Steve Berkowitz, Director of Jewish Culture and Civilization at Vermont...Christopher Smith, Associate Professor of Geography at SUNY-Albany...Social note: Daniel Bell now "Henry Ford II Professor of Social Sciences" at Harvard...Marion Blute appointed Assistant Professor of Sociology at Western Ontario, 9/81...Thomas Fararo, Chair of Sociology Department, Pittsburgh...Peter Willmott, Head, Central Policy Unit, Greater London Council (Room 506, Greater London Council, The County Hall, London SE1 7PB, England)...Harriet Friedmann and Robert Brym tenured at Sociology, Toronto...Joseph Galaskiewicz tenured at Minnesota...Larissa Lomnitz on Executive Committee of Society for Applied Anthropology...Peter Carrington awarded renewal of Social Science Research Council of Canada Postdoctoral Fellowship...Theda Skocpol and Richard Emerson nominated for American Sociological Association Council...Maureen Hallinan, Editor of Sociology of Education...Janet Abu-Lughod, Liaison Co-ordinator for Arab World of American Sociological Association's Committee on World Sociology...Bert Adams elected Chair of ASA's Family section...Chad Gordon, Secretary-Treasurer of ASA's Social Psychology section...Noah Friedkin awarded National Academy of Education Spencer Fellowship...Robert Cole appointed to the U.S. National Science Foundation's Advisory Council...Herbert Gans awarded 1980 NAEB Book Award for Deciding What's News...Elliot Liebow awarded the Evaluation Research Society's 1980 Myrdal Award for contributions to government...Mark Granovetter awarded Woodrow Wilson Foundation's Faculty Development award...he's at the Institute for Advanced Study (Princeton), 1981-82...Visiting faculty at California-Irvine this year include Patrick Doreian, Alden Klovdahl, H. Gilman McCann, William Richards and David Strauss...Visiting faculty at the Structural Analysis Programme, Sociology, Toronto, are Ronald Breiger, Joel Levine, Leslie Howard, Joseph Galaskiewicz...Karen Cook (Washington) on leave at Stanford, 1980-81...John Higley (ANU) on leave at Center for International Affairs, Harvard to June 1981...Alvin Wolfe (S. Florida) on leave at California-Irvine, 1981-82...Donald Hildum (Oakland) on leave at Structural Analysis Programme, Toronto, 1981-82...Donald Warren (Oakland) a Fulbright at Leiden, 5-7, 1981...Theda Skocpol and John Padgett to Chicago.

New Journals

Mathematical Social Sciences is an international and interdisciplinary journal which will publish original research as well as survey papers, short notes, calendar of meetings, and book reviews. Contact editor, Ki Hang Kim, Mathematics Research Group, Box 69, Alabama State University, Montgomery, Alabama 36101, U.S.A. Among Editorial Board members are Claude Flament, Frank Harary, and Boris Schein. Papers in Volume 1 include: P.S. Albin, "The complexity of social groups and social systems described by graph structures"; F. Harary and J.A. Kabel, "A simple algorithm to detect balance in signed graphs". Subscriptions \$85 from Elsevier North-Holland, 52 Vanderbilt Avenue, New York, New York 10017, U.S.A.

Women and Environments is an informal journal discussing urban issues, scholarly and practical, from a feminist perspective. Subscriptions (\$5) and information from Gerda Werkele, Faculty of Environmental Studies, York University, 4700 Keele Street, Downsview, Ontario, Canada M3J 2R2.

Networking: The Great New Way for Fascists to Get Ahead

"From top to bottom Francoism was a system of interlocking personal connections. For Dionisio Ridruejo, the Falangist poet turned social democrat, 'everything in Spain, a telephone, a business contract, the most insignificant bureaucratic favor, comes because you have a friend'". Quoted by Raymond Carr in the New York Review of Books, 19 February, 1981, p. 43.

Spring and Summer Reading for Network Beachcombers

Two recommendations from Robert Bezilla:

One of the best examples I have ever seen of non-directive probing of a hostile respondent is contained in John Le Carré's Smiley's People. (Ed. note: It's fun to map the characters as an ego-centered net, too.)

Philip José Farmer's tetralogy (last volume, The Magic Labyrinth) is science-fiction which resurrects in one population the entire cumulative human population. It brings together such unlikely combinations as Cyrano de Bergerac, Mark Twain, Alice Liddell, King John, and Richard Burton, the explorer.

And one recommendation from the Ed.: Tom Wolfe's The Right Stuff is ostensibly about how the first American astronauts were driven by a normatively-guided ideal, "the right stuff" of which all good pilots are made. As such, it is ideologically incorrect. However, lurking within the words is a second book about the astronauts' manipulation of interpersonal networks and their building of external constituencies. A fascinating account of coalitions, conflicts and competitions.

HOW TO PREPARE CAMERA-READY COPY FOR CONNECTIONS

Our main purpose is to reduce the time and costs of producing copy. To prepare CONNECTIONS, we cut and paste copy for a photo-offset process, which reduces the typed surface by 25% in order to fit onto standard North American-sized paper. Copy should be clean for this process and the layout should be uniform and clear. However, acceptance of submissions does not depend on their being in camera-ready form.

Please use a carbon ribbon on a 12-pitch typewriter (12 letters to the inch). Please use Prestige Elite 72 typescript. The title, author's name and affiliation and the abstract should be typed in *Light Italic 12* typescript. All handwork should be done in black ink (not ballpoint, please). Typed surface should be 9" x 11½" (23 cm by 29 cm). You will need to use paper that is wider and longer than either A4 or Letter Size. Any over-sized, unlined, white paper may be used, as long as the typed surface is of the specified dimensions with a margin of at least 1" on all sides. DO NOT TYPE page numbers onto the manuscript, instead number the pages lightly but clearly in pencil on the upper right hand corner--outside the typed surface.

Please indent all paragraphs 5 spaces, single space text and double space between all paragraphs, headings, etc. for clarity after copy is reduced. Major headings such as left-justified headings in capitals, should be used sparingly. Most section headings, including a heading for 'references' should be left-justified, lower-case and underlined. The title, etc., (see above) should be in *italics*, in capitals, followed by a double space and the author and affiliation in lower case italics. Double space and indent the text 5 spaces, typing in Prestige Elite. Leave titles etc. blank if no italic script is available, but leave an appropriate space for their inclusion by us. For reference style, follow the American Journal of Sociology, underlining journals and book titles, and using a 5 space indent for second and subsequent lines of the reference. Do not begin References or Footnotes on a new page, continue below text and single space between each item listed. CONNECTIONS prefers British spelling and punctuation for consistency throughout the issue wherever possible.

MEETING CALENDAR

POLITICAL ECONOMY OF WORLD SYSTEMS

The 5th annual PEWS conference will be held at the University of Wisconsin, 14-16 May 1981. With the theme, "Ascent and Decline in the World-System," the conference focuses on "the ways in which states move up and down within the structured but dynamic whole". This theme will be treated under 3 rubrics:

1. Processes and events which condition possibility: war, capital creation, financial crisis, new technologies, state creation and class formation, etc.
2. Strategies, policies and interests of ruling groups and states facilitating or hindering movement.
3. Does socialism or NIEO or OPEC make a difference?

Information from the World Political Economy Study Group, North Hall, University of Wisconsin, Madison, WI 53706. (Source: PEWS News.)

BLUE-COLLAR WORKERS

The 4th conference on "Blue-Collar Workers and Their Communities" is being held 15-18 May 1981 at McMaster University with the theme, "Labour Responds to the Current Crises". 25 sessions are scheduled. Information from Peter Archibald, Dept. of Sociology, McMaster University, Hamilton, Ontario, Canada (tel: 416-525-9140 X 4481).

ORGANIZATION ECONOMY SOCIETY

The Organization Economy Society Conference will debate critical problems deriving from crises and realignments in the world economy. It also wishes to encourage the development of comparative research with an Australian dimension. Participants include Claus Offe, Erik Olin Wright, Franco Ferraresi, Bob Connell, Gianfranco Poggi and Philip McMichael.

18 workshops will be held including Labour Markets, Class Formation & the World Economy, Divisions in the Ruling Class, Fragmentation of the Working Class, Historical Trends and Transformations in the World Economy, Multinational Corporations in the World Economy, and the New International Division of Labour.

The Conference is at Griffith University, Brisbane, Queensland 4111 Australia, 16-19 July 1981. (tel: 07-275-7111).

AMERICAN SOCIOLOGICAL ASSOCIATION

24-28 August, 1981. Toronto, Canada.

While the final schedule has not yet appeared, many network persons will present papers in many sessions.

Network social functions are also contemplated by Toronto networkers--watch ASA conference bulletin boards for news of such events.

NINTH WORLD CONGRESS OF SOCIOLOGY

The date is now definitely set for 16-21 August 1982 at Mexico City. No INSNA person has volunteered to organize an ad hoc series of sessions (the deadline for submissions for ISA is 30 June 1981), so we shall have to infiltrate the already functioning Research Committees, etc.

For example, Ron Burt (Sociology, Berkeley) and Barry Wellman (Sociology, Toronto) are organizing a Community Networks session for the Community research committee.

Here are the names of the Chairs of some relevant Research Committees:

Economy and Society (Neil Smelser, Sociology, California-Berkeley)

Community (Terry Vlack, Sociology, Chicago)

Education (Margaret Archer, Sociology, Warwick, Coventry, England)

NINTH WORLD CONGRESS OF SOCIOLOGY (CONT'D.)

Ethnic Relations (John Rex, Research Unit on Ethnic Relations, SSRC, Univ. of Astin, Birmingham, England)

Family (V. Stolte-Heiskanen, Unionkatu 45 E 54, Helsinki 00170)

Futures (Eleonora Masini, Casella Postale 6203, Roma Prati)

History of Sociology (Stephen Lukes, Balliol, Oxford)

Innovative Processes in Social Change (Orlando Fals Borda, Apartado Aereo 52508, Bogota 2)

Aging (Anne-Marie Guillemard, Centre d'Etude des Mouvements Sociaux, 54 Blvd. Raspail, 75270 Paris)

Mass Communication (Joseph Vidal-Beneyto, 14 ave. de la Industria, San Just Desvern, Barcelona)

Medicine (Mark Field, Sociology, Boston U.)

Organizations (Michel Crozier, Centre de Sociologie des organisations; 88 rue de Lille, 75007 Paris)

Political (Erik Allardt, Research Group for Comparative Sociology, Marinkatu 10 A 13, Univ. of Helsinki)

Poverty, Social Welfare and Social Policy (Else Øyen, Sociology, Univ. of Bergen)

Mental Health (Normal Bell, Sociology, Toronto)

Regional and Urban Development (Manuel Castells, Inst. of Urban Development, California-Berkeley)

Science (Peter Weingard, Universität Bielefeld, West Germany)

Social Stratification (Natalie Rogoff Ramsøy, Inst. for Applied Social Research, Munthesgate 31, Oslo 2)

Deviance and Social Control (Paul Friday, Sociology, Western Michigan Univ., Kalamazoo)

Migration (Hans-Joachim Hoffmann-Nowotny, Sociology, Univ. of Zürich)

Women (Deniz Kandiyoti, 68 Bartholomew Road, London NW5)

Logic and Methodology (Edgar Borgotta, Rupert, Vermont 05768)

POLITICAL-ECONOMY OF CANADIAN-AMERICAN URBAN DEVELOPMENT

The annual Urban History conference with this theme will be held 24-28 August 1982 at the University of Guelph, Ontario, Canada. Four thematic areas are planned (co-chairs in parenthesis):

1. Economic growth--systems and their evaluation, industrial/corporatization, role of the state, entrepreneurship (Blaine Brownell, Center for Urban Affairs, U. of Alabama, Birmingham 35294).
2. Social structure and action--workplace democracy, neighborhood and other community groups, home and housing; health, education and welfare; local social planning (James Lemon, Geography, Toronto).
3. Form and spatial organization--transportation, housing, land development, morphological change (Michael Conzen, Geography, Chicago).
4. Government and politics--intergovernment relations, who governs? reform movements, public and private services (Alan Artibise, History, U. of Victoria, Victoria, B.C., Canada V8W 2Y2).

General information from Gilbert Stelter, History, Guelph N1G 2W1, Canada.

PRIMARY PREVENTION

Interdisciplinary Conference on Primary Prevention will be held at West Virginia University, Medical Center, Charlestown, 21-23 October, 1981.

Topics include: stress management, social competence, community interventions, social support systems, life span issues. Papers, panels, etc., may be addressed to conceptual efforts, programme reports, social policy issues and research methods.

For information, contact Robert Porter, School of Social Work, West Virginia University, Morgantown, West Virginia 26506, U.S.A. (From ASA Footnotes)

METROPOLIS AND COMMUNITY

The programme for the "Metropolis and Community" session for the ASA Annual Meeting is now available (24-28 August 1981, Toronto).

Papers include: Sylvia Fava (Sociology, Brooklyn), "The Suburban Generation"; Lea Hogoel (Sociology, Tel-Aviv), "Network Components in Differentiated Community Settings: Values and Strands"; Barry Wellman (Sociology, Toronto), "Community Networks and Mobilization of Resources". Organizer, David Cooperman, President, David Popenoe, Discussant, Harvey Choldin.

ECONOMIC ELITES

Lorne Tepperman and Jack Richardson have organized two sessions on "Theory and Method in the Study of Economic Elite Structures" at the Canadian Sociology and Anthropology Association annual meeting, Halifax, 28-31 May, 1981. Papers to be presented are:

Michael Ornstein (York), "Longitudinal analysis of directorship interlocks".
 Joseph Galaskiewicz (Minnesota), "Corporate control through board interlocks: conformity rewards in a regional system".
 Peter Carrington (Toronto), "Anticompetitive effects of directorship interlocks".
 Jorge Niosi (UQAM), "Economic elite or ruling class: theoretical and methodological differences".
 June Corman (Toronto), "Does government ownership produce a state capitalist class?".
 Thomas Koenig (Northeastern), "The effects of interlock patterns on political contributions".
 Dennis Olsen (Carleton) and Leo Panitch (Carleton) are the discussants.

RURAL DEVELOPMENT AND RETENTION OF THE RURAL POPULATION IN THE COUNTRYSIDE OF DEVELOPING COUNTRIES

The Programme Committee is soliciting proposals for panel co-ordinators, paper presenters and discussants by 15 July, 1981. Possible topics include the relationships existing between retention of the rural population and different elements such as land tenure systems, rural food self-sufficiency, local power structures, bureaucratic structures, age and sex, communication, appropriate technology, national urban policies and education. A book will be published based on the presentations.

The Conference will bring together specialists from developed and developing nations, with the expenses of several participants paid. Presentations can be made in English, French, Spanish and Portuguese.

Send three copies of proposals to the Co-ordinator, José Havet, Institute for International Co-operation, University of Ottawa, 190 Laurier Avenue East, Ottawa, Ontario K1N 6N5, Canada (Tel.: (613) 231-4910). Proposals should include a brief biography of the proponent (and participants, if possible), and a concise, but detailed description of the topic.

NETWORKERS DO IT IN THE SUN - AGAIN!

The 1982 Sunbelt (Tampa) Social Network Conference is scheduled for 12-14 February, 1982, once again at the Bay Harbor Inn. INSNA will sponsor it. The following sessions and organizers have been announced:

Peter Mariolis (Sociology, South Carolina), "Bridging theory and applications".
 John Sonquist (Sociology, California-Santa Barbara), "Collecting and processing network data".
 Everett Rogers (Institute for Communications Research, Stanford), "Communications networks".
 Stephen Seidman, (Mathematics, George Mason University), "Combinatorial and algebraic models".
 Muriel Hammer (N.Y.S. Psychiatric Institute), "Health and mental health".
 Bonnie Erickson (Sociology, Toronto), "Networks and attitudes".
 Nancy Howell (Sociology, Toronto), "Family, kinship and demography".

Alvin Wolfe (Anthropology, South Florida) and H. Russell Bernard (Anthropology, Florida) continue as Conference Co-organizers, with Linton Freeman (Social Sciences, California-Irvine), and Barry Wellman (Sociology, Toronto), as other Programme Committee members.

Registration fee will be \$30 for INSNA members, \$35 for those foolish enough not to belong to INSNA, and \$15 for students.

COMPARATIVE ANALYSIS OF BUREAUCRACY

The first International Conference on the Comparative, Historical, and Critical Analysis of Bureaucracy will be held in Zurich from 4-9 October, 1982. Suggested themes include Customary authority vs Bureaucracy; Contemporary alternatives; Bureaucracy, East and West.

Send papers (in triplicate) by December 1981 to Rolf Homann, Gottlieb Duttweiler Institute for Economic and Social Studies, CH-8803 Ruschlikon, Zurich, Switzerland.

*MEETING CALENDAR continued**PAST CONFERENCES**Letter From Tampa*

We climbed out of the pool and wandered inside. Another session of the (first ever) Sunbelt Social Network Conference was underway at Tampa's Bay Harbor Inn.

The conference was both comfortable and intellectual. The thirty-nine participants were interested in two types of issues: technical network questions (modelling, accuracy, change over time, clustering types of ties) and community support systems. (See Abstracts section of this issue for particulars.) Bernard and Sailer's paper had the most immediate impact: they resoundingly demonstrate that informants have lots of trouble accurately reporting information about their networks. Geographically, the conference had a predominantly Southern representation but Northerners are well-advised to journey poolside next year.

See "Networkers Do It In the Sun - Again!" for further information on the 1982 conference sessions.

Letter From Albany

Do conferences take on the demeanor of their host cities? Where the Tampa conference was casual but serious, the Albany conference (2-4 April) was sober but serious.

One hundred and twenty network analysts attended the conference on the "contributions of network analysis to structural sociology". Host Nan Lin, and his SUNY-Albany Sociology Department, laid on a heavy schedule. Over a dozen serious papers came forth (all fully written out and circulated to conference participants). See our Abstracts section this issue for particulars; the papers themselves can be ordered for \$1.00 each prepaid from Ms Peggi Patterson, Department of Sociology, SUNY-Albany, Albany, New York 1222, U.S.A.

My dominant impression of the conference (besides Allegheny Airlines) was "normal science". No revolutionary breakthroughs, no messianic leaders, but a lot of serious people doing good work on a broad range of substantive and theoretical issues. The mainstream feeling was certainly furthered by the cordial words of the two discussants: Peter Blau (on methodological issues) and James Coleman (on theoretical issues).

Return Migration

The first European Conference on International Return Migration was held in Rome, 22-25 April, 1981. It brought together scholars interested in European return migration, intra-Europe and from overseas.

Information from Daniel Kubat (Sociology, Waterloo, Canada).

From: University of Toronto Bulletin



RESOURCES FOR LONGITUDINAL NETWORK ANALYSIS

Ronald E. Rice, *Institute for Communication Research, Stanford University*

This paper is essentially a bibliographic resource of longitudinal network analysis research and methods. The text represents only a few paragraphs -- for brevity's sake -- of a paper presented to the Sunbelt Social Networks Conference in Tampa, Florida. That paper provided introductory concepts and terms, as well as examples and some review of the sets of literature categorized by the section headings below. What is most conspicuously missing here are explanations of actual research and tools used under each approach listed. Only the most comprehensive reviews under each approach are noted, with a few comments.

The point of that paper and this bibliography is that much network analysis is cross-sectional in nature, largely due to the belief that prior research and current datasets and methodologies have not yet set precedents or provided tools with which to approach the problem. The fact is, however, that considerable literature and tools already exist. These resources should be accessed even by those most interested in the qualitative and holistic aspects of networks: not only because the typical assumption that the network studied at one point in time is at equilibrium and will stay that way is almost certainly wrong, but also because the notion that most aspects of networks change over time is probably the most organic component of analysis.

DATA SOURCES. There are classic texts and articles on over-time studies and models of networks (as widely defined, below) in the social sciences (Homans, 1950; Lazarsfeld, 1954; Rapoport, 1963; Coleman, 1964; Bartholomew, 1967; Leik and Meeker, 1975) in addition to well-established theory and techniques in the engineering and physical sciences for handling process. And, there is clear precedent for over-time network data, notwithstanding the difficulties in obtaining such data. A few of the most classic data sources include Davis, Gardner and Gardner's (1941) study of 18 women as they interact in 14 events, Newcomb's (1961) two-year study of intact groups of fraternity residents, Sampson's (1970) detailed accounting of a rift in a monastery, Kapferer's (1972) study of textile factory workers and their involvement in a strike, and Rogers and Kincaid's (1980) 10-year monthly recall data of family planning adoption in 24 Korean villages. Recently assembled sociological network databases are becoming quite massive, such as Shapiro's (University of Pittsburgh, Dept. of Sociology) 200 years' worth of data on all civil and religious offices, individuals who held them, and their interactions.

TYPES OF NETWORKS CONSIDERED. First, we emphasize communication networks. We do not consider the many longitudinal analyses of other kinds of networks, such as power and influence networks in communities (Laumann, 1971), interlocking corporate directorates (see *Social Networks*, 1979, 1, 4), the anthropological literature and its descriptive analyses of kinship networks, urban telecommunications/transportation linkages (Cloker, 1978), immigration flows (Coombs, 1979; Jedlicka, 1979), etc. However, we have a wide definition of network communication: any kind of human symbolic interaction or other networks which are analyzed in the context of theorizing about human communication. Second, the emphasis here is on providing the reader a short guided tour through possible approaches and tools, and not (necessarily) through substantive issues in social science and network theory.

EXPLANATORY MODE. The determinist mode assumes that if the parts are measured and understood well enough, a perfect theory will then be able to predict exactly the results, by means of the right combination of variables. Most network analysis which is not simply descriptive is deterministic rather than probabilistic in nature. There is nothing necessarily wrong with this emphasis. However, Hewes (1980) argues that the "presumption of determinacy [of events -- that events are completely determined, and that we can model them with perfect theory, measurement and model specification] is not necessarily correct." He goes on to discuss various reasons why deterministic models may be less satisfactory or appropriate than probabilistic analysis (and when they might be more appropriate). The probabilistic, or stochastic, approach instead assumes that "the probability distribution...of events are predictable in principle" and not the events themselves. The probabilistic approach assumes that not only can we not measure and specify perfectly, but more importantly, that many network behaviors are not strictly determined, but rather inherently involve some randomness or distributions of alternative possibilities.

TIME. We refer to static comparisons as those which do indeed consider changes, but do not explicitly denote time in the models or methods. In static comparisons, specific intervals or durations of time are not involved, nor even is time associated with other variables. The implicit but very significant fundamental assumption in static comparisons is that the network had reached equilibrium or even total stasis; otherwise it would be very difficult to evaluate meaningfully the direction of change. What we call temporal analysis does explicitly involve time, such as by time lags, or time as a subscript. The choice of time intervals is problematic and of crucial significance, is often arbitrary or determined by interviewer scheduling, and may seriously cloak true patterns of change. Dynamic or variational analyses do consider time and various measures of time (such as rates of change, durations, birth and death processes, etc.) as variables, although these analyses are much less common in communication research. Often for good reason, considering the difficulties in data collection and analytical sophistication required.

MEASUREMENT. Two other distinctions which Hewes (1980) makes are a) whether the variable is measured as a discrete state or on a continuum, and b) whether time is measured as discrete or continuous. For example, we could consider whether two individuals were linked or not (discrete state) or their strength of interaction (continuous) either across, say, monthly intervals (discrete time) or during their actual interaction episode (continuous time approximated by infinitesimal intervals). Hewes suggests some methodologies for each of the four combinations, although he focusses on discrete-state, continuous-time analyses. Network research using reported or "cognitive" data must test the accuracy of recalled or perceived sociometric interaction. It is fairly clear that we can seldom depend on reported sociometric data to represent the behavior the research hopes to be analyzing (Holland and Leinhardt, 1973; Bernard, Killworth and Sailer, 1980, 1981). With the emergence of computer-mediated communications in organizations and research groups, we may begin to acquire actual, overtime behavioral human communication network data. The task then will be to understand the relationships between our actual communication behaviors and our perceived images of our social structure -- which is more 'real', which is more influential or useful in which context?

Static Comparisons

The two most comprehensive reviews of static network comparisons are by Mouton, Blake and Fruchter (1960), who provide detailed tables for four analysis categories (such as choice volume or status stability) involving dozens of studies; and by Rogers and Kincaid (1980) who focus on studies involving link stability and network variables influencing the over-time adoption of innovations. Most static comparisons involve verbal descriptions -- which may be very rich and insightful, particularly in anthropology -- or correlations and t-tests of network indices, perhaps repeated measures of variance. Some analyses even compare whole matrices, say by quadratic assignment (Hubert, 1978), Q-analysis (Doreian, 1980) or rotations of a transformed matrix to "best-fit" scaling (Woelfel and Danes, 1980).

Deterministic Approaches

One is, of course, free to include network variables in the usual sort of temporal regression-based analyses and time-series. A good review of temporal and dynamic deterministic models of human network interaction is by Bernard and Killworth (1979), although they also include some probabilistic models. Deterministic information flows from an engineering perspective are conceptualized and analyzed by Ford and Fulkerson (1962).

The notion that a system proceeds through time in ways determined by whether levels of certain variables reach or exceed the values of certain other "control" variables (such as a population pushing against the carrying capacity of its environment) has had a long history in biostatistics and has been received well in sociology. Applications of these "structural control" models to social interaction processes have been described by Doreian and Hummon (1976) and Doreian (1979a). These models consider aspects of system looping (whether output and other system variables affect control of the system or not) and system connectedness (the propagation of consequences of change in one location throughout the system). Doreian sees social groups as "richly connected, closed-loop control systems". In his 1979a chapter, Doreian generalized the sociomatrix to a network of attitude/behavior interactions. Using the relative importance of every other individual to the norms as perceived by a group individual, he creates a matrix of values. This matrix can then be used to gauge structural control of norms (attitudes, behavior). See also Johnson (1980) for a comprehensive review of structural attitude change models, and his own synthetic model.

Probabilistic Approaches

Rapaport (1979) offers an excellent introduction to and review of probabilistic models of flow in networks (although Kleinrock, 1964, is the premier engineering text). He notes that most of these models are not strictly stochastic, in the sense that only expectations of outcomes from one period to the next are derived, and not full distributions. For our purposes, however, these models are considered probabilistic. In contagion or diffusion models, theoretically expected contacts at time t or at infinity are based first upon values such as the number of contacts made per node with random contacts. Then the models are elaborated by controlling for biases or constraints (such as reciprocation rate).

A particular form of information flow is the "Small World Problem", which considers how a message can be delivered to an target recipient who is personally unknown by the initial sender. The literature and models are reviewed by Bernard and Killworth (1978) and Travers and Milgram (1969), among others.

More complex probabilistic diffusion models, specifically from the mass communication perspective, are reviewed and analyzed by Gray and von Broembsen (1974). The six models considered involve interpersonal as well as mass media interaction, individual interest and retention, and discrete and continuous time.

The simplest Markov Chain model assumes that "the process remains in a specified state for an exponentially distributed length of time, with a rate dependent only on the state. Immediately thereafter, a transition is made to another state, with a probability that depends only the present and transited state" (Runger and Wasserman, 1979). Thus transitions from one discrete state to another are involved; most network applications utilize discrete time periods, although continuous time has analytic advantages. The notable lack of "history" in the simple Markov model is disturbing to anyone who considers how people direct their sequences of personal contacts over time.

The flexibility in the notion of "state" provides some of the power of Markov analysis. States in a given analysis must be exhaustive and mutually exclusive, and different Markov processes have different things to say about how the process moves from one particular state to another particular state. A network-related "state" can be a kind of dyadic relationship (say symmetric or null), a defined conversation sequence (one person has just finished talking but the other has not started yet), actual network nodes where the transition could be number of messages sent electronically in the discrete time period, etc. Markov theory requires some stringent assumptions, which must be tested. These include a homogenous population, constant transition rates through time, sufficiently small sampling intervals, the embeddability of the transition matrix in a more fundamental matrix, independence between states, a given "order" or dependence on being in one or more prior states, etc. Hewes (1980) discusses some of these assumptions and their tests. The test formulae and strategies can be found in Anderson and Goodman (1957), Billingsley (1961), Kullback, Kupperman and Ku (1962), Coleman (1973: Chapter 1), and Singer and Spilerman (1972a, b). Ginsburg (1972a,b) critiques most Markov models and offers some solutions to their lack of history or causality.

With respect to the range of processes modelled by Markov chains, Sorensen's (1975) is the most accessible review of social mobility models. His review pays particular attention to one of the complications: population heterogeneity, when there are differences in individuals in the likelihood of making a transition. Wasserman's (1978) review specifically considers representations of networks as directed graphs (which show interpersonal links as binary values). He offers a four-field table of models and research by discrete or continuous time and deterministic or probabilistic mode. He goes on to note similar models and applications in the natural sciences such as fluid mechanics, percolation and polymerization processes (such as reported by Morgan, 1976).

An entirely different set of Markov studies, specifically from the communication research community, involve conversation interaction analysis. Cappella (1979) and Cappella and Streibel (1979) review the literature on talk and silence phases in interactions as well as the competing schools of thought: whether patterns are personality traits, whether they can be molded by the other's interaction habits, whether patterns are dependent on content or developing phases of group discussion, etc. Alternative positions are being fought out in Markovian studies, using varying number of states. In general, however, this literature is a fine example of continued research based upon commonly accepted and used terms, content coding strategies, propositions, and evidence criteria.

Tuma, Hannan and Groenveld (1979), Tuma (1980) and Hannan and Tuma (1981) go even further, in their "event histories" approach. Using periodic data about continuous processes, they use linear and stochastic differential equations, among others, to model transition rates between qualitative states or quantitative measures to analyze and predict the probability of being in a particular state, the expected number of events by a particular time, the probability of having been in a particular number of states or a sequence of states, state duration, among other variables of interest.

Resources

The bibliography is coded by the terms and concepts noted above, to help the reader in determining which resources might be useful. Additions to, or corrections of, this bibliography are welcome.

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NOTE: Codes on left margin represent a crude analytical topic index. The codes are as follows:

Explanatory Mode --

- A = Anecdotal or descriptive; verbal explanation of process
- D = Deterministic
- P = Probabilistic

Approach toward Time Analysis --

- C = Static Comparisons
- T = Temporal
- V = Variational or Dynamic

Miscellaneous --

- E = Major or Classic Source of Over-Time Network Data
- I = Review or Introductory Text for Content of Title
- G = General Concordance (Quadratic Assignment)
- M = Markov
- S = Structural Control Model
- Q = Q-Analysis
- Z = Simulation

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RELATIONAL DATABASES FOR COMBINED NETWORK AND ATTRIBUTE DATA FILES:
A SAS IMPLEMENTATION

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I. Introduction

In a recent article Sonquist (1980) presented an overview of the processing of data for a studies combining both conventional attribute and social network data. He explored the available software and illustrated the data management task as a whole and observed that most network analysis programs have little or no data management capabilities. It should be noted that research designs using both attribute data and social network data will need data management resources which are able to deal with both types. An obvious solution is to use the file managing capabilities in the existing statistical packages. This requires proper file design and is facilitated by using several data management operations not yet well known among social scientists. These operations and their underlying concepts receive extended treatment in the database management systems (DBMS) literature (1).

In this paper we will outline some of the most basic aspects of "relational" database procedures and will conclude with a social network illustration of some powerful relational operators as implemented with the file managing capabilities of an existing statistical package, the Statistical Analysis System (SAS) (1979). SAS has an extensive set of file handling capabilities and is widely available on large-scale, IBM-compatible equipment. Although not designed according to current DBMS criteria, the file procedures in SAS are sufficient to implement some relational operators although they will not be highly efficient in use of computer resources. Researchers with combined network and attribute data will thus be able to save a great deal of time by avoiding having to write special purpose, data management programs. For some researchers the procedures illustrated here will permit them to combine the two types of data analysis for the first time. In later papers we expect to explore the uses of existing data management capabilities in other statistical packages (e.g., OSIRIS IV and SPSS-SIR for solving this problem).

II. Selected Relational Database Concepts

Current DBMS technology can be classified into three types: hierarchical, network, and relational systems. Historically, the hierarchical and the network developed first (2). The relational, however, is easier to understand and work with and is more powerful. It reduces redundancy, makes updating and corrections easier, and offers a powerful collection of operators for assembling just the data subsets one needs for particular analysis tasks or for processing queries.

Because of its inherently simple file structure it is often useful to think of one's data in relational terms even if it is stored physically in another kind of data structure. One of the advantages of the relational approach is on this conceptual level, facilitating the mapping of data between network structural analysis and conventional statistical analysis. To use the techniques described in the example below, first organize your data as a set of tables, or, more technically, put it into canonical form (Sonquist, 1980). The next paragraphs explain how this is done.

The starting point for deciding which data to put into which tables is to think of the "dependencies" within the data. One piece of data (the value of a variable for a particular case) has others dependent on it if the value of each of these others is associated with IT ALONE and not with the rest (see Date, 1977: 154). For example, the following file, typical of much social science, uses a straight-forward dependency of all data on the person's identification number. The name, political contributions and age of that person can each be determined from the UNIQUE SUBJECT who is unambiguously identified by the value for "person number." Age is NOT dependent on contributions, etc.; it is only dependent on person number and so is everything else. In this example either P# or PNAME could be used as an identifier. We shall use P#. The result is data in a canonical, "flat file," or table form. In these examples the name of the file is listed in the upper left hand corner:

*James Mulherin's research supported by (U.S.) National Institute of Mental Health Postdoctoral Fellowship.

PERSON:	P#	PNAME	DEMCONT	REPCONT	AGE
	P1	Smith	0	10	60
	P2	Jones	15	0	55
	P3	Adam	5	5	62
	P4	Katz	0	0	51

The variables in the PERSON file are person number, person name, Democratic Party contribution, Republican Party contribution and age in years. A common shorthand for referring to such a canonical file is PERSON (P#, PNAME, DEMCONT, REPCONT, AGE). The file is named, its contents are listed and the unique identifier or "primary key" is underlined. There is one record (line) in this file for each unique object of this type (person).

This canonical approach does not produce one very large interrelated data file, full of complex dependencies, perhaps with a large set of null values and possibly a mixture of record types. Rather, several simple files are used, each of which has a clear-cut dependency of each attribute on one "primary key" with no dependencies of the remaining attributes on each other. The primary key is an attribute which uniquely identifies each row of the file. Other attributes may be used as "non-primary" keys. The latter identify subsets of the file, generally involving more than one row.

Let's suppose we are studying the political contributions of the directors of large corporations. We might also want to set up the following two additional files recording the attributes of directorships and the attributes of corporations.

DIRECTORSHIP:	P#	C#	TIMEB	OFFICE
	P1	C1	5	Member
	P1	C3	7	Officer
	P2	C2	6	Officer
	P3	C3	3	Member
	P4	C1	8	Officer
	P4	C2	2	Member

CORPORATION:	C#	CNAME	INDUSTRY	LOCAT	RANK	ASSETS
	C1	Citibank	bank	NYC	2	158
	C2	ARCO	mining	NYC	3	104
	C3	Ford	manuf	Det	7	85

The directorship file, DIRECTORSHIP (P#, C#, TIMEB, OFFICE), shows the individual director's P# (as in the first file example), the corporation number of the directorship, the length of tenure on the board of directors, and whether the person is an officer of the corporation. Note that P# and C# function together as a single, "concatenated," primary key. Time in office and office held are "dependent" on P# and C# together, not on P# alone or on C# alone. Thus, they are attributes of an entity which we shall refer to as a directorship, not attributes of a person or of a corporation. There is one record for each directorship.

The corporation file, CORPORATION (C#, CNAME, INDUSTRY, LOCAT, RANK, ASSETS) shows the corporation number, its name, industry, location of the corporate headquarters, its rank and its assets. Each attribute is "dependent" only on the corporation number. Corporation name is an alternate candidate for a primary key, but we shall use corporation number.

It is important that variables which are really attributes of directorships NOT be initially recorded in the CORPORATION file, and vice-versa. Variables should be recorded only once, in exactly one file, the one in which the proper dependency pattern can be maintained! They may arbitrarily be moved elsewhere, later on in the analysis, to carry out contextual or compositional analysis (Sonquist, 1980). This will become more clear in the next paragraph through the use of relational database notation.

In Sonquist's (1980) terms, the three files introduced above contain two point classes, people and corporations, and one line class, directorships. We cannot use a database consisting only of persons and corporations with directorship information incorporated in the person or the corporation file because this leads to dependency patterns that violate the canonical structure (3). The graph of a database organization without the DIRECTORSHIP file would be:

person <<----->> corporation

The double arrows denote a "many-to-many" connectedness pattern between persons and corporations. Each person may be the director of many corporations (--->), and each corporation typically has more than one director (<---). To achieve a canonical form each many-to-many relationship is replaced by an intersection file (Chen 1979), in this case, the DIRECTORSHIP file, and we have:

```
person <-----> directorship <-----> corporation
```

Now we have two one-to-many relationships instead of one many-to-many relationship since each directorship is associated on the one hand with exactly one person and on the other with exactly one corporation. This preserves the canonical form and lets us use the powerful relational operators to deal with data manipulation problems.

To utilize the database either for asking questions or for subsetting and combining files for particular network and statistical analyses we will use a set of relational operators. Three of the most useful for this kind of social science data are the SELECT, the PROJECT, and the JOIN operators (4). They are more general than the specific file management techniques currently available in most statistical packages, and they have the property that when applied to one or more files in canonical form, the result is another file also in canonical form.

The SELECT operator is already familiar to everyone who has used a statistical package; it subsets "horizontally," taking just those rows of our flat file which we need while eliminating the rest. A statistical package does the subsetting by applying a boolean expression to the values of specified variables. The case is SELECTED if the result of the expression is TRUE.

For example, if we use the DIRECTORSHIP file and do a SELECT with the criterion OFFICE = "Officer" we would end up with the following new file OFFICERS:

```
OFFICERS:  P#  C#  TIMEB  OFFICE
           P1  C3   7   Officer
           P2  C2   6   Officer
           P4  C1   8   Officer
```

The PROJECT operator vertically subsets the table or file, taking just the columns we want. Then it drops the duplicate rows. If we did a PROJECT over the attribute for DEMCONT in the file, PERSON, we would end up with a list of values of the variable DEMCONT, the (trivial) new file DOLLARS. We might choose to have these sorted into ascending sequence at the same time:

```
DOLLARS:      DEMCONT
              0
              5
              15
```

The JOIN operator takes as input two files with at least one attribute column in common and matches them. The common attribute is generally the primary key for one file and a nonprimary key in the second file. In our example, it is a segment of the concatenated primary key. The JOIN operator not only matches, but concatenates a given row in the first with every instance of a matching row in the second (5). (Those experienced in punched card processing from earlier days will recognize a match operation with multiple secondaries on a collator followed by a reproducer operation with multiple detail cards for each matched master; those knowledgeable in set theory will recognize this as the intersection of two sets of keys.) For example, if we wanted to create a new temporary analysis file by adding corporation names to the file on DIRECTORSHIP, we would first PROJECT the CORPORATION file over C# and CNAME to drop out unwanted information. This would yield:

```
TEMP1:      C#      CNAME
           C1     Citibank
           C2     ARCO
           C3     Ford
```

Then we would join the file TEMP1 to the DIRECTORSHIP file using C# as our common attribute. Since every corporation has at least one directorship and every directorship has exactly one connection to a corporation the resulting file, TEMP2, would be exactly like the original DIRECTORSHIP file except for the addition of a column of firm names matching their appropriate C#s.

TEMP2:	P#	C#	CNAME	TIMEB	OFFICE
	P1	C1	Citibank	5	Member
	P1	C3	Ford	7	Officer
	P2	C2	ARCO	6	Officer
	P3	C3	Ford	3	Member
	P4	C1	Citibank	8	Officer
	P4	C2	ARCO	2	Member

While DBMS software systems capable of carrying out these operations (making up a "relational algebra," see Date, 1977) are being developed, they are not yet generally available to social science users. In the meantime the operators can be implemented by SAS or other file handling software with a certain amount of effort and care (significantly less than the effort and care required to write special-purpose FORTRAN code to accomplish equivalent results).

The illustration in Appendix A will be meaningful principally to those familiar with SAS data management techniques. Other readers are referred to the SAS publications listed below for assistance in interpreting the example. To do SELECTS, PROJECTS, and JOINS in SAS requires a larger number of SAS commands (6).

SELECT:	PROJECT:	JOIN:
DATA	DATA	DATA
SET	SET	SET
IF	PROC SORT	IF
PUT	DATA	PUT
	SET	DATA
	IF	MERGE
	KEEP	IF
	PUT	PUT
		PROC SORT
		DATA
		SET
		IF
		KEEP
		PUT

III. Generating Network Program Input Datasets

The example in Appendix B shows how these canonical data forms can be transformed into input for network analysis programs. Since some programs, e.g., Alba's (1973) COMPLT program use a list of linked entities while other programs, e.g., White, et al. (1976), require an adjacency matrix format, we illustrate both conversions. The code is complex, and is not optimized for efficiency; rather, it is laid out to follow the logical pattern used by relational operators. Nevertheless, it works. The adjacency matrix example below cost about one dollar to run at UCSB.

Suppose your aim is to produce a file of people connected to each other through common membership on a board of directors, i.e., a person to person network. Alternatively, your aim could be to produce a file of corporations connected to each other through common directors, i.e., a corporation to corporation network. The algorithm to do either is the same. In the following illustration, we will produce a person to person network using the sample files used above.

First, PROJECT over P# and C# in DIRECTORSHIP to eliminate the unwanted attributes, TIMEB and OFFICE.

Second, form the Cartesian product of the P#-C# primary key (this is the pairing of every value of P#-C# with each and every value of P#-C#); the Cartesian product of a set is a form of multiplication of the set by itself.

FIRST:		SECOND:	
P1 C1		P1 C1	P1 C1
P1 C3		P1 C1	P1 C3
P2 C2		P1 C1	P2 C2
P3 C3		P1 C1	P3 C3
P4 C1		P1 C1	P4 C1
P4 C2			etc. etc.

Third, SELECT a subset of the Cartesian product such that we keep only those pairs whose first C# is the same as the second C# and whose first P# is different from the second P# (7).

Fourth, PROJECT over the two P's to eliminate the duplicates. This set of P# pairs is our desired result. (If we wanted the corporation network, we would SELECT those pairs in the third step such that two P#'s are the same and the C#'s are different.)

THIRD:	P1 C1 P4 C1	FOURTH:	P1 P4
	P1 C3 P3 C3		P1 P3
	P2 C2 P4 C2		P2 P4
	P3 C3 P1 C3		P3 P1
	P4 C1 P1 C1		P4 P1
	P4 C2 P2 C2		P4 P2

Fifth, if necessary format the person to person ties for input to the network program. In our example (see Appendix B) we show the adjacency matrix format and the list format.

ADJACENCY	LIST
MATRIX	FORMAT
0 0 1 1	P1 P4 P3
0 0 0 1	P2 P4
1 0 0 0	P3 P1
1 1 0 0	P4 P1 P2

Clearly, the use of SAS statements to generate adjacency information is awkward. A better idea would be to write a SAS PROC--a supplementary program callable from SAS to perform these tasks. In our judgement, the implementation of SAS PROC's for the sequence of PROJECT, JOIN and CARTESIAN PRODUCT-SELECT operations should be a high priority task.

FOOTNOTES:

1. For an overview of database management approaches both Martin (1977) and Date (1977) are good sources; Chen (1979) is a readable presentation of recent developments; Kim (1979) reviews many existing relational systems. Chen's (1979) work provides a good practical approach to the use of "entity-relation" concepts in database modelling and design.
2. The DBMS "network" does not necessarily mean the same as the various meanings of social network data.
3. The penalty for attempting to do so is addition, deletion or update anomalies (Date 1977), unnecessary duplication of information, extremely difficult programming (in writing special purpose file-processing programs), and the inability to use projection, join, and selection operators effectively.
4. The SELECT, PROJECT and JOIN, along with the extended Cartesian product illustrated in Appendix B below, will allow almost any retrieval or reformatting task desired by network researchers. Date (1977: 113-122) discusses the complete database relational algebra which includes traditional set theoretic operations (union, intersection, difference, Cartesian product) and special relational operations (selection, projection, join, division).
5. This operation is, in fact, an "equi-join"; the values of the two keys are "equal". Other types of joins resulting from other Boolean expressions on the variables in the two files are possible. The equi-join is the important one for our purposes here.
6. For the sake of clarity the examples in the appendices illustrate the file transformations with more SAS commands than might be absolutely necessary. Also, certain SAS messages have been suppressed and certain automatic variables have been deleted to emphasize the main results.
7. A computational note: If the Step 3 selection operation is performed during the generation of the Cartesian product itself (i.e., Step 2), only those rows need be generated which are to be kept, and the use of large amounts of core storage can be kept to a minimum; we chose not to do it this way. We decided not to use the SAS PROC MATRIX to avoid the possibility of users not having enough core storage for processing moderate sized network datasets. Using PROC TRANSPOSE gives an upper limit of 4000 by 4000 choices or ties, far more than would be economical to process using this method.

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 Appendix A: A SAS Implementation of SELECT, PROJECT and JOIN

```

1          * TITLE "CREATE AND RETRIEVE NETWORK DATASETS"
2          * COMMENTS ARE BEGUN WITH ASTERISKS AS IN THIS LINE.
3          * EACH SAS FILE MANIPULATION COMMAND BEGINS WITH A DATA STEP.
4          * THE NEW FILE CREATED IN THE DATA STEP IS GIVEN A NAME.
5          * THE NAME FOLLOWS THE WORD DATA;
6          DATA PERSON;          * BUILD THE FILE CALLED "PERSON";
7          INPUT P_ID $ P_NAME $ DEMCONT REPCONT AGE;
8          PUT _INFILE_ ;          * WILL CAUSE A LISTING OF CASES AS THEY ARE INPUT;
9          CARDS;

P1 SMITH 0 10 60
P2 JONES 15 0 55
P3 ADAM 5 5 62
P4 KATZ 0 0 51

14         ;
15         DATA DIRECT;          * BUILD DIRECTORSHIP FILE ;
16         INPUT P_ID $ C_ID $ TIMEB OFFICE $ ;
17         PUT _INFILE_ ;
18         CARDS;

P1 C1 5 MEMBER
P1 C3 7 OFFICER
P2 C2 6 OFFICER
P3 C3 3 MEMBER
P4 C1 8 OFFICER
P4 C2 2 MEMBER

25         ;
26         DATA CORP;          * BUILD CORPORATION FILE ;
27         INPUT C_ID $ C_NAME $ INDUSTRY $ LOCAT $ RANK ASSETS;
28         PUT _INFILE_ ;
29         CARDS;

C1 CITIBANK BANK NYC 2 158
C2 ARCO MINING NYC 3 104
C3 FORD MANUF DET 7 85

```

```

33      ;
34      DATA ; *****
35          * TO ILLUSTRATE THE SELECT OPERATOR, WE WILL RETRIEVE THE
36          * RECORDS OF CORPORATION DIRECTORS WHO ARE OFFICERS;
37      SET DIRECT;          * THE SET COMMAND CALLS IN ALL CASES OF FILE "DIRECT";
38      IF OFFICE = 'OFFICER' ;          * TAKE ONLY THE RECORDS OF OFFICERS,
39          * DISCARDING THOSE WHO ARE MEMBERS ONLY ON THEIR BOARDS;
40      PUT 'RESULT: ' _ALL_ ;          * _ALL_ IS A SAS KEYWORD FOR ALL VARIABLES.
41          * THE PUT COMMAND PRINTS THE RESULTS OF PREVIOUS MANIPULATIONS;

```

```

RESULT: P_ID=P1 C_ID=C3 TIMEB=7 OFFICE=OFFICER
RESULT: P_ID=P2 C_ID=C2 TIMEB=6 OFFICE=OFFICER
RESULT: P_ID=P4 C_ID=C1 TIMEB=8 OFFICE=OFFICER

```

```

42      DATA TEMP1; *****
43          * TO ILLUSTRATE THE PROJECT OPERATOR WE WILL ASK FOR A LIST OF
44          * DIRECTOR TENURES. THIS WILL REQUIRE SORTING THE DIRECTORSHIP
45          * FILE BY THE VARIABLE TIMEB AND ELIMINATION OF DUPLICATE CASES;
46      SET DIRECT;          * CALLS IN THE DIRECTORSHIP FILE;
47      PROC SORT; BY TIMEB;          * SORTS IN ASCENDING ORDER OF TENURES;
48      DATA;          * NEW DATA STEP;
49      SET TEMP1; BY TIMEB;          * CALLS DIRECTORSHIP FILE SORTED BY TENURES;
50      IF FIRST.TIMEB;          * ONLY TAKES THE FIRST VALUE IN CASE OF TIES;
51      KEEP TIMEB;          * RETAIN ONLY THE VALUES OF TENURE ON THE BOARD;
52      PUT 'BOARD TENURES: ' TIMEB ;

```

```

BOARD TENURES: 2
BOARD TENURES: 3
BOARD TENURES: 5
BOARD TENURES: 6
BOARD TENURES: 7
BOARD TENURES: 8

```

```

53      DATA TEMP1; *****
54          * THIS EXAMPLE COMBINES A SELECT AND A PROJECT.
55          * FIND P_ID AND NAME FOR PERSONS GIVING NOTHING TO THE DEMOCRATS.
56          * STEP 1. SELECT FROM PERSON FILE WHERE DEMCONT=0 GIVING TEMP1 ;
57      SET PERSON;
58      IF DEMCONT=0 ;
59      PUT 'TEMP1: ' _ALL_ ;

```

```

TEMP1: P_ID=P1 P_NAME=SMITH DEMCONT=0 REPCONT=10 AGE=60
TEMP1: P_ID=P4 P_NAME=KATZ DEMCONT=0 REPCONT=0 AGE=51

```

```

60      PROC SORT; BY P_ID P_NAME;
61          * STEP 2. PROJECT TEMP1 OVER P_ID P_NAME ;
62      DATA ;
63      SET TEMP1; BY P_ID P_NAME;
64      IF FIRST.P_ID & FIRST.P_NAME;
65      KEEP P_ID P_NAME;
66      PUT 'SELECTING DEMCONT=0 & PRINTING P_ID P_NAME : ' P_ID P_NAME;

```

```

SELECTING DEMCONT=0 & PRINTING P_ID P_NAME : P1 SMITH
SELECTING DEMCONT=0 & PRINTING P_ID P_NAME : P4 KATZ

```

```

67      DATA TEMP1; *****
68          * A JOIN USES THE SAS MERGE COMMAND. FOR EXAMPLE:
69          * FIND THE DEMOCRATIC CONTRIBUTIONS OF DIRECTORS OF CORP C2.
70          * STEP 1. SELECT FROM DIRECT FILE WHERE C_ID=C2 GIVING TEMP1 ;
71      SET DIRECT;
72      IF C_ID='C2';
73      PUT 'TEMP1: ' _ALL_ ;

```

```

TEMP1: P_ID=P2 C_ID=C2 TIMEB=6 OFFICE=OFFICER
TEMP1: P_ID=P4 C_ID=C2 TIMEB=2 OFFICE=MEMBER

```

```

74      DATA TEMP2;          * STEP 2. JOIN TEMP1 AND PERSON OVER P_ID GIVING TEMP2 ;
75      MERGE TEMP1 (IN=INT) PERSON (IN=INP); BY P_ID;
76      IF INT & INP;          * ONLY INCLUDE OBSERVATIONS WHERE P_ID VALUES MATCH;
77      PUT 'TEMP2 : ' _ALL_ ;

```

```

TEMP2 : P_ID=P2 C_ID=C2 TIMEB=6 OFFICE=OFFICER P_NAME=JONES DEMCONT=15
REPCONT=0 AGE=55
TEMP2 : P_ID=P4 C_ID=C2 TIMEB=2 OFFICE=MEMBER P_NAME=KATZ DEMCONT=0
REPCONT=0 AGE=51

```

```

78      PROC SORT; BY P_NAME DEMCONT;
79                * STEP 3. PROJECT TEMP2 OVER P_NAME, DEMCONT GIVING RESULT ;
80      DATA ;
81      SET TEMP2; BY P_NAME DEMCONT;
82      IF FIRST.P_NAME & FIRST.DEMCONT;
83      KEEP P_NAME DEMCONT;
84      PUT 'SELECTING DEMCONT OF DIRECTORS OF CORP=C2: ' P_NAME DEMCONT;

```

```

SELECTING DEMCONT OF DIRECTORS OF CORP=C2: JONES 15
SELECTING DEMCONT OF DIRECTORS OF CORP=C2: KATZ 0

```

```

85      DATA TEMP1; *****
86                * MULTIPLE FILES AND LOGICAL OPERATORS GIVE ADDITIONAL POWER.
87                * FIND THE CITIES CONTAINING THE CORPORATIONS FROM WHOSE
88                * DIRECTORS THE LARGE ($10K AND OVER) CONTRIBUTIONS CAME.
89                * STEP 1. SELECT FROM PERSON FILE DEMCONT >=10 OR REPCONT >= 10 ;
90      SET PERSON;
91      IF DEMCONT >= 10 OR REPCONT >= 10;
92      PUT 'TEMP1: ' _ALL_ ;

```

```

TEMP1: P_ID=P1 P_NAME=SMITH DEMCONT=0 REPCONT=10 AGE=60
TEMP1: P_ID=P2 P_NAME=JONES DEMCONT=15 REPCONT=0 AGE=55

```

```

93      DATA TEMP2;          * STEP 2. JOIN TEMP1 & DIRECT OVER P_ID GIVING TEMP2 ;
94      MERGE TEMP1(IN=INT) DIRECT(IN=IND); BY P_ID;
95      IF INT & IND;
96      PUT 'TEMP2: ' _ALL_ ;

```

```

TEMP2: P_ID=P1 P_NAME=SMITH DEMCONT=0 REPCONT=10 AGE=60 C_ID=C1 TIMEB=5
OFFICE=MEMBER
TEMP2: P_ID=P1 P_NAME=SMITH DEMCONT=0 REPCONT=10 AGE=60 C_ID=C3 TIMEB=7
OFFICE=OFFICER
TEMP2: P_ID=P2 P_NAME=JONES DEMCONT=15 REPCONT=0 AGE=55 C_ID=C2 TIMEB=6
OFFICE=OFFICER

```

```

97      PROC SORT; BY C_ID;
98                * STEP 3. JOIN TEMP2 & CORP OVER C_ID GIVING TEMP3 ;
99      DATA TEMP3;
100     MERGE TEMP2(IN=INT2) CORP(IN=INC); BY C_ID;
101     IF INT2 & INC;
102     PUT 'TEMP3: ' _ALL_ ;

```

```

TEMP3: P_ID=P1 P_NAME=SMITH DEMCONT=0 REPCONT=10 AGE=60 C_ID=C1 TIMEB=5
OFFICE=MEMBER C_NAME=CITIBANK INDUSTRY=BANK LOCAT=NYC RANK=2 ASSETS=158
TEMP3: P_ID=P2 P_NAME=JONES DEMCONT=15 REPCONT=0 AGE=55 C_ID=C2 TIMEB=6
OFFICE=OFFICER C_NAME=ARCO INDUSTRY=MINING LOCAT=NYC RANK=3 ASSETS=104
TEMP3: P_ID=P1 P_NAME=SMITH DEMCONT=0 REPCONT=10 AGE=60 C_ID=C3 TIMEB=7
OFFICE=OFFICER C_NAME=FORD INDUSTRY=MANUF LOCAT=DET RANK=7 ASSETS=85

```

```

103     PROC SORT; BY LOCAT;
104                * STEP 4. PROJECT TEMP3 OVER LOCAT GIVING RESULT ;
105     DATA ;
106     SET TEMP3; BY LOCAT;
107     IF FIRST.LOCAT;
108     KEEP LOCAT;
109     PUT ' CORPORATION CITIES OF LARGE CONTRIBUTING DIRECTORS: '
110         LOCAT;

```

```

CORPORATION CITIES OF LARGE CONTRIBUTING DIRECTORS: DET
CORPORATION CITIES OF LARGE CONTRIBUTING DIRECTORS: NYC

```

Appendix B: A SAS Implementation for Generating Network Input Datasets

```

1 *****
2 * TITLE "TRANSFORMING RELATIONAL DATA FILES TO NETWORK INPUT FORMATS"
3 * TO ILLUSTRATE THE CARTESIAN PRODUCT OR MULTIPLY OPERATOR,
4 * WE WILL CREATE A SAS FILE OF ALL POSSIBLE PAIRS OF THE
5 * ENTRIES IN THE DIRECTORSHIP FILE.
6 * WE ARE LOOKING FOR TIES BETWEEN PERSON I AND PERSON J VIA
7 * SOME CORPORATION. FOR CONVENIENCE, PERSON I IS REFERRED TO
8 * AS LPERS AND PERSON J AS RPERS.
9 * FIRST, WE WILL MAKE ALL THE ENTRIES OF THE DIRECTORSHIP
10 * FILE INTO A LONG ROW VECTOR. TO DO THIS IN SAS, WE
11 * WILL TRANSPOSE BOTH THE CORPORATION IDENTIFICATION
12 * NUMBER AND THE PERSON IDENTIFICATION NUMBER INTO
13 * SEPARATE ROW VECTORS. THEN WE WILL MERGE THESE ROW
14 * VECTORS TO CREATE AN EVEN LONGER ROW VECTOR.;
15
16 PROC TRANSPOSE DATA=DIRECT OUT=ROWC PREFIX=CORP;
17 VAR C_ID;
18 PROC TRANSPOSE DATA=DIRECT OUT=ROWP PREFIX=PERS;
19 VAR P_ID;
20 DATA CPROD;
21 KEEP LCorp LPERS RCorp RPERS;
22 MERGE ROWC ROWP;
23 ARRAY CORPV1 (I) CORP1-CORP6; * AT THIS STEP, YOU MUST KNOW THE NUMBER OF;
24 ARRAY PERSV1 (I) PERS1-PERS6; * ELEMENTS IN THE DIRECTORSHIP FILE;
25 ARRAY CORPV2 (J) CORP1-CORP6; * HERE IT IS SIX;
26 ARRAY PERSV2 (J) PERS1-PERS6;
27 DO I = 1 TO 6;
28 LCorp = CORPV1; * ASSIGN THE ITH ELEMENT OF ARRAY CORPV1 TO LCorp;
29 LPERS = PERSV1; * ASSIGN THE ITH ELEMENT OF ARRAY PERSV1 TO LPERS;
30 DO J = 1 TO 6;
31 RCorp = CORPV2; * ASSIGN THE JTH ELEMENT OF ARRAY CORPV2 TO RCorp;
32 RPERS = PERSV2; * ASSIGN THE JTH ELEMENT OF ARRAY PERSV2 TO RPERS;
33 OUTPUT; * THE CARTESIAN PRODUCT HERE IS A 36 BY 4 MATRIX,
34 * NOT PRINTED HERE TO SAVE SPACE.;
35 END;
36 END;
37 DATA PTIES; * CREATE FILE OF PERSON TO PERSON TIES;
38 SET CPROD;
39 IF (LCorp=RCorp) AND (LPERS NE RPERS); * SELECTS ONLY THE CASES WE NEED;
40 PUT 'PERSON TIES: ' LPERS LCorp RPERS RCorp;

PERSON TIES: P1 C1 P4 C1
PERSON TIES: P1 C3 P3 C3
PERSON TIES: P2 C2 P4 C2
PERSON TIES: P3 C3 P1 C3
PERSON TIES: P4 C1 P1 C1
PERSON TIES: P4 C2 P2 C2

41
42 *****
43 * TO ILLUSTRATE THE CREATION OF ADJACENCY MATRIX FROM THIS PERSON;
44 * TIES FILE, WE WILL CREATE AN ADJACENCY MATRIX OF PERSON;
45 * TO PERSON TIES;
46
47 * FIRST, WE WILL CREATE A ROW VECTOR OF ALL PERSONS FROM THE PERSON FILE;
48 * BY THE USE OF THE SAS PROCEDURE TRANSPOSE. ;
49
50 PROC TRANSPOSE DATA=PERSON OUT=ROWUP PREFIX=UP;
51 VAR P_ID;
52 PROC SORT DATA=PTIES; BY LPERS; * THIS STEP MAY BE OMITTED IF THE ;
53 * DIRECTORSHIP FILE IS SORTED BY PERSON ID;
54 DATA ADJTEMP;
55 RETAIN UP1-UP4; * THIS INSTRUCTS SAS TO KEEP THE VALUES;
56 * OF THESE VARIABLES FOR ALL OBSERVATIONS;
57 IF _N_=1 THEN SET ROWUP; * THIS INSTRUCTS SAS TO OBTAIN THE INFORMATION
58 * FROM THE ROWUP DATASET;

```



```

59     SET PTIES;
60     DATA ADJ;
61     RETAIN MAT1-MAT4;
62     SET ADJTEMP; BY LPERS;
63     ARRAY OUT (I) MAT1-MAT4; * YOU MUST KNOW THE NUMBER OF PERSONS ;
64     ARRAY UP (I) UP1-UP4; * THAT EXISTS IN THE PERSON FILE ;
65                                     * INITIALIZE ADJACENCY MATRIX TO ZERO;
66     IF FIRST.LPERS THEN
67         DO OVER OUT;
68         OUT=0;
69         END;
70     DO OVER UP;
71         IF UP=RPERS THEN OUT=1; * IF THE ITH ELEMENT OF ARRAY UP IS EQUAL ;
72                                     * TO RPERS THEN ASSIGN 1 TO THE ITH ELEMENT ;
73                                     * OF ARRAY OUT;
74     END;
75     IF LAST.LPERS THEN OUTPUT;
76     ELSE RETURN;
77     DATA _NULL_ ; ***** STEP TO PRINT ADJACENCY MATRIX;
78     SET ADJ;
79     PUT 'ADJACENCY MATRIX: ' MAT1-MAT4;

```

```

ADJACENCY MATRIX: 0 0 1 1
ADJACENCY MATRIX: 0 0 0 1
ADJACENCY MATRIX: 1 0 0 0
ADJACENCY MATRIX: 1 1 0 0

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80     *****
81     * TO ILLUSTRATE THE CREATION OF LIST FORMAT, WE WILL CREATE;
82     * A LIST FORMAT OUTPUT OF THE PERSON TO PERSON TIES FILE;
83
84     PROC SORT DATA=PTIES; BY LPERS; * THIS STEP CAN BE OMITTED IF ;
85                                         * THE DIRECTORSHIP FILE IS ;
86                                         * SORTED BY PERSON ID. ;
87
88     DATA LIST;
89     FORMAT LIST1-LIST4 $4.; * THIS ASSUMES OUR PERSON IDENTIFICATIONS ;
90                                     * HAVE VALUES OF NO MORE THAN 4 CHARACTERS. ;
91     RETAIN LIST1-LIST4 J;
92     SET PTIES; BY LPERS;
93     ARRAY OUT (J) LIST1-LIST4;
94     IF FIRST.LPERS THEN DO; * INITIALIZE LIST TO BLANKS ;
95         DO OVER OUT;
96         OUT=' ';
97         END;
98         J=1;
99     OUT=RPERS; * ASSIGN TO JTH ELEMENT OF ARRAY OUT THE VALUE ;
100                                     * OF RPERS. ;
101     J=J+1;
102     IF LAST.LPERS THEN OUTPUT;
103     ELSE RETURN;
104     DATA _NULL_ ; * STEP TO PRINT LIST FORMAT ;
105     SET LIST;
106     PUT 'LIST FORMAT: ' LPERS LIST1-LIST4;

```

```

LIST FORMAT: P1 P4 P3
LIST FORMAT: P2 P4
LIST FORMAT: P3 P1
LIST FORMAT: P4 P1 P2

```

SPECIAL JOURNAL ISSUES

Abstracts from SOCIAL NETWORKS 2, (No. 4), 1979-80

HAMMER, Muriel (New York State Psychiatric Institute). *"Social Access and the Clustering of Personal Connections."*

Analysis of an elementary level of social structure may be approached through a systematic description of who has access to whom. "Access" itself is a potential and cannot be directly measured, but differential actual acquaintanceship among sets of individuals can be presumed to reflect degrees of access. The paper presents a preliminary quantitative analysis of the systematic relationships shown by the patterns of acquaintanceship in several small social networks in the metropolitan New York area.

BURT, Ronald S. (California-Berkeley). *"Innovation as a Structural Interest: Rethinking the Impact of Network Position on Innovation Adoption."*

The act of adopting an innovation is argued to be a type of structural interest. The proposed conception of innovation as a structural interest describes how a potential adopter perceives utility in innovating as a function of his position in network(s) of relations with other potential adopters. Implications of the concept are in accord with diffusion research describing the linkage between social structure and innovation in terms of a potential adopter's social integration. The proposed concept avoids, however, three ambiguities in translating social integration into a structural concept stated in terms of network position. Moreover, it extends the scope of earlier work to suggest new connections between social structure and innovation.

In order to make empirical implications explicit, hypotheses for a reanalysis of the classic Medical Innovation data are described. The proposed conception of innovation states the utility a doctor should perceive in prescribing a new drug as a function of his position in professional and social networks among other doctors in his community. The hypotheses predict when a doctor should begin prescribing a new drug and the relative importance of his personal characteristics versus network position as the determinant of when he begins prescribing the new drug.

JONES, Wendy L. (Australian National). *"Couple Network Patterns of Newcomers in an Australian City."*

Data from a study of newcomer families in Canberra, Australia, are used to illustrate patterns of couples' network formation in a new social setting. The discussion focuses on particular couple network patterns which newcomers developed during their first year and on the influence of these patterns on the newcomers' experience of the new social environment. Different network structures were found to affect the newcomers' potential for both individual change and the development of intimate relationships in this situation.

McCORD, Edward (Pittsburgh). *"Structural-Functionalism and the Network Idea: Towards an Integrated Methodology."*

In this paper it is argued that, for the sake of analytical precision, we ought to understand structural-functionalism to be a social network theory, as opposed to the common practice of dissociating the two. The rise of 'network theory' against the background of traditional structural-functionalism is reviewed, and the appreciation by some anthropologists that social structure is itself in fact an abstraction from social networks is noted. In a more original vein, it is shown that some network theories have themselves possessed a functional form.

PEAY, Edmund R. (Flinders University of South Australia). "Connectedness in a General Model for Valued Networks."

Social networks have been closely identified with graph theoretical models, which constitute their most familiar mode of representation. There are a number of such models which may embody symmetric, directed, or valued relationships. But the study of networks with valued linkages, using the natural formalization provided by the valued graph or digraph, has been impeded by a traditional lack of analytical machinery for dealing with valued structures. In this paper, we demonstrate the development and elaboration of formalizations for the central network concepts of reachability, joining, and connectedness through graph theoretical models of increasing complexity, culminating in their expression within a general model for valued structures. This model for valued (symmetric or directed) graphs, or vigraphs, provides a unified representation and matrix methodology for dealing with qualitative and quantitative structures, incorporates many existing methods as special cases and suggests new applications. Some of the most interesting of these follow the recognition, consistent with the model, that the "values" assigned to network linkages may be sorts of entities other than numbers.

FRIEDKIN, NOAH (University of California, Santa Barbara). "A Test of Structural Features of Granovetter's Strength of Weak Ties Theory."

Granovetter's 'strength of weak ties' theory offers a satisfying approach to the study of integration in networks of face-to-face interaction consisting of multiple subgroups. The present paper tests five hypotheses of this theory in the setting of a multidisciplinary social network of biological scientists. Considerable support for the theory is indicated: the local bridges and intergroup ties in the network are disproportionately weak ties.

LEE, Trevor R. (Tasmania). "The Resilience of Social Networks to Changes in Mobility and Propinquity."

Very little is known of the resilience of social networks in situations where individuals within a social network remain *in situ*, but the physical links which enable interaction between them are radically altered. This paper examines the long-term disruption of social networks following the collapse of the Tasman Bridge in Hobart, Tasmania. This accident divided the city in two for almost three years and radically altered normal patterns of mobility and accessibility.

Abstracts from NETWORKS 10, (No. 4), 1980

SHIER, D. R. and Christoph WITZGALL (National Bureau of Standards). "Arc Tolerances in Shortest Path and Network Flow Problems."

This paper studies one aspect of the "robustness" of optimal solutions to shortest path, and, more generally, network flow problems. Specifically, we characterize the maximum decrease in an arc's cost that can be tolerated without changing optimality of the current solution. Calculation of these quantities is quite simple for nonbasic arcs, and somewhat more involved for basic arcs. When such tolerances are to be determined simultaneously for all arcs in the network, considerable duplication of effort can be avoided through the use of specialized algorithms. Several algorithms for calculating all arc tolerances are presented, one of which is shown to have complexity order n^2 for general networks with n nodes.

HANDLER, Gabriel Y. and Israel ZANG (Tel-Aviv). "A Dual Algorithm for the Constrained Shortest Path Problem."

In this paper we develop a Lagrangian relaxation algorithm for the problem of finding a shortest path between two nodes in a network, subject to a knapsack-type constraint. For example, we may wish to find a minimum cost route subject to a total time constraint in a multimode transportation network. Furthermore, the problem, which is shown to be at least as hard as NP-complete problems, is generic to a class of problems that arise in the solution of integer linear programs and discrete state/stage deterministic dynamic programs. One approach to solving the problem is to utilize a k th shortest path algorithm, terminating with the first path that satisfies the constraint. This approach is impractical when the terminal value of k is large. Using Lagrangian relaxation we propose a method that is designed to reduce this value of k . Computational results indicate orders of magnitude savings when the approach is applied to large networks.

BUZACOTT, J. A. (Toronto). "A Recursive Algorithm for Finding Reliability Measures Related to the Connection of Nodes in a Graph."

A recursive algorithm is developed for finding the probability that not all nodes are connected in a graph with arcs that can fail. The number of multiplications required by the algorithm when applied to a complete graph on n nodes is shown to be of order 3^{n-1} , substantially less than other published algorithms. Further, it is shown that the algorithm enables other reliability measures related to the connection of nodes in a graph to be determined with minimal extra multiplications. The algorithm can also form the basis of methods for calculating the reliability measures of graphs with unreliable nodes and unreliable arcs. The complexity is then at worst 4^n and, in most cases, of order 3^n .

MIRCHANDANI, Pitu B. and Aissa Oudjit (Rensselaer Polytechnic). "Localizing 2-Medians on Probabilistic and Deterministic Tree Networks."

Locating a single facility (the 1-median problem) on a deterministic tree network is very efficiently solved by Goldman's algorithm. This paper explores the possibility of efficiently solving the 2-median problem for both deterministic and probabilistic tree networks. Interesting properties (Theorems 1-4) are derived that relate the location of 1-median to the location of pairs of 2-medians. Two simple algorithms, the "Improved Link-Deletion" algorithm for the deterministic case and the "Selective Enumeration" algorithm for the probabilistic case, are presented which somewhat improve existing methods to determine 2-medians on tree networks.

WOLLMER, Richard D. (California State). "Investment in Stochastic Minimum Cost Generalized Multicommodity Networks with Application to Coal Transport."

In a generalized multicommodity network, certain resources are in limited supply. The total consumption of any resource is a linear combination of the individual arc flows. In this problem the supply of any resource is a non-negative random variable which may be increased by an investment. The objective is to invest in resources in a way that minimizes total expected cost. This problem is formulated as a two stage linear program under uncertainty. The first stage variables are the amounts that are to be invested in each resource. The values of the first stage variables are determined before the actual values of the random variables become known. The second stage variables correspond to the amount of flow on each arc of each commodity. The values of the second stage variables are determined after the actual values of the random variables are known. The solution techniques given exploit the network structure in both the first and second stage.

PICARD, Jean-Claude (Ecole Polytechnique, Thies, Senegal) and H. Donald RATLIFF (Georgia Institute of Technology). "A Cut Approach to a Class of Quadratic Integer Programming Problems."

This paper presents an algorithm for solving a class of quadratic integer programming problems. These problems include discrete versions of the quadratic placement problem and the squared Euclidean distance problem. The algorithm solves a sequence of at most $\sum_{i=1}^n (u_i - l_i)$ minimum cut problems, or equivalently maximum flow problems, on a graph with $n+2$ vertices where n is the number of variables in the problem, u_i and l_i are upper and lower bounds, respectively, on the i th variable.

Abstracts from JOURNAL OF GRAPH THEORY 4 (No. 4), 1980

BURR, Stephan A. (City College - CUNY) and Vera ROSTA (Waterloo). "On the Ramsey Multiplicities of Graphs-- Problems and Recent Results."

Ramsey's theorem guarantees that if G is a graph, then any 2-coloring of the edges of a large enough complete graph yields a monochromatic copy of G . Interesting problems arise when one asks how many such G must occur. A survey of this and related problems is given, along with a number of new results.

BOESCH, F. T. (Bell Telephone Laboratories) and C. L. SUFFEL (Stevens Institute of Technology). "Realizability of p -Point Graphs With Prescribed Minimum Degree, Maximum Degree, and Line Connectivity."

It is well known that certain graph-theoretic extremal questions play a central role in the study of communication network vulnerability. Herein we consider a generalization of some of the classical results in this area. We define a $(\rho, \Delta, \delta, \lambda)$ graph as a graph having ρ points, maximum degree Δ , minimum degree δ , and line connectivity λ . An arbitrary quadruple of integers (a, b, c, d) is called $(\rho, \Delta, \delta, \lambda)$ realizable if there is a $(\rho, \Delta, \delta, \lambda)$ graph with $\rho=a$, $\Delta=b$, $\delta=c$, and $\lambda=d$. Necessary and sufficient conditions for a quadruple to be $(\rho, \Delta, \delta, \lambda)$ realizable are derived.

PANELLI, Stefano (Istituto Matematico Dell'Universita' Dell'Aquila). "On a Conjecture on Maximal Planar Sequences."

Let $d_1^k, d_2^k, \dots, d_p^k$ denote the nonincreasing sequence $d_1, \dots, d_1, d_2, \dots, d_2, \dots, d_p, \dots, d_p$, where the term d_i^k appears k_i times ($i=1, 2, \dots, p$). In this work the author proves that the maximal 2-sequences: $7^3 6^4 5^{15}$, $7^3 6^{15} 4^{17}$, $7^7 6^{15} 5^{19}$ are planar graphical, in contrast to a conjecture by Schmeichel and Hakimi.

GROTSCHEL, Martin (Bonn), Carsten THOMASSEN (Aarhus) and Yoshiko WAKABAYASHI (São Paulo). "Hypotraceable Digraphs."

A hypotraceable digraph is a digraph $D=(V,E)$ which is not traceable, i.e., does not contain a (directed) Hamiltonian path, but for which $D-v$ is traceable for all $v \in V$. We prove that a hypotraceable digraph of order n exists iff $n \geq 7$ and that for each $k \geq 3$ there are infinitely many hypotraceable oriented graphs with a source and a sink and precisely k strong components. We also show that there are strongly connected hypotraceable oriented graphs and that there are hypotraceable digraphs with precisely two strong components one of which is a source or a sink. Finally, we prove that hypo-Hamiltonian and hypotraceable digraphs may contain large complete subdigraphs.

BUCKLEY, Fred (St. John's). "A Ramsey Property for Graph Invariants."

We consider the problem of which graph invariants have a certain property relating to Ramsey's theorem. Invariants which have this property are called Ramsey functions. We examine properties of chains of graphs associated with Ramsey functions. Methods are developed which enable one to prove that a given invariant is not a Ramsey function. Results for several familiar invariants are presented.

SLATER, Peter J. (Sandia Laboratories). "Medians of Arbitrary Graphs."

For each vertex u in a connected graph H , the distance of u is the sum of the distances from u to each of the vertices v of H . A vertex of minimum distance in H is called a *median vertex*. It is shown that for any graph G there exists a graph H for which the subgraph of H induced by the median vertices is isomorphic to G .

WRIGHT, E. M. (Aberdeen). "The Number of Connected Sparsely Edged Graphs. III. Asymptotic Results."

The number of connected graphs on n labeled points and q lines (no loops, no multiple lines) is $f(n,q)$. In the first paper of this series I showed how to find an (increasingly complicated) exact formula for $f(n,n+k)$ for general n and successive k . The method would give an asymptotic approximation to $f(n,n+k)$ for any fixed k as $n \rightarrow \infty$. Here I find this approximation when $k = o(n^{1/3})$, a much more difficult matter. The problem of finding an approximation to $f(n,q)$ when $q > n + cn^{1/3}$ and $(2q/n) - \log \rightarrow -\infty$ is open.

DELORME, C., M. MAHEO and H. THUILLIER (Paris-Sud), K.M. KOH and H. K. TEO (Nanyang). "Cycles with a Chord are Graceful."

In this paper, we prove that every cycle plus a chord is graceful, thus answering a conjecture of R. Bodendiek, H. Schumacher, and H. Wegner.

ALAMEDDINE, Ahmad Fawzi (University of Petroleum and Minerals). "On the Number of Cycles of Length 4 in a Maximal Planar Graph."

Let p and $C_4(G)$ be the number of vertices and the number of 4-cycles of a maximal planar graph G , respectively. Hakimi and Schmeichel characterized those graphs G for which $C_4(G) = \frac{1}{2}(p^2 + 3p - 22)$. This characterization is correct if $p > 9$. However, for $p=7$ or 8, there is exactly one other graph which violates the theorem in the sense that the upper bound of $C_4(G)$ is also attained.

WHITE, Arthur T (Western Michigan). "A Note on Conservative Graphs."

An application of conservative graphs to topological graph theory is indicated.

Abstracts from JOURNAL OF GRAPH THEORY 5 (No. 1), 1981

BERMOND, J. C. (Paris-Sud) and C. THOMASSEN (Aarhus). "Cycles in Digraphs--A Survey."

The main subjects of this survey paper are Hamiltonian cycles, cycles of prescribed lengths, cycles in tournaments, and partitions, packings, and coverings by cycles. Several unsolved problems and a bibliography are included.

PLANTHOLT, Mike (Michigan). "The Chromatic Index of Graphs with a Spanning Star."

Vizing's Theorem states that any graph G has chromatic index either the maximum degree $\Delta(G)$ or $\Delta(G) + 1$. If G has $2s + 1$ points and $\Delta(G) = 2s$, a well-known necessary condition for the chromatic index to equal $2s$ is that G have at most $2s^2$ lines. Hilton conjectured that this condition is also sufficient. We present a proof of that conjecture and a corollary that helps determine the chromatic index of some graphs with $2s$ points and maximum degree $2s - 2$.

JACKSON, Brad, T. D. PARSONS and Tomaz PISANSKI (Pennsylvania State). "A Duality Theorem for Graph Embeddings."

A generalized type of graph covering, called a "wrapped quasicovering" (wqc) is defined. If K, L are graphs dually embedded in an orientable surface S , then we may lift these embeddings to embeddings of dual graphs \tilde{K}, \tilde{L} in orientable surfaces \tilde{S} , such that \tilde{S} are branched covers of S and the restrictions of the branched coverings to \tilde{K}, \tilde{L} are wqc's of K, L . The theory is applied to obtain genus embeddings of composition graphs $G[nK_1]$ from embeddings of "quotient" graphs G .

O'KEEFE, M. and P. K. WONG (Seton Hall). "The Smallest Graph of Girth 6 and Valency 7."

With the aid of a computer, we give a regular graph of girth 6 and valency 7, which has 90 vertices and show that this is the unique smallest graph with these properties.

ITO, T. (Tsukuba). "On a Graph of O'Keefe and Wong."

The graph of O'Keefe and Wong, with valency 7, girth 6, and 90 vertices, is constructed as a 3-fold covering graph, and it is shown that there is a unique covering graph with these properties.

DECKER, R. W. (Hobart and William Smith Colleges), H. H. GLOVER (Ohio State) and J. P. HUNEKE (Ohio State). "The Genus of the 2-Amalgamations of Graphs."

A graph G is called the 2-amalgamation of subgraphs G_1 and G_2 if $G = G_1 \cup G_2$ and $G_1 \cap G_2 = \{x, y\}$, 2 distinct points. In this case we write $G = G_1 \cup_{\{x, y\}} G_2$. In this paper we show that the orientable genus, $\gamma(G)$, satisfies the inequalities $\gamma(G_1) + \gamma(G_2) - 1 \leq \gamma(G_1 \cup_{\{x, y\}} G_2) \leq \gamma(G_1) + \gamma(G_2) + 1$ and that this is the best possible result, i.e., the resulting three values for $\gamma(G_1 \cup_{\{x, y\}} G_2)$ which are possible can actually be realized by appropriate choices for G_1 and G_2 .

Special Journal Issues continued on page 40.

THESIS SUMMARIES

THE STRUCTURE OF THE AMERICAN CORPORATE NETWORK: 1904-1974

Mark S. Mizuruchi (Ph.D. Thesis, Sociology, SUNY/Stony Brook, 1980)

ABSTRACT

In recent years there has been a renewed interest among American social scientists in the issue of corporate ownership and control. The dominant view, first articulated by Berle and Means, is that the dispersal of large stockholdings early in the twentieth century led to a separation of ownership from control. This was supposed to have had major consequences for the workings of large corporations, the class structure, and the political system in American society.

Most studies seem to indicate that stockholding has gradually dispersed, although not as extensively as some believe. But these studies have tended to ignore the structure of relations among the corporations themselves, as well as the locus of power within the system of intercorporate ties. Consequently, many researchers have turned to the study of interlocking directorates and the networks created by them. Yet despite the growing methodological sophistication of these studies, there has been virtually no historical analysis of data from the United States. This is especially important because the issue of the rise of managerial control explicitly rests on a set of historical changes which supposedly began early in the twentieth century and continued at least into the 1960s, when the "managerial revolution" was considered generally complete.

This study is an examination of a number of propositions about changes in the structure of intercorporate relations in the United States. Employing data on interlocks among large American corporations from seven different years between 1904 and 1974, I focus on three general areas: 1) connectivity of the network, including number of interlocks, density, radius, and other characteristics; 2) the centrality of corporations in various sectors, in particular the centrality of financial corporations; and 3) the existence of and changes in the clique structure. Centrality was computed based on the approach developed by Bonacich and modified by Mariolis, Bearden, *et al.*, and others. Peak analysis was employed to identify cliques. A comparison between peak analysis and factor analysis was also presented.

The findings suggest that there was some basis to the managerialist position, but only within a specific period. Interlocking and density declined by about 50% between 1912 and 1935, the period discussed by Berle and Means, and investment banks became less and less central after 1912. But after 1935, rather than continuing to decline, interlocking and density actually increased slightly. Furthermore, although the centrality of investment banks declined, that of commercial banks and insurance companies remained high during the entire seventy-year period.

The findings on cliques ran directly counter to the managerialist thesis. Rather than a system of several distinct groups which disintegrated over time, I found one huge cluster dominated by J. P. Morgan & Co. up through 1919. By 1935, specific cliques began to emerge, corresponding with the decline in the unparalleled dominance of J. P. Morgan & Co. But the overlapping among the cliques remained far more prominent than the differences between them.

In conclusion, I argue that the managerialists pointed to an actual trend that occurred early in the century, but that they misunderstood its consequences. The system did change from one dominated by a few individuals to one dominated by large institutions which appear to transcend particular individuals. Nevertheless, the structure of intercorporate relations established by these early leaders remains, and has remained basically unaltered during the entire century. Those corporations most dominant early in the century, the major New York financial institutions, remain in the center of the network into the 1970s. These findings call into question the tenability of the managerialist thesis, and thus have implications for organizational theory, stratification, and political sociology.

URBAN FRIENDSHIPS: QUALITATIVE AND QUANTITATIVE ASPECTS OF PRIMARY-RELATIONS IN AN URBAN COMMUNITY CONTEXT

Lea Hagoel (Ph.D., Sociology, Minnesota, 1980)

ABSTRACT

The main question this dissertation will examine concerns the nature and meaning of friendship, as members of friendship dyads see it. This concern is associated with a strong interest in the urban community, and is accompanied by the belief that a better understanding of the urban community could be achieved through a (heuristic) examination of friendship in the city. The basis for this argument is the acknowledgment that the phenomenon of friendship is sociologically related to that of community, both theoretically (as discussed by Effrat) and empirically (Fisher et al., 1977). A close examination of urban friendships seems to be in order at this stage of the field of urban community, if any conclusions about community are to be drawn from network (or other) studies of primary relations in the city.

Beyond the relationship between friendship and community, and the emphasis in the analysis on friendship values and patterns, it is argued here that the multi-dimensionality of friendship can be further extended to other social roles, and the concept of multiplexity could be refined if rather than entire ties, the co-occurrence of various dimensions, or strands of the relationships within any one bond would be emphasized, and at the same time be viewed as empirical questions rather than in an a-priori way, at least until enough data is collected to formulate hypotheses regarding the nature of the relationship between the strands of any given bond.

The focus of this dissertation on friendship, is in a way heuristic: Although it is argued that this is a relevant aspect of community in the metropolitan area, it is, at the same time, a neglected, taken-for-granted one in recent works. Data will be provided here to support 1) the relations, already established by Fisher and others (1977), between friendship and community; and 2) data on friendship values, which when analyzed into their component parts and compared to the friends' patterns of interaction, will support the argument concerning the necessity of introducing value measures in order to make our understanding of community and friendship more powerful. Thus, a systematic comparison of the meanings of friendship and acquaintances (based on in-depth interviews) shows that while 'on the surface' at least, the interactions involved in each of these social ties are highly similar, the normative commitment clearly distinguishes between them: it is strong and essential in friendships, it is almost entirely absent from an acquaintance relation.

Further support for this distinction between observable interaction and the meanings of the relations for the actors is found in the analysis of friendship values and friendship patterns. While the latter seem very similar for the entire sample, friendship values significantly distinguish between sub-groups by age and gender. It can be concluded that knowledge of behavioral patterns per se is not sufficient to understand the social phenomena involved.

The network approach would benefit from an inclusion, in its analysis, of meanings and value dimensions. It is obvious that the interpretive aspects of social relations are indispensable if a better understanding is to be achieved. At the same time, the networks which tie individuals to the community represent an important level of social reality which is masked if data is simply aggregated from individuals. This point emerged as a finding in the process of data analysis, when the interview sample aggregate characteristics were compared to the characteristics of friendship dyads formed within the same sample.

The analysis of friendship values necessarily requires the use of factor analysis to test the assumptions about the dimensionality of friendship and about the nature of these dimensions. This study will be exploratory, though, for these reasons: 1) With regard to friendship patterns, the assumption that friendship is a discrete role may not be the case. If so, then it would take several different studies to go beyond and to apply the alleged different components for the purpose of hypothesis-testing or model building. 2) A thorough search of the literature on friendship values indicates that simply constructing a coherent instrument which measures underlying value factors breaks new ground. Again, the use of this instrument to test out friendship values in different contexts, such as family, small groups other than community, is work for later research. The mapping of friendship dimensions is the equivalent of hypothesis testing concerning friendship value components. These components were derived from the sociological literature which is largely narrative and does not provide tested friendship scales. However, the connection between such values and the interaction patterns of the same sample of friends has not been made yet. This connecting link has to be explored before hypotheses can be made explicit in order to test them. This goal will be pursued through an empirical study, carried out in part of the Twin Cities Metropolitan Area (TCMA).

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HORIZONTAL CO-OPTATION THROUGH CORPORATE INTERLOCKS

Peter J. Carrington (Ph.D. Thesis, Sociology, Toronto, 1981)

ABSTRACT

This thesis analyzes the relationships among industrial concentration, directorship interlocking, and industrial performance in the Canadian economy.

The research reported here is an empirical test of the proposition that directorship interlocks are a mechanism of oligopolistic co-ordination in Canadian markets: i.e. that directorship interlocks are one method used by business enterprises operating in oligopolistic markets to co-ordinate their production and pricing decisions, thereby increasing their joint power over the operation of those markets and their joint maximization of self-interest, as indexed by market profit levels. This proposition is tested by path analyses based on the following three hypotheses: (1) that directorship interlocking in a market increases with market concentration, (2) that market profit levels increase with horizontal interlocking, and (3) that horizontal interlocking explains part of the variation in market profit levels previously attributed to concentration. The tests are performed using data on profits and concentration in 1972 for all enterprises operating in 30 "market areas" (comparable to S.I.C. two-digit industries) including most industries in the logging, mining and manufacturing sectors of the Canadian economy, and on directorship interlocking in 1972 among a sample of 5306 firms representing all major Canadian economic activity.

The results of the path analyses strongly suggest that directorship interlocking is indeed a mechanism of oligopolistic co-ordination. In the 22 market areas where horizontal interlocking exists, variation in the density of this interlocking explains 30% to 40% of the variation in profit levels previously attributed to concentration. In all 30 market areas that were analyzed, the density of a combination of horizontal interlocking and interlocks between banks and enterprises operating in these market areas (the latter of which is highly correlated-- $R=0.97$ --with bank-mediated indirect horizontal interlocking) explains all of the variation in profit levels previously attributed to concentration.

Ronald Burt's research on vertical corporate interlocks in the U.S.A. has provided excellent circumstantial evidence that such interlocks have co-optive intent: that they are established by those who control business establishments in an attempt to co-opt other establishments that constitute problematic elements of their environments. The present study answer affirmatively two important questions that are raised by Burt's results: (1) Do horizontal interlocks have a similar purpose? and (2) Are they successful? -- do they in fact facilitate the co-optation of problematic others, thereby increasing organizational effectiveness? Thus the present study provides strong additional evidence for the applicability of the theory of interorganizational co-optation to directorship interlocks.

More concretely, this study shows that horizontal directorship interlocking has a strong effect on relative profit levels in Canadian industries, whether or not the effect of concentration is taken into account. Thus directorship interlocking, whose importance has until now been regarded with skepticism by most economists, appears to be a major explanation of the connection between concentration and profits, which has been well established in the industrial organization literature but is still poorly understood. This relationship between interlocking, concentration and profits has important anti-combines policy implications, especially in a country such as Canada, where it is often argued that industrial concentration is an inescapable by-product of the corporate bigness necessary for international competitiveness.

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AKIYAMA, Jin (Nippon Ika) and Frank HARARY (Michigan). "A Graph and its Complement with Specified Properties. IV. Counting Self-Complementary Blocks."

In this series, we investigate the conditions under which both a graph G and its complement \bar{G} possess certain specified properties. We now characterize all the graphs G such that both G and \bar{G} have the same number of endpoints, and find that this number can only be 0 or 1 or 2. As a consequence, we are able to enumerate the self-complementary blocks.

CHUNG, F. R. K. (Bell Laboratories). "A Note on Constructive Methods for Ramsey Numbers."

Let $r(k)$ denote the least integer n such that for any graph G on n vertices either G or its complement \bar{G} contains a complete graph K_k on k vertices. In this paper, we prove the following lower bound for the Ramsey number $r(k)$ by explicit construction: $r(k) > \exp(c(\log k)^{4/3}) / [(\log \log k)^{1/3}]$ for some constant $c > 0$

New Books continued from page 45

Ki Hang Kim and Fred Roush (Mathematics, Alabama State), 1980, Introduction to Mathematical Consensus Theory. New York: Marcel Dekker, 192 pp. \$25.00.

This book presents the theory of social consensus, that is, of social welfare functions and game theory, in terms of the mathematical background of combinatorics and matrix theory. Readers will become acquainted with the results of the published work to date in this field, and with the full range of applications of combinatoric mathematics to consensus theory.

The book begins by defining the types of binary relations used by workers in this field. Boolean matrix methods are described, as well as their application to the study of binary relations. The summaries of the most recent work and the collection of proofs in social consensus theory take the reader right up to the frontier of knowledge in consensus theory. The authors' presentation of their own work demonstrates that graph theory, Boolean matrix theory, lattice theory, probabilistic methods in combinatorics, and the theory of systems of distinct representatives can be used to advantage in this field.

Contents: Sets and binary relations. Boolean matrices and related structures. Utility functions. Social choice functions. Social choice functions on restricted domains. Solutions of games.

Ki Hang Kim and Fred W. Roush (Mathematics, Alabama State), 1980. Mathematics for Social Scientists. New York: Elsevier North Holland. 304 pp. \$14.95.

This textbook is intended for use in an advanced undergraduate or graduate level course on mathematics in which mathematical exposition is stressed rather than insight into the social sciences. (From publisher's blurb.)

Contents: I. Mathematical Concepts: Sets and binary relations, matrices, Boolean matrices and graphs, combinatorics, difference equations, differential equations, selected topics in probability, cluster analysis, on constructing mathematical models; II. Applications: demography, economics, management, political science and game theory, psychology, sociology, transmissions of information.

NEW BOOKS

Samuel Leinhardt, ed. (SUPA, Carnegie-Mellon). *Sociological Methodology 1981*. San Francisco: Jossey-Bass, 1981. \$29.95.

In Chapter 1, Harrison White shows that a sociological approach to production markets as structured systems of roles yields important new insights concerning market boundaries and the interdependence of buyers and sellers.

Chapters 3 & 4 concern the acquisition and analysis of social network data. Ove Frank surveys the statistical approach to the analysis of graph data, including: (1) Pure sampling in which various procedural designs are used to acquire information on a portion of the relational ties in a large system, (2) simple transition models for uncertain or randomly deformed graphs, and (3) stochastic process models for representing nondeterministic changes in graphs. Stephen Fienberg and Stanley Wasserman demonstrate standard iterative proportional fitting methods for digraph data, thus making the statistical approach to the analysis of social networks accessible to a wider range of investigators.

In Chapter 8, Burton Singer demonstrates that general continuous-time nonstationary Markov chains are useful models for individual choice behavior and presents a strategy for fitting general two-state chains to multiwave panel data.

In Chapter 9, David McFarland considers the use of stochastic models to analyze mobility data, focusing on the use of spectral decomposition to facilitate comparison and simplify verbal descriptions of complex patterns. The procedure is illustrated in terms of comparisons between observed and hypothetical matrices, matrices from different countries, and matrices from different subpopulations within a country.

Patric Doreian, in Chapter Ten, describes strategies for developing linear structural equation models that incorporate geographical space and illustrate these procedures using areally aggregated data on voting behavior and political insurgency. (From publisher's blurb.)

Patricia Wagner and Leif Smith. 1980. *The Networking Game*. Denver, Colorado: Network Research.

"The Networking Game is the art of discovering patterns in the world and making useful connections for ourselves and for others. It is about weaving new options into our safety nets. Networks are based on the interests each individual pursues; in fact, we like to think of people as explorers with many kinds of quests. This book is a tool to help you on those quests, no matter how large or small.

"The Rules: 1. Be useful. 2. Don't be boring. 3. Listen. 4. Ask Questions. 5. Don't make assumptions." (From Introduction.)

Scott Boorman (Sociology, Yale) and Paul Levitt (Sociology, Harvard). 1980. *The Genetics of Altruism*. New York: Academic Press, 448 pp. \$29.50.

This book presents a combination of two historically separate areas of population biology and social science. The formal models described in the book continue the tradition of mathematical population genetics stemming from Wright, Haldane, and Fisher. The substantive area to which these models are applied is the comparative evolutionary biology of social behavior, taking cases and data from both the social vertebrates and the social insects. The authors connect these two fields by a new approach that unifies a broad set of evolutionary insights into social behavior through the use of social network models to describe the impacts of altruism and cooperation on individual fitness.

The book develops genetic models based on theories of social networks and demography to analyze social behavior from an evolutionary perspective. Theoretical relationships between evolutionary models and abstract concepts of social structure are developed from a network standpoint that emphasizes types of reciprocity, altruism, and badges of group membership as a means of controlling cheating and ensuring the evolutionary stability of a social system.

The book describes principles of mathematical modeling in evolutionary sociobiology, with special attention paid to the natural mathematical structure that is emerging in this new area. Developments covered include an axiomatic theory of kin (sib) selection based on convexity properties of fitness coefficients, evolutionary foundations for the emergence of a division of labor, biological free-rider problems, and the use of social network models to analyze reciprocal altruism and related cooperative phenomena.

The authors apply genetic principles to analyze social structure as an evolutionary product in the animal kingdom. For vertebrate social systems involving reciprocal altruism, the cascade principle is used to explain relationships between social behavior and population structure, and specifically to account for the possible evolutionary success of traits that are counterselected when rare though positively selected when common. The work also gives extensive consideration to the applications of kin and group selection to both vertebrate and invertebrate social structures.

CONTENTS: I. The evolutionary roots of sociality, 1. The Theory of Reciprocity Selection. 2. Mathematical models for a simple cooperative trait. 3. Cascade to takeover by social trait. 4. Dynamics of the cascade using the 2-island approximation. 5. The cascade continued: initial conditions and global dynamics. II. The Theory of Kin Selection. 6. General models for sib and half-sib selection. 7. Axiomatization of sib selection theories. 8. Alternative combinatorial models and the status of the Hamilton theory. 9. Models of intergenerational altruism. III. The Theory of Group Selection. 10. Analysis of group selection in the Levins $E=E(x)$ formalism. 11. Group selection of founder populations. 12. Conclusions.

Bernard Farber (*Sociology, Arizona State*). 1980. *Conceptions of Kinship*. New York: Elsevier North Holland 320 pp. \$22.95.

Farber presents new evidence that kinship ties continue to be a viable force in determining cultural values. He uncovers a new understanding of the processes that lead to the adoption of one set of social values or another through an exhaustive look at the diverse historical, religious and ethnic sources of American social patterns. Then, he backs it up with research findings that reveal a new measure of kinship distances.

Called the Standard American Model, Farber's work gives the behavioral scientist an empirical study of kinship from the central perspective of collaterality--and new support for arguments that kinship is a significant element in maintaining civil and social continuity.

When is kinship regarded as a fundamental reality that determines social priorities? What is the relationship of kinship to social institutions, marital norms, fertility and child rearing? What would a better understanding of these phenomena mean to the future of family life and civil codes?

Contents: 1. Popular and legal conceptions of kinship. 2. Historical backgrounds of kinship models. 3. Kinship classification and social context (kinship models as metaphors of social structure). 4. Method of data collection. 5. Cognitive kinship maps: a serendipitous finding. 6. Variations in kinship distances: fundamental or superficial. 7. Family of orientation (kinship ideology). 8. Family of procreation (family organization). 9. Relatives and strangers (kinship and social exchange). 10. Perspectives on kinship.

Claire Sterling. 1981? *The Terror Network*. New York: Holt, Rinehart & Winston.

"Sterling's aim is to show that there is a network connecting the activities of most terrorist groups. She gleans evidence from captured evidence, because many terrorists appear to have been compulsive record keepers--prosaically enough, for simple accounting purposes. (Western European countries now have a Wiesbaden computer bank that lists some 10 million items of information related to terrorists, (including) life histories.) Although she does not believe there is some master plan worked out in Moscow, she makes a convincing case to support her contention that since 1968, terrorist activities directed against Western democracies--and there are, according to her, no others--have been aided and abetted by the Soviet Union." (Excerpts from the Toronto Globe and Mail April 11, 1981 review by Alan Pearson.)

Jeffrey Reitz. 1980. *The Survival of Ethnic Groups*. Toronto: McGraw-Hill Ryerson.

"This book explores the social meaning of the survival of ethnic groups such as Germans, Poles and Italians as distinct and identifiable social groups in North American society. Involved in this exploration is an historical and contemporary comparison of different ethnic groups in large Canadian cities. My goal is to present a coherent theoretical and empirical analysis which will uncover the root causes of ethnic group survival.

"Two kinds of evidence are used: historical sources and the contemporary social survey . . . This study traces the history of ethnic group formation in Canadian cities, and considers the sociological bases of group formation as these vary from one case to the next." (From Preface.)

Contents: 1. Ethnic group survival as a sociological problem. 2. History of ethnic community formation in Canada. 3. Comparing ethnic group cohesion. 4. Life-cycles of ethnic cohesion. 5. Economic position of the ethnic groups. 6. Effects of economic position on ethnic group cohesion. 7. Social dynamics of ethnic cohesion. 8. Ethnicity in society and in policy.

P. H. Gulliver (*Anthropology, York, Toronto*), 1979. *Disputes and Negotiations*. New York: Academic Press. 320 pp. \$19.00.

Previous examinations of negotiations by game theorists have been static and they, together with bargaining theorists, have focussed on abstract concepts and mathematical manipulations. In contrast, this study is grounded on materials taken from concrete cases of dispute and negotiation. Moreover, it is explicitly cross-cultural in scope. The intention is to show that processual patterns of interactive behavior in negotiations are essentially the same although in diverse societies negotiations have marked differences in interests, values, rules and assumptions.

The argument is supported by empirical data from the author's research in East Africa and by matching data from Western industrial negotiations. The common patterns of behavior are presented in the form of models in order to explain what happens in negotiations, how it happens and why. These models are based on the assumption that negotiations comprise a set of processes leading to interdependent, joint decision making by negotiators through their dynamic interaction with each other. These processes involve the exchange of information, and its manipulation, which permit and compel learning by each party about his opponent, about himself and about their common situation: that is, about their expectations, requirements, strengths and strategies. (Publisher's blurb.)

Contents: The Process of Negotiation. The Study of Joint Decision-Making. Some Basic Concepts for the Study of Negotiation. Processual Model of Negotiation, 1: The Cyclical Model--Information Exchange and Learning. Processual Model of Negotiation, 2: The Developmental Model. The Dynamics of Negotiation. Mediators: Triadic Interaction in the Negotiation Process. Two Case Studies. Conclusion.

Joyce Pettigrew (*Social Anthropology, Queen's, Belfast*). 1975. *Robber Noblemen: A Study of the Political System of the Sikh Jats*. London: Routledge & Kegan Paul.

"This book brings together 2 developments in Indian studies: 1st, the study of local factionalism; 2nd, the development of what have been called 'brokers' delivering votes, the 'political bosses' of other contexts." (From Max Gluckman's Foreword.)

"The faction operates at 3 levels--village, local area and state--and my main interest is in the vertical linkages The focus of the analysis centres on the manner in which factions among the Sikh Jats in a particular local area of the Central Punjab are manipulated by a political leader at state level to eliminate political rivals and competitors in an attempt to centralize power. In this context I examine the relationship of the faction as a traditional form of political organization to the social structure of the Sikh rural areas. Divisions within the family and rivalries and alignments between families are seen as forming a basis for factional alliances and enmities. Concepts central to the Jat value system such as honour, prestige, respect and reputation, sustain this mode of organization. Moreover, it is factions rather than castes or classes that compete for available political and economic resources. Historically, too, the faction has been the typical form of political coalition which has supported leaders at different periods. Nowadays it significantly hinders the establishment of unitary rule. One purpose of the book is therefore to attempt to analyse why the faction, as a typical form of coalition supporting the political leadership, prevents the effective centralization of power.

Immanuel Wallerstein (*Sociology, SUNY-Binghamton*). 1980. *The Modern World-System II. Mercantilism and the Consolidation of the European World-Economy, 1600-1750*. New York: Academic Press.

The argument of this work is that the modern world-system took the form of a capitalist world-economy that had its genesis in Europe in the long sixteenth century and that involved the transformation of a particular redistributive or tributary mode of production, that of feudal Europe (Braudel's "economic Ancien Régime") into a qualitatively different social system. Since that time, the capitalist world-economy has (a) geographically expanded to cover the entire globe; (b) manifested a cyclical pattern of expansion and contraction (Simiand's phases A and B) and shifting geographical locations of economic roles (the rise and fall of hegemonies, the movements up and down of particular core, peripheral, and semiperipheral zones); and (c) undergone a process of secular transformation, including technological advance, industrialization, proletarianization, and the emergence of structured political resistance to the system itself--a transformation that is still going on today.

In such a perspective, the seventeenth century, taken to cover a period running approximately from 1600 to 1750, is primarily an example of the cyclical pattern of expansion and contraction. In terms of the overall geography of the world-system, the boundaries created circa 1500 did not significantly change until after 1750. As for the ongoing secular processes of change, no marked qualitative leap is observable in the period from 1600 to 1750. We are arguing, therefore, for the essential continuity between the long sixteenth and seventeenth centuries, with the one great difference of expansion (A) and contraction (B), of growth and less growth. How shall we provide evidence for this way of summarizing reality? At one level the answer is quite simple. We shall try to identify the empirical differences between expansion and contraction, to

suggest why this cyclical pattern occurs, and to outline the consequences in terms of class-formation, political struggles, and cultural perceptions of the turn in economic fortune. From this empirical description, we shall try to specify more clearly the theory of capitalist development as part of a larger theory of sociohistorical change.

Contents: Crisis of the 17th century. The B-phase. Dutch hegemony in the world-economy. Struggle in the core--phase 1: 1651-89. Peripheries in an era of slow growth. Semiperipheries at the crossroads. Struggle in the core--phase 2: 1689-1763.

David Willer (Kansas) and Bo Anderson (Michigan State), eds. 1981. Networks, Exchange and Coercion. New York: Elsevier North Holland. 256 pp. \$16.95.

Focusing on networks of social exchange, this unique presentation introduces a dynamic, well-grounded theory of social structure. Suitable for historical, ethnographic and experimental research. (Publisher's blurb.)

Jean-Marie Benoist. 1978. The Structural Revolution. New York: St. Martin's Press. 247 pp. \$17.50.

A philosophical explication of the methodology and epistemology of structuralism, including Lacan, Levi-Strauss, Althusser, Foucault and Chomsky.

Ulf Hannerz (Stockholm). 1980. Exploring the City: Toward an Urban Anthropology. Irvington, N.Y.: Columbia University Press.

"In this attempt to provide a coherent and unified theoretical basis for the study of urbanism, Hannerz draws together central ideas about the city and urbanism from anthropological, historical, sociological, and geographical sources. This analysis considers the contributions to urbanism from a variety of individuals, groups, and schools, including Weber, Simmel, Marx via the Chicago School, and the Manchester School." (From publisher's blurb.)

Sandra Perlman Schoenberg and Patricia L. Rosenbaum. 1980. Neighborhoods that Work: Sources of Viability in the Inner City. New Brunswick, N.J.: Rutgers University Press. 179 pp.

This book addresses the questions of how working and lower class neighborhoods can become stable, desirable places to live that perform social functions appropriate to the local community. The authors bring a broad range of theory to bear in analyzing case studies of five St. Louis neighborhoods that have achieved various degrees of viability as defined by the extent to which residents can control the social order. They review U.S. federal policies intended to encourage neighborhood stability and test four propositions about the conditions under which communities become viable neighborhoods. Their approach stresses as sources of neighborhood viability 1) the presence of mechanisms to define and enforce shared agreements about public behavior, 2) a formal organizational structure that provides for communication, leader identification and neighborhood definition, 3) linkages to resources outside the neighborhood through leaders who make contact with outside institutions, and 4) mechanisms for interest aggregation which facilitate exchanges between conflicting groups within the community. They generalize the findings beyond St. Louis and suggest public policies to promote neighborhood viability. (From NORG Bulletin, 12/80.)

Marilyn Gittell. 1980. Limits to Citizen Participation: the Decline of Community Organizations. Beverly Hills, California: Sage Publications. 208 pp.

Marilyn Gittell and her collaborators address some of the most fundamental issues confronting neighborhood organizations and the entire citizen participation movement in this book. They examined the operation of sixteen education-oriented community groups in Boston, Atlanta, and Los Angeles. While middle-class organizations are included in the sample for comparison, the emphasis is on low-income organizations. Both locally-initiated and legally mandated organizations are included in the evaluation of the impact of community groups on public policy. (From NORG Bulletin, 12/80.)

The authors stress the difficulties of mobilizing low-income citizens for political action and sustaining their organizations. They confirm the class-boundedness of community organizations and the significant impact of class on the behavior and power of neighborhood groups. They conclude that the impacts of federal policy were perhaps the most important single force shaping the performance of community groups, and that "excessive reliance on a highly developed organizational structure may be a losing strategy for lower-income groups." Increasing external dependency, bureaucratization, and legal constraint are identified as major problems in the future of neighborhood organizations.

W

Arthur Naperstek, David Biegel and Barbara Spence (Psychology, Southern California), 1979. Neighborhood and Family Services Project Community Analysis, I. First Level Analysis, Washington, D.C.: American Psychological Association "Catalog of Selected Documents in Psychology" 9. 315 pp. \$28.00.

The report presents first level analysis of research data focusing on the factors affecting help seeking and receiving of mental health services in urban ethnic neighborhoods. Findings are based upon interviews with over 250 professional and community helpers in Baltimore, Maryland, and Milwaukee, Wisconsin. Interviewees included clergy, human service agency staff, natural helpers, neighborhood leaders, pharmacists, physicians, and school personnel. Problems associated with the breakdown of the traditional family system and with economic pressures are found to be recurrent sources of stress. The helping networks, consisting of both professional and community helpers, serve as important community strengths and resources. However, fragmentation of these networks remains an important obstacle to community residents seeking and receiving help. Other important obstacles are seen to be stigma related to seeking mental health services and lack of knowledge about where to go for help. The analysis reveals that potentials for integrating community and professional helping networks already exist in the community. Policy recommendations for integrating the two in light of the findings of the present report are discussed. (Publisher's blurb.)

William Mitchell (Anthropology, Vermont). 1978. Mishpokhe: A Study of New York City Jewish Family Clubs. The Hague: Mouton. 262 pp.

Mishpokhe is an original and penetrating descriptive analysis of an uncommon form of the family in one of the most intensely urban areas of the world. It is about family circles and cousins' clubs, two remarkable social innovations, that attempt to keep relatives together even as the indomitable forces of urbanization and industrialization continue to rend them apart. This is the first full-scale work devoted to their description and a discussion of their implications for kinship theory. Mitchell uses survey questionnaires as well as field work methods and employs a variety of concepts adapted from studies about "descent groups," "voluntary associations" and "formal organizations." (From publisher's blurb.)

Contents: 1. The Jews of New York City. 2. The origins of family clubs. 3. Membership and leadership. 4. Resources and records. 5. Social gatherings. 6. Feud and fissions. 7. Why family clubs? an explanatory model. 8. Family clubs and kinship theory.

Manfred Kochen (Michigan) and Karl Deutsch (Harvard). 1980. Decentralization. Cambridge, Mass.: Oelgeschlager, Gunn & Hain. \$27.50.

"This book describes a theory of systematic planning for the future of large service organizations incorporating basic concepts and mathematical models for decentralization and stressing common aspects of service networks." (Publisher's blurb.)

Carolyn Mullins (Office of Information and Computer Services, Indiana). 1980. The Complete Writing Guide: to preparing reports, proposals, etc. Englewood Cliffs, New Jersey: Prentice-Hall. 288 pp. \$6.95.

How to work smarter by writing better. Good ideas are all too often buried by poor writing. This book presents an easy-to-use system for producing effective written documents quickly and efficiently. Conveniently organized as a checklist for those working against a deadline, this handbook covers every phase of the writing process, from the initial gathering of data to final production and mailing. Mullins outlines step-by-step techniques for planning a realistic writing schedule. She tells how to organize and standardize information, and explains the design of effective tables and illustrations. A section on revision includes handy grammatical checklists, while time-saving hints, such as the use of boiler plates and Word Processing Systems, are given throughout. She uses numerous examples from actual reports and proposals; in addition, paragraphs are numbered for easy cross-referencing. (Publisher's blurb.)

(Editor's note: What the publisher does not tell you is that Mullins developed many of her techniques through making some of the key network papers comprehensible.)

The Volunteer Skillsbank: An Innovative Way to Connect Individual Talent to Community Needs. 1980. Boulder, Colorado: The National Center for Citizen Involvement. \$5.00.

A "skillsbank" is a way of matching individual skills and needed tasks. This book presents hand, key-sort and computerized ways of running skillsbanks through a variety of information processing systems.

New Books continued on page 40

ABSTRACTS

Abstracts from the SUN BELT SOCIAL NETWORK CONFERENCE, Tampa, February 20-22, 1981.

WOLFE, Alvin W. (South Florida). *"Uses of network models in health and human services."*

Increased public awareness of network concepts has created a demand for their application to the solution of human problems, and network studies have now developed to the point where they can respond to that demand. Application of network models had to await the development of theory and methodology in the social sciences. Different kinds of network models can be applied at various levels to different domains of the general universe of health and human services. Three different types of network models are elaborated. The first is called "network as the sum of links"; the second is called "network as generated structure"; and the third is called "network as a flow process." Examples of applications of each type of model are presented, and it is proposed that network analysis is on the threshold of making some highly useful contributions to the extremely important areas of health and human services.

BERNARD, H. Russell (Florida) and Lee SAILER (Pittsburgh). *"Informant accuracy: An overview."*

(Abstract not available)

WELLMAN, Barry (Toronto). *"The new East York study of community ties."*

This paper discusses some methods used in the new East York study. "Help" is disaggregated into component strands and coded without symmetry assumptions; not all ties are assumed to be helping, and E. O. Wright's work on occupational social relations is used.

FREEMAN, Linton C. (California - Irvine). *"Ego networks and centered graphs."*

(Abstract not available)

DOREIAN, Patrick (Pittsburgh). *"Models of network effects on social actors."*

This paper deals with various strategies for dealing with the following problem: what is the impact of a social structure on the behavior and certain social characteristics of the social actors found in the social structure? By using network concepts, models are formulated that incorporate both network effects and effects due to other characteristics of the actors. Maximum likelihood estimation procedures are provided for these models.

CAULKINS, Douglas (Grinnell College). *"Community centrality and interorganizational networks: Lost, saved and liberated community models."*

Wellman and others have described the configuration of personal networks predicted by the "lost," "saved" and "liberated" community models. We can extrapolate from these models of personal networks to the level of interorganizational networks formed by overlapping memberships in community voluntary organizations. According to this extrapolation, each model predicts a systematic relationship between two structural levels, first, the centrality of a community in an intercommunity network and, second, the configuration of the interorganizational network in the community. The "community lost" model suggests that as community centrality increases, the interorganizational network becomes less cohesive. Clusters of organizations in the network tend to become more differentiated institutionally and less local in their sphere of activity. The "community saved" model predicts a high level of cohesion in the network and a large cluster of local organizations, regardless of the centrality of the community. With increased community centrality the organizational network tends to bifurcate into a local and a non-local cluster. According to the "community liberated" model, as community centrality increases, the interorganizational network develops multiple clusters which are differentiated by subcultural identification rather than by institutional affiliation. The greater the community centrality, the greater the tendency for clusters to contain both local and non-local organizations. Finally, the "liberated" model predicts a low level of cohesion in the network regardless of community centrality but also suggests that the proportion of isolated organizations is low. Hypotheses derived from each of these models are tested with data from a system of 18 neighborhood communities in a Norwegian commune. Each neighborhood is rated as central, intermediate, moderately

peripheral, or peripheral in the system of communities. The entire system contains 160 organizations with over 5,444 memberships. A hierarchical cluster analysis routine is used to identify clusters of overlapping organizations in this network. The results of the test of hypotheses favor the "liberated" and "lost" models. Some implications for theories of social integration are discussed.

GREENBAUM, Susan (Native Amer. Res. Assoc.). *"Residential proximity as a factor in social networks formation: Implications for organizing urban neighborhoods."* W

Community Development Block Grant legislation during the 1970's gave rise to literally thousands of block clubs and neighborhood improvement organizations in urban areas in the United States. The underlying purpose in encouraging the growth of these organizations was to tap existing local support networks in order to mobilize self-help activities among neighbors. This policy emphasis raises questions concerning the importance of residential proximity for the formation of friendships and acquaintances among people who live in city neighborhoods. Festinger et al. (1950) convincingly demonstrated that proximity was the key variable patterning the formation of social relationships among a residential group of married engineering students at MIT. Festinger et al. and subsequent researchers have suggested, however, that in more heterogeneous settings, like urban neighborhoods, proximity would exert less of an influence on local social structure. The present study compared the spatial distribution of social network ties in different types of neighborhoods located within the same medium-sized midwestern city. The four neighborhoods varied in ethnic composition. All four areas predominantly consisted of single-family detached structures, that were built on 50-foot lots and arranged in a gridded face-block configuration. Data on local social relationships were collected via an interview survey with 104 randomly selected residents of the four neighborhoods. The results indicated that proximity was more, rather than less, important as a predictor of social relationships among residents of the four neighborhoods, than among the population studies by Festinger et al. Over half of all local acquaintances were with households who lived on the respondents' face-blocks. Moreover, friends in the neighborhood were even more disproportionately found on the face-block than were acquaintances. The effects of proximity were the same across neighborhoods. These findings confirm that shared residential space is a major variable underlying the formation of social relationships, even within heterogeneous populations.

MIDDLETON, Dewight (SUNY-Oswego). *"Network and domain in Manta."*

This paper describes in detail the personal work-focused network of a poor fisherman in the coastal city of Manta, Ecuador, and tests the heuristic power of a recent analytic conceptualization of urban phenomena by Hannerz (1980). Network analysis has been effective in revealing the cross-cutting nature of personal networks, and in focusing attention on the interstitial domains of urban society. Further, it has played an instrumental role in showing how individuals muster personal resources toward achieving goals. While detailed analyses of the morphological characteristics of networks, and lively descriptions of the nature of their cross-cutting, interpersonal linkages, have appeared abundantly in the literature, effective conceptualization of their linkages to the larger society has proved more problematic. In 1970, Noel Chrisman suggested that we focus our efforts on the arenas of recruitment to networks in order to forge such linkages. Recently, Hannerz (1980) has, in a similar vein but with critical differences, proposed that the city be divided conceptually into five domains: (1) household and kinship; (2) provisioning; (3) recreation; (4) neighborhood; and (5) traffic. Hannerz builds his conceptual scaffolding by adding to the base of domains, the role inventory organized by these domains, and the role repertoire organized by individuals into networks. This more systematic and abstract conceptualization by Hannerz bears better comparative potential than that devised by Chrisman a decade ago. The key domain in the view of Hannerz is that of provisioning because it is the most likely to involve immediately the investigator in tracing hierarchical linkages to the remainder of the city, and to forces and organizations external to it. This paper elucidates the domains of Manta, details relevant role repertoire and inventory, describes the formation, maintenance, and shrinkage of a personal network resulting from changes in the provisioning domain, and evaluates the effectiveness of this new conceptualization.

SCHERER, Jacqueline (Oakland). *"School-community networks in Pontiac."*

(Abstract not available)

Scherer, Jacqueline (Oakland). *"The work of nets: Literature review."* OK

Scholars have attributed many functions to social networks. For example, communications flow through network channels; there are exchanges of support, information, assistance, and money. A review of network literature will be undertaken to document the range of functions that have been attributed to networks, and a thesis of this material will be presented. One of the ways in which networks may be defined analytically is through their functions.

This work is part of my N.I.E.-supported research, "School-Community Social Networks: A Decade of Desegregation." The focus of the overall study is upon "the work of nets" as these operate in one particular community.

von MERING, Otto (Florida). "A four-dimensional theory of a social network; From practice to theory and back again."

A. In order to bring together phenomena often regarded as diverse or unrelated under a single unifying concept, the 'four-dimensionality' of a network--of people, places, and behavior in time--is argued. To say "a network is four-dimensional" is merely to state that it extends in time, that it has duration, or that it continues to exist from moment to moment.

B. This echoes the idea, first introduced in 1908 by Hermann Minkowski, that "nobody has ever noticed a place except at a time, or a time except at a place." And, it reiterates Sir Arthur Eddington's dictum that "it is not difficult to conceive events as ordered in four dimensions. It is impossible to conceive them otherwise."

C. Restated, a social network in its four-dimensionality is all one "thing" both in space and time, before all its other describable qualities and definable characteristics. In order to understand this "unitariness," certain indicator statements are discussed.

D. The application to and implication of the above for a planned, three-year developmental change project in community and school-based primary prevention are discussed.

HURD, Gary S., E. Mansell PATTISON and J. E. SMITH (Med Coll of Georgia). "Reliability studies of network self-reports: The Pattison Psycho-social Inventory (PPI)."

The raw data for network studies have originated from a large number of methods, ranging from ethnographic observation to the electronic monitoring of experimental groups. By far the most common method has been the self-report, where an informant is requested to make a list of alters whom the informant feels satisfy the researchers selection criteria. The reliability of self-reporters has rarely been reported as part of the studies utilizing as the principal data collection method. Recently, the method's reliability has been challenged.

In response to these questions the authors have conducted a limited test-retest study using an instrument currently finding wide use among mental health researchers and clinicians. Two populations are considered: psychiatric patients and psychologically healthy individuals. In both populations, high levels of replicability are obtained for overall responses and within different subsets of reported relations. Another area for the examination of self-report reliability is within population consistency. We are able to provide data from a number of studies conducted by independent researchers which resulted in comparable data on the sizes of ego-centered social networks.

The question of validity is a very different problem from reliability. We conclude with a discussion of the validity issue and propose possible solutions. Central to these solutions is the verification of hypotheses based on the prior results of self-report network studies.

RICE, Ronald E. (Stanford). "Networks over time: A review of methods and research with an extended bibliography."

The early interest in communication network analysis (predominantly in small laboratory, interpersonal or office groups) was not maintained during the 1960s. In the past half-decade, particularly, social network analysis has become fairly widely utilized. This new emphasis has been spurred by new computer programs to handle large data sets and which provide a (sometimes confusing) range of analyses, by new methodologies which provide flexibility and rigor to network studies, and by an acceptance of the network paradigm, whether as just a general way of viewing social structure and interaction, or as a more powerful and useful tool in analyzing networks. The next development necessary in network analysis is providing and understanding the tools for analyzing networks over time. There has in fact been considerable work in this area, although it has only occasionally, and then limited to speciality areas, been consolidated and reviewed. This paper attempts to provide an overview into the kinds and range of over-time communication network studies performed, as they are integrated with a review of over-time methodologies. These methodologies include, for example, typical time-series analyses of singular measures (such as connectedness or group structure), comparisons of entire matrices (markov chains, concordance measures), simulation and modelling, logit models, etc. This paper hopes to provide an introductory reference to the approaches, tools and analyses available to date.

MIGALSKI, Michael (California - Irvine). "Functional equivalence: The structure of supports."

A review of recent literature shows a widening gap between two cohorts of social researchers. This gap, which was less noticeable in earlier research, has resulted in two separate areas of study: social network analysis and social supports. Sociological studies of support groups have concentrated on the kinds of support necessary for successful functioning in society, but have ignored where the support originates and how it is distributed. The structural approach to social network studies has developed new methodologies to analyze the structure of interpersonal networks, but the structures analyzed are often not based upon what individuals gain or give through interaction but on notions of contact, affect, or fuzzily defined general relations such as friendship. Only recently have attempts been made to utilize concepts of network structure to explore the content of interactions which may provide support. The main problem with most of this research is that the network structuralists have ignored the function of relations while the social support researchers have not considered the structure of functions. A major area of application for both fields is in mental health intervention. However, these attempts have yielded mixed results. The reason

for the irregularity in intervention outcomes is due to the lack of integration between social supports and social structure studies.

The concept of functional equivalence is introduced to supply the link between structural methodologies and the support typologies developed by other social researchers. Functional equivalence is proposed to discover which members of an individual's network provide similar support functions and how sources of particular kinds of support are distributed within a personal network. In its main methodological features, functional equivalence is similar to the productive work done on structural equivalence. The departure is in the emphasis upon relational content as opposed to relational types or node position within a network.

MARIOLIS, Peter (South Carolina). "Region and subgroup: Organizing concepts in social network analysis."

Consider a matrix representation of a social network:

$$\begin{array}{c}
 x_1 \quad x_2 \quad x_3 \quad x_4 \quad \dots \quad x_N \\
 \begin{array}{c}
 x_1 \\
 x_2 \\
 x_3 \\
 \cdot \\
 \cdot \\
 x_M
 \end{array}
 \left[\begin{array}{c|c}
 & \\
 \hline
 A & B_1 \\
 \hline
 B_2 & C
 \end{array} \right]
 \end{array}$$

Each row and corresponding column represents a unit in the network; each element in the matrix represents a possible relation. A region is any subset of elements. A subgroup is any subset of units. A subgroup defines four regions in a matrix. The A region represents relations among the subgroup members. The B regions represent relations between subgroup members and nonmembers. The C region represents ties among nonmembers.

Applying these concepts to the notion of density (the proportion of actual ties to possible ties) yields at least four implications: One is that it allows us to see the fundamental similarities between the Alba-Kadushin clique analysis approach and blockmodel approaches. Although these two approaches are generally represented as fundamentally different (relational vs. positional), the approach in this paper shows that they are variants on the same theme. A second implication of "region" and "subgroup" is that they allow us to see the relationships among measures usually thought of as distant. For example, they show that absolute and relative point centrality measures are, or are proportional to, densities of regions defined by subgroups. Third, the paper shows how one can use "region" and "subgroup" to analyze personal, or ego-centric, networks. Finally, "region" and "subgroup" form a basis for a distinctive approach to social network analysis, which I will briefly adumbrate.

JEDLIČKA, Davor and Kenneth JOHNSON (Georgia). "A discrete time-dependent model for analysis of decision making process."

In dealing with behavioral problems in the social sciences there is a tendency to use Markov chains as a model for study. However, considering that basic assumptions of Markov chains that "the future is independent of the past" denies the importance of experience, its usage must certainly come into question. It is reasonable to say that to apply Markov processes to human decision making denies that human beings learn from experience.

This problem which arises in the attempt to apply Markov chains has been realized elsewhere. By limiting one's frame of study to a homogeneous population or to a sufficiently small collection of states in the probability space, Markovian models are able to provide some information for short periods of time. It should be noted that man's penchant for consistency and fear of change is not reflected by Markov chains. In this paper we develop a new probabilistic model to deal with consistency in decision making.

CARRINGTON, Peter and Greg H. HEIL (Toronto). "Clustering to reduce the number of types of tie."

When data have been collected on a large number of types of tie on a population, one may wish to reduce the number of graphs if subsets of the graphs are believed to be multiple indicators of the same type of tie, and/or the number of graphs makes analysis inconvenient. A similar problem in multivariate analysis is usually handled by factor analytic or other variable-clustering techniques. This paper describes a straightforward method for reducing the number of graphs. A matrix of similarities between graphs is computed and clustered. Graphs within each cluster are then combined. An application is reported in which 36 types of tie among business enterprises in the same industry were defined, and reduced to 6 types of tie consistently over 82 industries. In this application, inter-graph similarity was defined by the Katz-Powell index, and clustering was done by McQuitty's hierarchical procedure.

Selected abstracts from the Annual Meeting of the AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Toronto, January 14-18, 1981.

ALLEN, Peter (Free University of Brussels). "Modeling in Self-Organizing Systems."

Over recent years new concepts have appeared concerning the evolution of complex systems. The structure and function of the system are viewed as the result of a "self-organizing" evolution. This "self-organizing" corresponds to the passage of the system through branching possibilities, where the particular branches are each characterized by structures and functions which are stable but often of qualitatively differing characters. Such a model admits that while, of course, it is not closed to the external world, neither is it closed with respect to its own interior, for it is small fluctuations of behavior within it, which amplified by non-linearities, choose which branch of those possible the system will adopt. Essentially then we recognize that the "world" is much richer than the "model," and that at critical moments new or abnormal behavior can break through from the micro to macro level. The essence of the model is behavioral, and shows that in the evolution of a complex system we have a dynamic dialogue between the "system" and the "values" of the actors, between supply and demand as the feedbacks lead successfully and simultaneously to adaptive behavior of the different components of the system.

BEAUMONT, J.R., M. CLARKE and A. G. WILSON (Leeds). "The Evolution of Urban Spatial Structure: A Theoretical And Empirical Investigation."

In this paper we examine several different approaches to the modelling of the evolution of urban spatial structure, using techniques from dynamic systems theory. We focus on the spatial structure of shopping centers in examining both the form and stability of equilibrium patterns and the dynamics and evolution of these patterns. Theoretical developments inform us that these models give rise to several interesting types of behavior, such as jumps in the value of state variables that can be interpreted by the use of catastrophe theory and bifurcation theory. The use of difference equations to model the dynamics of supply side behavior results in a wide range of different paths to an end state from the same initial conditions but using different parameter values. To illustrate these theoretical developments we present a variety of numerical results using a hypothetical 149 zone urban system. These results both give rise to new ideas. The patterns obtained are compared with classical central place theory and it is argued that the approach is a dynamic extension of this theory. Extensions of the methodology will enable planners to gain a better understanding of the spatial structure of cities.

DENDRINOS, Dimitrios S. (Kansas). "Patterns of Aggregate Urban Evolution: A Catastrophe Theory Approach."

Empirical evidence has established that the share of metropolitan areas' population to that of the nation's exhibit a rich variety of evolutionary patterns. They range from strictly unimodal behavior to long-term cycles, to that of short-term pulsations over extended time periods, and finally to sudden explosion or implosion. Such patterns have been documented from annual as well as decennial census of population data, for the period 1940-1977.

A general theory of metropolitan evolution is attempted that identifies stable, unstable and meta-stable states and transition phases from one to another, both continuous and discontinuous. Using the theory of structural stability, catastrophe theory and bifurcation theory the basic elements of urban evolution are presented. Various dynamic phenomena widely studied in biology and fluid mechanics are discussed within the context of metropolitan development.

Some simple logistic difference and time delay differential equations are employed to analyze phenomena of period doubling cycles, chaotic behavior and morphogenesis in urban evolution. They are tied in to the size of urban settings, their regional location, their comparative advantages in the national economy, their carrying capacity and social costs of growth. The incidence of the various phenomena is used to further provide insights into the nature of urban agglomerations, their start-up and end phases.

SEGRAVES-WHALLON, Barbara Abbott (Michigan). "Implications of the Evolution of Complex Urban Society for Systemic Communication and Control."

Certain highly general properties and processes of complex urban society will be identified, characteristics definitive of the central aspects of organization, operation, and change over time in the self-organizing societal entity. In the context of the broad applications to biological and social systems of a dynamic model of the generation of order and its transformations made possible by recent work in irreversible, non-equilibrium thermodynamics, the identification of these significant baseline features of the complex (social) system will permit an examination of the role of communication networks in effecting the non-linearities by which the self-organizing social system emerges, develops, operates, and changes. The implications of these communication networks for system-wide coordination and integration accordingly will be clarified.

WOLFE, Alvin W. (South Florida). "Network Models in Health and Human Services; An Overview."

A variety of network models is proving useful now in helping us to understand social processes in complex systems. Network analysis is popular now because it is possible now. Modern electronic data processing and modern forms of mathematics make feasible the pursuit of theoretical concerns that social science has not dealt with satisfactorily: relations rather than things, process rather than form, generative rather than functional models. Network thinking can take several directions, one visualizing a social network as the summation of links among persons, another conceiving a social network as a structure of relations, and the third seeing a network as a system through which resources flow. Network applications have increased in the health and human service fields and it seems likely that their full effects have not yet been felt. Using more formal models than have been used in the past, current network researchers are enhancing the scientific rigor of their efforts. If they do not lose their humanistic motives, if they do not fall prey to the tendency to treat network analysis as an abstract game, network scholars will contribute directly to the physical and emotional well-being of modern populations.

WELLMAN, Barry (Toronto). "The Structural Basis of "Support System" Analyses." W

"Support system" analyses must go beyond the essentially sensitizing, psychologistic use of social network metaphors. They would profit from using differentiated social structural concepts and methods now common in sociology. These include (a) analyzing social networks as complex, differentiated structures and not as unitary wholes; (b) moving beyond voluntaristic assumptions that network ties are "chosen" and recognizing the extent to which they are structurally embedded; (c) taking into account a wider range of network relationships than just "support" ties; (d) taking into account the effects of large-scale divisions of labor on the flows of resources through networks; and (e) utilizing more powerful mathematical methods to describe network structure and its consequences. Examples from the East York Social Networks study are provided.

WARREN, Donald I. (Community Effectiveness Inst., Ann Arbor). "Problem Anchored Helping Networks (PAHN's): A Key Social Bond of Urbanites."

Research conducted in the Detroit metropolitan area has provided data on a distinct form of informal social tie whose significance for mental health and problem coping has both basic research and applied social policy implications. An NIMH sponsored study of 2500 families indicates the variability in strength and characteristics of local neighborhoods and communities plays a major role in the capacity of individuals to use formal and informal problem solving resources. Two types of problems are discussed: those involving the severing of social ties (Homes and Rahe "life crises") and a set of "recent concerns" whose characteristics involve the building or creating of new social networks. Both the size and content of such networks are explored and their implications for well being and social integration. A set of six different informal social bonds are compared with PAHN's. Further research distinguishing among varieties of what have been labeled "social networks" is discussed. Practical uses of the PAHN social tie are also explored and examples of their role in mental health service delivery elaborated. Issues of primary prevention, treatment, after-care and home placement are focused on.

HAMMER, Muriel (N.Y. State Psychiatric Inst.). "Social Networks and Health."

Differences in social contact patterns have been shown to have important effects in a range of health conditions as diverse as complications of pregnancy, heart attacks, recovery from cancer, and even overall longevity. Drawing on our data and findings from other studies, with some concentration on child development and family health, this paper considers some of the ways in which social networks operate to promote and enhance individual health.

HURD, Gary S. (Med Coll of Georgia), Barbara W. LEX (Harvard Med School) and E. Mansell PATTISON (Med Coll of Georgia). "Congruence of Personal Networks and Marital Satisfaction."

Research into the composition and structure of personal networks demonstrated the existence of three modal network types. Type 1 is of predominantly involuntary, rural bounded relationships such as those found in nuclear families. Type 2 networks emphasize voluntary, non-rural bounded relationships such as extended kin group cohorts and friends. The Type 3 network represents a balance between Types 1 and 2 with about equal social participation in voluntary and involuntary relationships. Marital dyads are embedded in a social network composed of relationships maintained independently from spouse and those that are shared by the couple. This network may also be categorized as having memberships in one of the network types defined for cohorts and their resulting couple network on marital satisfaction is examined for three populations: happily married couples, couples undergoing divorce and couples where one or both of the members are heroin addicts.

TOLSDORF, Christopher (Parent-Child Resource Centre, Willimantic, CT). "Stress and Network of Children of Divorcing Couples."

This paper focuses on the role of the social network as experienced by families involved in divorce and custody suits. Networks have profound influences on the divorce/custody battle process, and in turn the nature and extent of network linkages is usually dramatically changed. For example, support can paradoxically solidify the adversarial process, as it spreads, functionally separates the network into two unconnected blocks, thus inactivating many linkages. This splitting intensifies some support linkages, but this intensification is not long-lasting.

Data will be presented from a series of court-ordered custody evaluations in which psychological evaluations of individuals, their families, and their networks were used in the formulation of custody recommendations. Reports from children, their parents, and social network members will be shared, and a model of network response to custody disputes will be described.

EDMUNDSON, Eileen (Florida Mental Health Inst.) and Richard WEINBERG (Erich Lindemann Mental Health Center). "Longitudinal Comparisons of Network Characteristics and Personality Correlates of Patients."

As a part of a wider Early Intervention Project, the Florida Mental Health Institute has been experimenting with an approach called Community Network Development (CND), attempting to enhance the community support networks of mental health clients who have had brief hospitalization. CND provides a supportive environment in which members can practice interpersonal and problem-solving skills learned in other aspects of the Early Intervention Projects. The project provides an opportunity to assess the network characteristics over time and to compare these with the personality characteristics of the participants in the community networks.

YOUNG, Donald A. (Health Care Financing Administration, Baltimore). "The Communication Network Linking Clinical Research and Clinical Practice."

Very little is known about the influence and impact of communication in transferring research findings to medical practitioners. Although practitioners hear about new findings from many sources, publication of clinical research results is a primary input to medical innovation and the diffusion of new clinical practices and procedures. There is growing evidence that traditional patterns of scientific communication do not serve clinical research nearly as well as basic research in screening for quality or promoting orderly growth of a solid knowledge base. In addition, clinical investigators see their peers as the primary recipients of new findings and fail to provide information needed by practitioners. As a result of inefficiency in the communication of clinical research results, practitioners may receive inaccurate or incomplete messages and fail to use new information appropriately.

HAGGERTY, Robert J. (William T. Grant Foundation and Cornell University Med Coll). "Social Stress and Child Health."

Social stresses (e.g. death, moves, job loss, school failure, divorce, birth and care of a disabled child) are frequent events in the life of families with children. Such stressful events were recorded as acute on 1/3 of days in a random sample of families studied through a diary in Rochester, N.Y. While there are severe problems of definition and measurement of stress, there are strong positive correlations of stress with physical as well as psychological disease, and with timing and amount of use of health services. Changes in white blood cell phagocytosis, adrenal responses and endorphins have been demonstrated in humans under stress and may account for changes in susceptibility to illness. Stress research is now focusing upon determination of what makes a stressor cause distress in one and not in another, and thereby changes susceptibility to illness and use of health services. There are exciting new studies of how children might be assisted to develop coping skills to diminish the adverse consequences of stress. Circumstances that appear to diminish distress include anticipation of the event, mental and possibly physical rehearsal of how to cope with common stress, relaxation response (and transcendental meditation) and presence of social support. Child health in the 1980s will need to be concerned with social stress and ways to diminish its adverse consequences just as it was in the past with infectious agents and safe environment.

PRETZER, William S. (Smithsonian). "The Emergence of the Factory."

The organization of production in factories required the transformation of the cultural as well as the social and economic landscape of the North Atlantic community between the late 18th century and mid-19th century. The first factories involved more than the application of new power sources and the use of novel machinery in a new setting. Technological innovation required new modes of thought for factory owners and workers alike. Entrepreneurs created new market conditions and technological possibilities by altering the

nature of work and restructuring relations between employers and workers. Machinery made its own demands on workers but also enabled employers to transform skill and work requirements, as well as to increase productivity. Managers sought to facilitate the assertion of new forms of authority in the factory and to impose a new discipline on workers. For their part, workers did not passively accept their new role but, rather, resisted, altered and accommodated to the new demands made on them. The factory was only one forum, but a crucial one, for the creation of industrial capitalist classes.

HOGAN, Dennis P. (Chicago). *"Subgroup Variations in Early Life Transitions,"*

The timing and sequencing of life course activities involve problems of coordination, resource management, and adaptation. Unique historical circumstances characterize each cohort at the time it undergoes age-related transitions. These historical circumstances partly determine the problems of coordination, resource management, and adaptation encountered by persons during life course transition. Each birth cohort is composed of members with differing social and personal characteristics. The effects of historical circumstances on transitions may vary among different subgroups of the population. Class, ethnic, and residential variations may identify subgroups that differ in how they "work out" historically relevant experience.

This paper identifies subgroup variations in the timing and sequencing of school completion, first full-time job, and first marriage among American males born 1907 to 1952. Transition behaviors are described for men simultaneously classified according to social class, community of residence, and paternal ethnic ancestry. The joint effects of membership in specific social class, community size, and ethnic categories are measured. The effects of subgroup membership on transition behaviors are shown to vary among levels of education.

SIMKUS, Albert (Michigan). *"Socioeconomic Careers in the Context of Radical Social Change."*

Time brings changes in the social statuses of individuals as a result of the processes of aging and historical change. Not only do age and historical change have their own independent effects, they also interact. Different age groups experience societal changes differently. This paper is concerned with the relationships between radical social change and socioeconomic careers, particularly with these relationships in Hungary during the last 50 years. Hungarian data allow an unusual quantitative description of the process of social mobility as it was influenced by great changes in social organization and policy. Changes in socioeconomic careers in Hungary have been affected by policies related to East European state socialism and by certain general constraints to which all industrialized societies are subject. Three such constraints are apparent: (1) Since human capital cannot be expropriated and redistributed, changes in the transmission of social position are easier to implement through intergenerational than through intragenerational social mobility. (2) Changes in both inter- and intragenerational social mobility are least inefficient when they involve changes in individuals' early careers, rather than changes at advanced ages. (3) Social mobility requiring minor changes in people's skills and knowledge is less costly to society than radical changes in positions. As a result of these constraints, changes in social order are likely to have greatest effect only on those persons just beginning their careers during crucial periods.

KATZ, Michael B. (Pennsylvania). *"Families and Early Industrialization: Cycle, Structure and Economy."*

This paper describes the relation between family cycles, structures, and economies during early industrialization. It is based on a case study using nominal level census and tax data from Hamilton, Ontario between 1851 and 1871 and from Buffalo and rural Erie County, New York, in 1855. Its argument is that five great changes in family organization have occurred since the early nineteenth century. These are: (1) the nuclearization of the household; (2) the prolonged co-residence of children in the homes of their parents; (3) the decline in marital fertility; (4) the separation of home and work; and (5) the emergence of a stage in the family cycle in which husbands and wives dwell together after all their children have left home. The first four of these had become evident in Hamilton by 1871. The paper shows their relation to social change and to class structure. It contends that models which portray change as starting in the middle class and trickling downwards are incorrect.

NONINI, Donald M. (Stanford). *"Peripheral Structures and Evolving Systems: Reflections on Malaysian Culture and Economy."*

Biological theorists have long recognized the special importance of peripheral or marginal populations in the evolutionary process. Many biological theorists, e.g. Mayr, have suggested that contradictions between the local adaptive setting and the overall adaptive zone of a species result in an evolutionary potential for genetic revolution amongst small populations located on the periphery. In cultural evolution too, theorists have long stressed the "evolutionary potential" of marginal populations. Hence, a comparison of the characteristics of marginal populations in biological and cultural evolution seems warranted. The present paper begins this task of theoretical comparisons by analysing patterns of economic behavior and capital accumulation in a small market town in northern West Malaysia, based upon three years of field research. An attempt is made to identify the internal program which guides capital accumulation in this

market town; the local community is placed within its environmental context; and particular concern is given to the contradictions arising from the inclusion of the local economic system within a broader regional and international network. The use of biological analogies aids in generating interesting hypotheses concerning this case without implying any biological reductionism.

FORD, Susan M. (Southern Illinois). *"Cladistic Analysis and its Possible Application to Studies of Social Systems."*

Cladistic analysis is experiencing increasingly wider acceptance and use by biologists interested in studying evolutionary relationships between taxa. This method of analysis can be used both when a fossil record is known and when only living members of the groups under study are known. Recently, refinements in the technique of this analysis have allowed its application to groups exhibiting reticulate evolution. Therefore, this technique can be used for studying changes in human behavior which undergo not only differentiation but diffusion as well. The basic method of cladistic analysis will be outlined, and the validity of necessary and/or suggested assumptions discussed. Possible applications of this methodology to the study of the evolutionary history of social systems and cultural traditions will be proposed, with a consideration of the benefits which may be gained by such applications.

PATTEE, Howard H. (SUNY - Binghamton). *"Historical Complexity and Functional Simplicity in Evolution and Society."*

The process of evolution in biological, social and technological contexts is generally associated with increasing complexity. This complexity generates hierarchical organization. Thus we have levels of organization, e.g., the cell, the organ, and the organism, the individual, the city and the state, or the switch, the network, and the computer. Although plausible reasons can be given for the value of this level structure of complex systems, there is remarkably little known both theoretically and empirically about the processes that actually generate new levels. The classical theories of natural selection, of gradual adaptation and optimization are now augmented by the theories of sudden change, the catastrophes and bifurcations that capture the more innovative and revolutionary aspects of evolution; but these theories do not recognize the primary dependence of evolution on symbol systems. Complex organizations are maintained by symbolic descriptions, e.g., genetic instructions, cultural systems, programs, etc. Without these symbolic constraints that harness the physical embodiments of function, hierarchical organizations will degenerate. On the other hand, at a given level, symbolic description itself may fail if the complexity becomes too great, and a new level of description must arise before a new level of structure can persist. The new level of description cannot be as detailed as the previous level, and therefore new levels of natural selection will also be possible.

DIENER, Paul (Southern Illinois - Carbondale). *"Tappers, Trappers, and Anabaptists: A New Evolutionary Analysis."*

Recent debates in cultural anthropology have focused upon the role of direct environmental influences in the social change process. Marvin Harris and many other cultural ecologists have suggested that environmental pressures directly induce behavioral changes, and that only later do behavioral changes become "codified" in the cultural information system. New evolutionary theorists, on the other hand, have argued that most cultural change begins with informational reorganization.

MARUYAMA, Magoroh (Southern Illinois). *"Two Types of Causal Loop Theories: Homeostatic and Morphogenetic."*

A system with causal loops among its elements can either maintain a steady or cyclic pattern among the heterogeneous elements by means of change-counteracting loops, or increase heterogeneity and generate new patterns by means of change-amplifying loops, or both. The basic principle of biological and social processes is to increase heterogeneity and find mutually beneficial positive-sum interaction patterns among heterogeneous elements. Until recently science has been dominated by homogenistic, hierarchical or independent-event patterns of thinking. Even most of the "avant-garde" scientists of today, including many of non-equilibrium thermodynamists, are partly trapped in these old patterns. Homeostatic and morphogenetic, nonhierarchical interaction patterns are psychologically unnatural to most scientists. On the other hand, these patterns have been natural and endogenous to many, but not all, of the Asian and African cultures as evidenced by anthropological and archaeological data as well as architecture and art designs.

YOUNISS, James (Catholic Univ.). "The Development of Reciprocity in Personal Relations."

Parents have generally been considered the dominant influence in children's moral development; it is primarily from parents that children have been thought to acquire moral values and rules for moral behavior. But while parents are undoubtedly important in this regard, children are also subject to other influences. Both Piaget and Sullivan, for example, believed that relations with peers play a vital role in children's social relations. Not only do children acquire interpersonal sensitivity from interactions with age-mates, this interaction may also provide a practical basis for principled morality. By virtue of their greater power, adults are necessarily figures of authority. The moral principles they import to children come ready-made. From the experience of forming relationships with their equals, however, children participate in the mutual construction of rules or procedures governing those relationships. Research conducted by the present speaker indicates that this experience fosters the development of reciprocity, mutuality, and egalitarianism, qualities prototypic of the values upon which democratic societies are based.

DAMON, William (Clark). "Peer Interaction and Children's Moral Development."

Theorists have argued that peer interaction should facilitate children's moral development, but the nature of this influence has not been systematically investigated. In the present study, pre- and post-tests of moral judgment were compared for three groups: (a) children who debated with one another about a problem in distributive justice; (b) children who heard an adult discuss the same problem; (c) a control group who received no special treatment between testings. Children in the first group advanced farther in their moral judgments from pre- to post-test than did the other two groups, supporting the hypothesis that peer interaction facilitates moral development. Within the first group, analysis of videotapes of the children's distributive justice debates revealed that the communicative styles of children who advanced from pre- to post-test differed from those of children who showed no change. The implications of these findings are discussed.

WHITE, Howard D. (Drexel). "Authors as Markers of Intellectual Space."

Patterns of co-citation of authors in a field, obtained from an online literature search, show which authors are perceived as similar and which as dissimilar, in the composite view of all citers. Similarity coefficients (Pearson r 's) are used to render this composite view as a map of intellectual space, in which authors who are similar in subject matter and approach cluster together. The intellectual space of one field--the social studies of science, technology, and society--is explored in the present report, using 71 established authors as input to factor analysis and computer mapping. Seven distinct, yet intercorrelated groupings emerged: social historians of science, philosophers, science policy writers, sociologists (stratification and reward), sociologists (communication patterns in P&D), and citation researchers and eighth, isolated from the rest, economists of technological growth emerged. The technique distinguished between who were seen as highly specialized in a single specialty, and others, seen as broadly relevant across specialties (e.g., R. K. Merton and D. deS. Price). It also reveals the relative centrality and peripherality of both authors and specialties. Potential applications exist for sociologists and historians of science, and for literature retrieval specialists.

UMPLEBY, Stuart A. (George Washington). "Systems, Observers, and Groups."

Within the field of cybernetics and systems, those with an interest primarily in theory rather than applications have tended to divide themselves into two groups. One group, usually associated with general systems theory, has looked for similarities among different kinds of systems. The second group, usually associated with cybernetics, has been preoccupied with systems which observe. Conferences in this field are usually marked by at least one major confrontation between the ontologists--those with an interest in systems--and the epistemologists--those with an interest in observers. For people who do not understand both paradigms being used, these debates can be quite confusing. Decision-making in human groups is one area which has not been treated in great detail by cyberneticians or systems theorists. This new area of enquiry, by shifting the focus of the debate, could help reunite these two approaches. The empirical approach of the systems theorists would help to bring to bear the wealth of knowledge already developed by the social sciences. The deductive approach of the cyberneticians would introduce the new insights regarding the behavior of autonomous systems.

MESAROVIC, Mihajlo D. (Case Inst. of Technol.). "Frontiers of General Systems and Cybernetics Research: Applications."

Through the past thirty years general systems and cybernetic ideas have been applied in a variety of ways in a variety of areas. The extent to which these ideas have been successful in bringing valuable insight to practical problems depends on the specific context, but it is becoming increasingly clear that we are in the midst of what can be called the systems age. A brief review of how general systems research and cybernetics have been applied, with particular emphasis on such efforts as the reports to the Club of Rome, will be given in order to place the field in a larger context; along with a few thoughts on its future directions.

RECKMEYER, William J. (San Jose State). "Frontiers of General Systems and Cybernetics Research: A Synthesis and Perspective."

Mankind has been fundamentally involved in a profound quest for knowledge ever since the beginnings of its existence--a quest that has resulted in a sophisticated though misleading understanding of the world in which we live. Unfortunately, the nature of this quest has largely emphasized disciplinary specialization at the expense of a corresponding integration--a situation that bodes ill for the future of the quest and severely inhibits a requisite appreciation for the intrinsic unity and harmony of reality. General systems & cybernetics research grew out of the pioneering efforts of scholars like von Bertalanffy, Boulding, Wiener, Ashby, Bateson, Rapoport, and von Foerster to develop a rigorous means for investigating and understanding the underlying principles and patterns of order characterizing reality in all of its manifestations through the explication of a meta-disciplinary epistemology, metaphysics, and methodology that would unify and transcend the narrow disciplinary perspectives of modern scholarship. During the last thirty years great strides have been made in generating insights into such systemic considerations as the nature of enquiry; problems of self-reference; non-linear & mutual causality; the relationships between observers & what they observe; internal and external organizational, dynamic, and evolutionary features of phenomena; anamorphosis; interdependence; autonomy; self-organization; and autopoiesis, as well as in the application of systemic ideas in conventional disciplinary studies. The paper presents a unified overview of the field's current frontiers and looks at its future.

von FOERSTER, Heinz (Illinois at Urbana-Champaign). "Cybernetics of Epistemology."

If epistemology is taken to be the theory of knowledge acquisition, rather than of knowledge per se, then the appropriate conceptual framework for such an epistemology is that of cybernetics, the only discipline that has given us a rigorous treatment of circular causality. The processes by which knowledge is acquired--i.e. the cognitive processes--are interpreted as computational algorithms which, in turn, are being computed. This leads to the contemplation of computations that compute computations, and so on; that is, of recursive computations of arbitrary depth and of the Eigen-Operators, Eigen-Functions, and Eigen-Values associated with these computations. Within this frame the activity of the nervous system, some clinical observations, notions of "object," "behavior," etc. and the ethical consequences of this position will be discussed.

KLIR, George J. (SUNY - Binghamton). "Frontiers of General Systems and Cybernetics Research: Methodological Considerations."

The aim of this survey paper is to characterize the area of systems methodology and describe its past developments, current status, and trends. The main issues of systems methodology will be discussed from both the scientific and organizational points of view.

GRAY, William (Massachusetts Dept. of Mental Health). "Frontiers of General Systems and Cybernetics Research: Humanistic Considerations."

From their beginnings humanistic concerns have been obvious in general systems and cybernetics research, evidenced in Ludwig von Bertalanffy's Robots, Men, and Minds and Norbert Wiener's The Human Use of Human Beings. In the technological developments that threaten the extinction of the human species and in the development of management and control systems usable for regulating people to the point of dehumanization, humanistic considerations have been harmed. But the seeds of humanism implicit in the work of von Bertalanffy, Wiener, Kenneth Boulding, Anatol Rapoport, Heinz von Foerster, Warren McCulloch, and W. Ross Ashby have blossomed and in the past twenty-five years humanistic considerations have become central in the frontiers of general systems and cybernetics research. This has been accomplished by a turning of the human knowledge process on to itself as a necessary object of study--an acknowledgement that what had previously been considered the "cold, hard, objective facts of science" are all products of a "soft brain"--a subjectively experiencing brain. In the human this subjective brain has evolved the remarkable capacity to produce system forming knowledge externalizable as artifactual system formings. Noogenetic evolution is now primary. The crucial task of our era is to understand and be able to modify the wondrous system forming of noogenetic evolution by our brain and this will not be possible unless humanistic considerations are held primary. Our own emotional cognitive structuring model will be used as an illustration.

ROBINSON, Peter (Dept. of Communications, Canada). "Scientific and Technical Information in Transborder Data Flow."

Some of the broader issues of transborder data flow will be discussed, with specific reference to recent attempts to come to grips with them. An effort will be made to eliminate the superficial issues causing confusion in this area, allowing concentration on the crucial aspects of transborder data flow problems. While financial and other economic information fulfill a dominant role in the movement of information on a global scale, this presentation will focus on those questions arising from the international exchange of scientific and technical information. Another salient point in this discussion will be on the purchase of data processing services in the international open market. Finally commentary will be furnished regarding several ramifications of the "free flow" concept.

NAKAYAMA, Taro (Prime Minister's Office, Japan). *"The Informationalization of Society in the 1980's."*

Ten years ago, a thought-provoking study was published in Japan with the title: "White Paper: The Plan for an Information Society." At that time, it was proposed that Japan change its goal from industrialization to "informationalization." A national goal was enunciated, calling for the creation of "a new information society which will bring about a general flourishing state of human intellectual creativity by the year 2000. Following colloquies between government and the private sector, such corporate giants as Mitsubishi, Sumitomo, and Mitsui took steps to participate in "information syndicates," along with manufacturing, banking, and commercial concerns. As the nations of the world now consider the challenge and opportunities of the 1980 decade, the emphasis on developing comprehensive, responsive programs for information exchange has increased. With the advent of innovative information technology which offers both economies of investment and unprecedented performance levels, there must be a concomitant emphasis on the enhanced management of these vital resources and services.

GREEN, Lyndsay and David SIMAILAK (Inuit Tapirisat of Canada). *"The Inukshuk Project: Use of TV and Satellites by Inuit Communities in the Northwest Territories."*

The Inuit of Canada, through their national organization, are experimenting with a stellite system which links six communities in three Arctic regions in a unique interactive communications network with one-way video and two-way audio teleconferencing capability. Through this system Inuit are holding meetings, teaching classes and broadcasting TV programs, all in their own language, Inuktitut. This system is structured as a community facility with programming decisions made at the local level in response to community priorities. This paper examines the structure of the system, designed for four broad categories of use, meetings, adult education, children's education and broadcasting. The system permits the satellite signal to be transmitted to people's homes, to small meeting rooms or to a large video-screen in the community halls. Data gathered from the experiment are being analysed to define the design of a permanent Inuit communications system. This paper discusses the innovative aspects of the project, especially the democratic and decentralized nature of the system. Several Inuit communities have refused to allow English language, southern television programming to be broadcast in their communities and maintain their right to community control over television distribution. The paper looks at the implications of this tenet of the communications work of the Inuit, their right to "freedom from information."

Abstracts from the ALBANY CONFERENCE ON CONTRIBUTIONS OF NETWORK ANALYSIS TO STRUCTURAL SOCIOLOGY. Albany, April 3-4, 1981

KNOKE, David (Indiana) and Edward O. LAUMANN (Chicago). *"The Social Organization of National Policy Domains: An Exploration of some Structural Hypotheses."*

This paper develops a model of the policy process in elite functional subsystems of the national society, such as national security, agriculture, education, health, and energy. The policy domain refers to the substantive focus of concern of national-level policy initiatives and debate. The elite subsystem concerned with a policy domain is constituted by the set of consequential actors (1) having an interest in the substantive concerns of the policy domain and (2) possessing the relevant resources to insure their being taken into account in collective decision-making about policy alternatives. Domain membership is continuously-negotiated social construction, while relations among domain actors are expressed through informational exchanges, resource transactions, and boundary penetration. These elite organizations monitor the subsystem and its external environments for stresses and malfunctions that bring the system into disequilibrium. The policy process begins when a domain actor draws attention to such strain problems. Actors whose organizational interests are affected by the problem generate policy options, or alternative solutions, whose adoption requires authoritative action. Domain actors negotiate the placement of the issue and their preferred alternatives onto the governmental agenda, from which a final authoritative selection is made. The main theoretical question is: How does variation in the social structure of policy domains affect the process by which policy issues are recognized, developed, and resolved? Key dimensions of policy domain structure are identified and related to the rate, volume, location, and sequential timing of issue processing in a series of testable hypotheses.

MOORE, Gwen and Richard D. ALBA (SUNY - Albany). *"The Role of Status Groups in Elite Linkages."*

A common view of the political elite in the United States is of a WASP-dominated group which excludes nearly all persons of less favored origins from elite positions, activities and networks. This conception is grounded in the notion of a status group and receives theoretical support from the exclusionary mechanisms which help to preserve status-group privileges. We assess the accuracy of this conception of the elite, using data from a unique set of interviews with 545 top position holders in powerful political, economic and social institutions in the United States. We examine ethnic representation within the elite as well as its impact on elite activities and interaction. The evidence reviewed here is quite consistent with the usual portrait of an ethnically exclusionary establishment but does indicate that ethnic stratification has an impact on entry into the elite.

BREIGER, Ronald L. (Harvard). *"The Social Class Structure of Occupational Mobility."*

This paper provides an analytical framework within which hypotheses of class structure are brought to bear directly in the formulation of models for the occupational mobility table. The proper aggregation of rows and columns is portrayed as the fundamental theoretical issue in mobility table analysis, rather than as an exogenous "given" to be decided upon prior to the construction of explicit models. Homogeneity of mobility within and between classes, class hierarchy, and tangible boundedness are the central themes. These themes are implemented in loglinear models, and applied in the analysis of large (seventeen-category) intergenerational mobility tables. Four such tables from the studies of Blau and Duncan (1967) and Featherman and Hauser (1978) are fitted acceptably. Seven falsifiable hypotheses about the social class structure of occupational mobility are identified and assessed comparatively within the new framework.

RYTINA, Steve (SUNY - Albany). *"Structural Constraints on Intergroup Contact: Size, Proportion and Intermarriage."*

Effects of size distributions, or proportions, on intergroup contacts are a central prediction of Blau's primitive theory of social structure. To assess this, three dichotomous social attributes (race, mother tongue, and high school completion) were used to construct intermarriage tables for 118 SMSAs. A strategy of repeated residualization based on an algebraic conception of Blau's theory reveals that sheer scale has no effect, that heterogeneity has fairly substantial impact, and that salience declines as the minority becomes smaller. Empirical tests of the axiom of in-choosing yields mostly supportive results with very small minorities providing the bulk of the exceptions. The total pattern of findings is substantially supportive of Blau's theory.

COOK, Karen S. (Washington). *"Network Structures from an Exchange Perspective."*

Exchange theory provides a framework within which many of the social processes of interest to network theorists can be formulated. This framework, however, is distinctive in several respects:

(1) It focuses upon "purposive action," assuming for example that ties or links between actors are established, maintained or broken primarily in terms of the "value" provided by that exchange relation (or set of relations) directly or indirectly.

(2) Exchange networks fundamentally represent the flow of resources within a social structure of "connected" exchange relations, and it is this flow of resources and its social structural consequences which are of basic interest.

(3) Since exchange networks represent the structure of resource dependencies among a set of actors, these networks can be viewed as power structures which are dynamic as a result of actors' attempts, through power-gaining and power-balancing mechanisms, to alter the network and thus re-distribute power.

Exchange theory provides useful theoretical grounding for networks in which the basic social processes of interest to the researcher can be represented as exchange processes of resource flows. And cross-fertilization between exchange theory, and social network "theory" and methods appears promising. It should be clear from this discussion, however, that exchange theory is but one possible source of "grounding" for a developing theory of social networks.

KADUSHIN, Charles (Graduate Center, CUNY). *"Long-term stress reactions: Some causes, consequences, and naturally occurring support systems"*.

Although Vietnam veterans are more stressed than others of their generation, and those Vietnam veterans who have seen heavier combat are more stressed than other Vietnam veterans, we have seen that a number of factors in their current life are associated with reduced levels of stress reaction. In terms of social factors, we have seen that a good relationship with one's wife is related to lower levels of stress reaction. Here we will show that social support from one's peers is also associated with reduced levels of stress reaction among veterans and is especially important in reducing stress reaction associated with combat.

ERICKSON, Bonnie H. (Toronto). *"Networks and attitudes: Theoretical implications of different network structure models for attitude similarity."*

This paper is concerned with networks of moderate size such as organizations or urban subcultures. Not so small as the small group nor the egocentric network, they permit us to study complex structural effects. Not so huge as the city or nation, they are feasible objects of study with current methodological and theoretical tools. Moreover, more ambitious future studies of macrostructures will have to incorporate intermediate-sized networks in order to explain the consequences of macro-structures for individuals. For example, class relations may generate a potential for political movements but the pattern of recruitment to such movements depends on the permeability and internal connectivity of more localized networks (Freeman 1973; Sheingold 1973). It is in localized networks, not whole societies, that people lead their lives and these networks are a vital intermediary between biography and history.

Network structure affects many things: diffusion of innovation (Coleman et al. 1961; Burt 1980b), flow of information (Erickson et al. 1978), access to resources (Granovetter 1973), patterns of conflict (Laumann and Marsden 1979), and emergence of new social structures such as secret societies (Erickson 1981), are only a few examples. The sheer existence of structural effects is not in dispute. The problematic question is: just what aspects of networks have just which effects? Here, I will develop working hypotheses relating structural features to just one consequent, attitude similarity. I have chosen attitudes because the existing literature, though incomplete, is relatively rich and the topic has wide-ranging importance in substantive theories.

GRANOVETTER, Mark (SUNY-Stony Brook). *"The strength of weak ties: A network theory revisited."*

My mandate here is to evaluate the "current empirical status of the 'weak ties' hypothesis." I will interpret this mandate broadly, and report not only on empirical studies directly testing the hypothesis of my 1973 paper, "The Strength of Weak Ties," (hereafter referred to as "SWT") but also on work which takes the basic argument and uses it to suggest interesting empirical work not discussed in my original formulation.


My review of the past seven years' literature on "weak ties" will follow the outline of the SWT argument. First, I will review work focussing on the impact of weak ties on individuals; then that relating to the flow of ideas and the sociology of science; finally, work evaluating the role of weak ties in producing cohesion in complex social systems.

In this account of empirical research inspired by or bearing on the argument of SWT, I show that the argument has, in fact, been useful in clarifying and explaining a variety of phenomena, ranging from effects of social relations on individuals, to the diffusion of ideas and innovations, to the integration of large-scale social systems.

LIN, Nan (SUNY-Albany). *"Social resources and instrumental action."*

I would like to sketch a theory explaining why certain goal-oriented actions are more successful than others. This theory covers only certain types of actions. First, it deals only with those actions which are taken to achieve a goal for the benefit of the individual who takes the action. This is the class of actions which are defined as instrumental in nature. Secondly, it only concerns those instrumental actions, which require the use of a personal contact. A contact becomes a requirement only when the searcher does not know the target person directly. Thus, the theory applies in an imperfect market where the diffusion of the information covers most of the real market situations.

The benefit of an individual in an instrumental action discussed here focuses on the resources valued by the members in the social system. Resources are defined as valued goods in a society, however consensually determined, the possession of which maintains and promotes an individual's self interest for survival and preservation. The resources may include both ascribed elements, such as sex and race, and acquired elements, such as prestige and authority. The values are normative judgment rendered on these goods. For most societies, they correspond to wealth, status and power. The theory focuses on those instrumental actions which are taken for the purpose of gaining valued resources.

WELLMAN, Barry (Toronto). *"The new East York study: strategy and tactics."* 

Generals often want to refight their last war; academics often want to redo their last study.

The reasons are the same in each case. The wear and tear of martial and scholarly campaigns have made both generals and academics aware of their mistakes in strategy, collecting materials, and analyzing situations. New concepts and tools have come along since the old campaign which would have made the job so much easier. Other writers, looking at the same events, now claim to know better. If only we were able to do it all over again!

It is with such thoughts in mind, both retrospective and prospective, that I want to look at where the network analytic study of community has come from and where it is likely to go. However, I propose to spend less time in refighting the past (in part, because I think it has been a famous victory) than in proposing strategy for the present and future. (You might call this paper my modest colonial contribution to the new American militarism.) I have three objectives in today's sally:

First, I want to position the exploits of those of us who have studied the community networks in the past fifteen years within the context of the overall development of the network analytic campaign. In so doing, I thus hope to set forth some of the underlying theoretical assumptions that have been important parts of this enterprise.

Second, I want to present our own new East York research into the community question. I am now actively living the generals' and scholars' dream; I am engaged in new data collection and analyses at my original battle site: the Borough of East York in Metropolitan Toronto. Hence I will spend the bulk of this paper talking about the theoretical assumptions in our current work, how we think it speaks to some of the limitations present in current network analytic work on community ties and support systems, and how we have gone about implementing our strategy in our actual East York research campaign. My main thrust will be that we are now advancing to use network analysis as a comprehensive structural approach to studying the Community Question, having already created a strong base by establishing the abundance and scope of personal community networks and by demonstrating the nifty utility of network analysis as a metaphor and method.

Third, I will present some of the first news from the front. As is the case with many generals, this will be more promises than performance, as we are just now gearing up for a full-scale analytic attack. Hence, I will present the fruits of our battle briefly and in passing.

MARSDEN, Peter V. (North Carolina-Chapel Hill). "Restricted Access in networks and models of power."

The idea that dependency is a source of an actor's power over others has been a central theme in the study of power over the last two decades. Beginning with Emerson's (1962) seminal paper on power-dependence relations, and Blau's (1964) related discussion of tactics for balancing dependency relations (and, hence, equalizing power relations), it has become commonplace to assert that power is less an attribute of an actor than of a relationship between actors. Thus, to speak of "the power of actor A" in an undifferentiated manner has been seen as misleading, in that one should specify the actors B, C, . . . that are dependent on A, and also should consider the reciprocal dependence of A on these actors in describing power relations.

In this paper I seek to develop a connection between Emerson's power-dependence framework and the model of power and collective decision-making developed by Coleman (1973; see also Coleman, 1977; Marsden and Laumann, 1977; Marsden, 1981). I am particularly concerned with integrating the idea, given by Emerson, that dependency is inversely related to the number of alternative relationships an actor may choose between in attempting to realize interests, into Coleman's model. I propose that one useful way in which to do this is to view differences between individuals in alternatives as the result of their positions within a network of exchange or access relationships. The fact that individuals may differ greatly in their centrality and accessibility to others in such networks is offered as a partial explanation for the fact that centrally positioned actors appear to possess a special prominence in most empirical studies of social networks.

In the following section of this paper I shall state some elementary foundations of the Emerson model of power relations and of Coleman's model of purposive action. I then develop a dynamic version of the latter model, as a preliminary to modifications of the model to take account of restricted access in networks. Effects of introducing the modification are illustrated using artificial data. In the final sections of the paper, I discuss unresolved issues raised by the modification introduced.

BURT, Ronald S. (California-Berkeley). "A note on corporate philanthropy."

Corporate philanthropy is described as a cooptive relation, akin to advertising, directed at persons as an economic sector. Using data on donations by American manufacturing firms, and holding price and income effects constant, those corporations most involved in philanthropy are found in industries most dependent on consumption by persons and providing their constituent firms the structural autonomy to be able to do something about eliminating uncertainty in the demand for their product. Moreover, the same market incentive determining corporate philanthropy is a significant determinant of corporate advertising expenditures; advertising being a more blatant type of self-interested relation from corporations to persons, a type of relation nicely complementing corporate philanthropic activities.

GALASKIEWICZ, Joseph (Minnesota). "Networks of resource allocation: Corporate contributions to nonprofit organizations."

In this paper I explore the different ways that resources are allocated in an economy of donative transfers. The paper is organized into three parts. In the first section I briefly describe the plight of nonprofit organizations and why they are so dependent upon donors for funds. In part two I explore in detail three alternative models of resource allocation. The most primitive is the patronage market. Nonprofits are the sellers, donors are the buyers, clients are the consumers, and the amount of the donation is the price. Alternatively, donors and donees can set up brokerages. They can identify intermediaries or brokers who aggregate funds from donors and distribute them, according to some community agenda, to donees. Thirdly, donors and donees can establish networks between and among themselves and use these to allocate resources. Each of these methods has its advantages and problems, and these will be discussed in detail.

The final section of the paper develops theoretical statements that will try to explain why one method or another might be more or less appropriate in a given population or organizations. I will hypothesize that in smaller, more heterogeneous donee populations, networks or brokerages will be adopted whereas markets will fail. I will also hypothesize that if the donor community is marked by status competition, markets or networks will be preferred and brokerages will fail. Finally, I will hypothesize that in populations of donors and donees which can sustain fewer relationships and relationships tend to be long term, markets or brokerages will be selected and networks will fail. In other words, I expect that structural characteristics of the donor and donee populations will greatly influence the method by which resources are allocated in the system.

Selected Abstracts from the Forty-first Annual Meeting, SOCIETY FOR APPLIED ANTHROPOLOGY, Edinburgh, April 12-17, 1981.

KUO, Wen H. (Utah). "Social networks of Asian-American communities."

Social support networks serve minorities in many ways. Using Asian-American communities as an example, this paper discusses the changes in the patterns of social networks across generations, as well as intergroup differences. The focus is on the nature of the paths of expansion from strong co-ethnic ties to the ties with the larger dominant society through weak linkages. The paper concludes with suggestions for future research in this area.

SOKOLOVSKY, Jay (Maryland) and COHEN, Carl (NYU Medical Centre). *"Social networks as intervention strategy: a test in the inner city."*

In the field of applied social sciences perhaps no construct, during the 1970s, has received more attention than that of social networks of social support systems. With the corresponding reordering of public systems of care from centralized, large-scale "total institutions" to decentralized small-scale "community-care" centers a search has begun for means of dealing with the needs of delinquents, drug addicts, the mentally ill and indigent elderly in these new settings. The attempt to not only maintain these troubled segments of our population "in the community" but also to humanely deal with their problems has led to an examination of "natural" systems of support that could enhance or become part of a helping or therapeutic environment. However, the literature on the applied use of network analysis has too often been largely anecdotal.

This study attempts to systematically evaluate an experimental program in a mid-Manhattan residential hotel where network intervention strategies were employed to deal with clients' problems. Although certain problem areas--sustenance, information, housing--were most amenable to network approaches the overall low rate of success indicates that the optimism generally surrounding the use of networks as a service technique must be re-evaluated.

SCHEPER-HUGHES, Nancy (North Carolina). *"Stranger or friend / dilemmas in deinstitutionalization: A view from the inner city."*

This paper explores the "repatriation" experiences of a cohort of thirty chronic psychiatric patients released from a State Hospital within the past five years and returned to a defensively tough, white "ethnic" working class community in Massachusetts. It will discuss these patients' adaptive strategies with regard to living arrangements, work, recreation, medication and treatment; their attempts at locating family, friends, and community benefactors; their competition for space and resources with other community "deviants" (alcoholics, the mentally retarded, tramps, and adolescent gangs); and their efforts at modifying symptoms and concealing disturbing behaviours in order to neutralize their presence in the community and avoid further confinement. In addition, this paper explores the dilemmas posed to a community somewhat notorious for its rejection of "outsiders" while, at the same time, proud of its ability to look after its "own."

MAYER, Leticia and Larissa LOMNITZ (National, Mexico). *"Power networks: Access to the Mexican bureaucracy."*

The National University of Mexico (UNAM) plays an important role in recruiting and training Mexico's political leaders and scientists. It is of interest to us to describe the recruitment, training and employment process from the university through career placement in the public or private sectors. As such it is tied to the public and private sectors; people are recruited, trained and employed in one of the sectors. We propose a micro-model of personal relations that describes the process of recruitment and training for the public sector within the university based on Richard Adams' work on power relations.

HENDERSON, Neil J. (East Central Oklahoma State). *"Preserving personal resource networks in rural nursing homes: Kinship and policy."*

In a thirteen-month anthropological study of a ninety-bed proprietary rural nursing home in southern Oklahoma, significant numbers of patients and staff were found to be kin. Pecan Grove Manor (pseudonym) nursing home draws both its employees and patients from the town (2,500 population) and nearby vicinity resulting in an institution of acquaintances and, moreover, kinsmen. While personal resource networks developed in the community do persist within the nursing home environment, the personal relationships are stunted due to a lack of any procedure for incorporating the new patient into the institutional setting. Current policy emphasizes a series of rites of individual dismissal (e.g., leaving the community in the first place, holiday and birthday parties which to patients signify individual vulnerability, attendance at funerals of friends and relatives). Alternatively, were there rites of incorporation for the patient, the nursing home experience would reflect basic and familiar interactions. Policy change emphasizing incorporation of patients into the nursing home could revitalize the kinship/friendship resource networks, thus community within the nursing home, resulting in an improved sense of continuity and well-being for the patients and the care-takers at little or no cost to the proprietor.

HALL, David S. and E. BOSANAE (West Virginia). *"Developing a referral mechanism for rural primary care centers."*

How the medical behavioral scientist's perspectives and research findings may be "meaningfully applied" by health professionals remains an important question. This paper reports upon how selected findings from a "basic research project" were translated into the development, testing, and acceptance of a mechanism for facilitating referrals from primary care centers to secondary and tertiary care providers. Three behavioral scientists conducted a broad-based study of four new rural clinics and the community surrounding each facility. Among the several types of "behaviors" studied were those relating to referrals. Clearly, a prerequisite for effective health care by relatively isolated rural primary care providers is linkage with secondary and tertiary services. Referrals and consultations are crucial vehicles for integrating and coordinating these levels of care, and information exchange and recording is an essential ingredient in the referral process.

DELANY, John J. and Raymond T. BRADLEY (Minnesota). *"Social networks: Attacking issues of dynamics."*

The paper by a group in the University of Minnesota summarizes a growing family of models for understanding dynamic properties of social networks. One central premise of our work is that the wide body of research on mostly architectural descriptions of social structure (e.g., models of kinship systems and the still proliferating models of informal group structure) has generated a large pool of pressing questions. These pertain to the emergence of group structure, changes in group structure over time, and the role of social networks for achieving efficient allocations of scarce economic resources. Thus, a primary goal of our work is the contribution of a collection of stochastic and deterministic dynamic network models which breaks away from the predominantly static conceptions of social structure. Within this effort, it is also our intention to suggest how the extraordinarily diverse and sometimes disparate history of network research may be meaningfully synthesized in a more dynamic framework.

FLAP, Hendrik Derk (State University, Utrecht). *"Effects of weak and strong ties between cliques on the diffusion of innovation."*

Several social scientists have shown the existence of effects of social networks on behaviour. The paper begins with a description of a few of these network effects (more specifically the effect of weak ties on the diffusion of innovation, the effect of criss-crossing ties on the peacefulness of social relations and the effect of density on social restraint). It then attempts to explain the occurrence of these effects by applying general behavioural theories like rational choice theory and balance theory. In applying these theories an attempt is made to specify the conditions under which the empirical generalizations concerning network effects will hold. The intent is to link the work of the network tradition with that of an institutional-individualistic tradition of the kind applied in, for instance, the economic theory of politics.

KLOVDAHL, Alden S. (Australian National University). *"Social support and social networks: the design of a research project."*

The concept of a social network is potentially useful for answering a wide range of questions about the availability of social resources in the cities, but there have been few studies of social--in contrast to personal--networks in urban areas because of the perceived insurmountable difficulties. The present paper discusses an attempt to study social networks in relation to social resources (and urban planning) in one city, using a random walk sampling design, and briefly describes the outcome of this effort. It suggests that routine research on large-scale urban social networks is within reach.

SEIDMAN, Stephen B. (George Mason University) and Brian L. FOSTER (Arizona State). *"A formal unification of anthropological kinship and social network methods."*

This paper integrates an approach to social networks developed with both anthropological kinship theory and cognitive anthropological decision theory. It outlines a potentially fruitful network approach to the study of non-dyadic relationships. Although anthropologists have long recognized the importance of non-dyadic relationships (e.g. membership in action sets), they have generally restricted their attention to the internal structure of one or more action sets. The methods proposed in this paper allow the study of the structure arising from the pattern of overlap among action sets.

TEPPERMAN, Lorne (Toronto). *"The natural disruption of dynasties."*

This paper builds on earlier published work on the fall of dynasties from prominence. The original work examined prominent families in Ontario and described process of "revolutionary" or "natural" disruption. This paper examines the question, "What factors enable families to retain their wealth and power?" The data used are historical and comparative including anthropological accounts of lineage, clan, and dynasty. The author contends that understanding dynasty persistence demands an understanding of extended family networks.

FEIL, Margaret (Centre for West African Studies, Birmingham). *"African urban networks: a comparison of men and women."*

This paper examines the relationships between marriage, employment and friendship networks, comparing men and women in six towns in Nigeria and The Gambia. The data, based on interviews of about 200 people in each town, show high levels of sociability among urban residents. However, structural factors ensure that women have a somewhat narrower range of contact than men. Social background is a better predictor of the resources used to handle problems than of the range of social networks or, especially, the number of close friends.

When various aspects of their social position are taken into account, the sociability of men and women is quite similar. Thus, the narrower networks of women are largely due to societal expectations which limit their contacts and resources; lower the education they receive; their access to wage employment and income; delay their migration to town; and promote their withdrawal from the labour force at least temporarily, at marriage. While women's contacts are broadened by participation in the labour force, more fundamental change of values is necessary if they are to become more nearly equal to men in social opportunities and resources.

PEDERSEN, D. (*Programa de Antropología para el Ecuador*). "Non-formal health systems."

This paper is based on research in traditional medicine carried out over a two-year period in four village study areas (black, Indian and mestizo populations) in northern Ecuador, South America. The aims of the study were to determine in representative population samples the retrospective morbidity and mortality experience and health-seeking behaviour, as perceived and defined by selected individuals in the communities under study; to measure the extent to which the formal (institutional) and non-formal health systems provide services and are utilized in relation to the needs of the mother-infant group; and finally, to identify the main structural and operational characteristics of the non-formal health systems. The paper presents the findings related to the scope and content of community participation in identifying, interpreting and managing health and disease, with a view towards analysing the relationships of the community with the conventional, modern health services and the non-formal health systems.

BERKANOVIC, Emil (*California-Los Angeles*). "Social networks, beliefs and the decision to seek medical care: Analyses of congruent and incongruent patterns."

The present paper reports a series of analyses undertaken in an effort to understand the factors that lead to behaviour that is either congruent or incongruent with the predictions one would make based on social networks and beliefs. Accordingly, four types of net-belief patterns have been identified. Within each, step-wise discriminant function analyses have been undertaken in order to identify the variables at four different levels of analysis that differentiate the symptomatic who seek medical attention from those who do not. Although the analyses are incomplete, there are several tentative conclusions that might be drawn at the present time. First, where both network influences and beliefs are congruent (either for or against seeking medical care), the individuals whose behaviour is incongruent with these variables are different depending on the direction of the incongruence. Second, in those instances in which network influences and beliefs are incongruent, individuals who conform to the network influences are different from individuals who conform to their own beliefs. Third, where network influences and beliefs are incongruent, personal beliefs appear to be stronger predictors of behaviour than network influences.

FINLAYSON, Angela (*Kingsbarns, St. Andrew*). "Supplementing social networks and professional services by self-help groups." *Ur*

People facing health problems/crises/life events/chronic difficulties frequently require information about possible solutions/adaptations as well as support in maintaining existing roles and self-esteem and/or finding new roles and new sources of self-esteem. Such information and support may come from professional services and/or the person's own social network. The latter may be deficient in providing relevant information/support at any given time. Professional services may be deficient in their appreciation of the importance of working with social networks. Evidence found in author's study of post-coronary rehabilitation showed person's loss of self-esteem and/or difficulty in finding new roles especially when social network members and/or professional services consciously or unconsciously collude in the process. Author's more recent experience in tutoring professional workers from different disciplines (nurses, social workers, remedial therapists, rehabilitation officers etc.) working with disabled/handicapped people confirms prevalence of such collusion. The potential of selfhelp groups, which can compensate for weaknesses in social networks and shortages in professional services by introducing 'Supplementary Significant Others' is considered; as is also the threat which they may be seen as presenting to existing social networks and to professional services. It is suggested that social researchers, understandably chary of accepting definitions of problems promulgated by professional services might find problems identified by self-help groups more useful for study.

McADOO, Harriette Pipes (*Howard University, Washington*). "Role of the extended family support network in the maintenance of stability and mobility of single and married black mothers." *Ur*

One of the strongest Black cultural patterns is that of extensive help systems. The family's effective environment is composed of a network of relatives, friends and neighbours. The social network acts to provide emotional support, economic supplements, and most importantly, to protect the family's integrity from assault by external forces. One of the segments within the Black community that has benefited the most has been the single-parent Black family in which the mother is the only parent present in the home. One purpose of this study was to explore the operation of the Black extended family within the present-day context. We explored the differential involvement and support given to Black mothers who are single parents and who have husbands. We also were concerned with the utilization of community support systems when family needs exhaust the family resources.

SAAL, Cornelius Dirk (Rijksuniversiteit, Groningen). "Related concepts in family sociology."

This paper relates the concepts "open" and "closed" family--a concept developed as early as 1950--to Elizabeth Bott's concept of "close-knit" and "loose-knit" social network. Substantial consideration is given to the implications for the socialization process of the child born and raised in an open family in a close-knit social network or in a closed family in a loose-knit social network.

FAVAZZA, A., J. THOMPSON and M. OMAN (Missouri). "Social networks of alcoholics."

This paper considers the networks of about 50 adult alcoholics. We have expanded Pattison's Psychosocial Kinship Inventory to include interpersonal reciprocity, I.E., in addition to interviewing patients we have interviewed the significant members of their networks to discover their perceptions of the quality and nature of their interactions with the patient. We have quantified the interactional data by developing a unique tool for measurement. By using this as well as sociodemographic attitudinal data we are able to provide information on types of alcoholic networks, on the functional processes of these networks and their similarity to neurotic networks. Through follow-up interviews we also report on changes in the alcoholic's health status over a 12-month period as well as changes in the composition and nature of the network.

HURD, G. S. (Georgia). "Evaluation of structural and interactional social network variables: Alcoholism, marriage and divorce."

Using the social model of the alcoholic marriage, the author examines methods for the simultaneous evaluation of structural and interactional social network variables. The various methods are contrasted for the prediction of social support satisfaction, symptom severity and marital outcomes.

Experimentally, the recording of network data ranges from asking informants to provide lists of their significant social contacts to electronically monitoring the interactions of some a priori group. Analytically, the treatment of network data has varied according to the research goals of the investigators. Rarely has there been an explicit recognition that network data contains two groups of variables, structural and interactional variables.

While the interactional group of variables have historically received greater attention than structural variables, they have proven to be difficult to treat on an empirical level. This may be seen as from the generally poor predictive power of social satisfaction and life events stress assessments in studies of psychiatric illness. Structural network variables such as size, relationship composition and centrality are more readily treated empirically but have rarely been utilized with interactional variables in the study of psychopathology.

O'CONNOR, B. (Rutgers). "The relationship between social network, psychological state, and coping strategies in geographically mobile corporate wives."

Recently there has been a growing awareness that the frequent relocation of corporation employees and their families may generate a number of problems, particularly for the wife. One of the problems seems to stem from the repeated breaking-down and rebuilding of her social network, which in turn affects her psychological state. For this study, a combination of three different methods are being used in order to analyze the nature of the relationship between moving, psychological state, and coping strategies. First, a series of questionnaires is administered to each subject which requests information on occupational and mobility experience, avowed satisfaction and happiness, symptoms of psychopathology, and alcohol/drug use and experience. Second, each subject rates the members of her social network to indicate her intensity of involvement with them. Third, the subject is interviewed to determine her strategies for adapting to the new location. A comparison is made among subgroups of the women based on the number of times they have moved and their length of residence in the new location.

CLECKNER-MORNINGSTAR, Patricia (Miami). "The role of network analysis in an interdisciplinary study."

Anthropological and sociological techniques were used to study 200 cocaine users in Miami. Primary star networks were collected for a subsample of 40 users. They were asked to draw a chart, of all relationships activated weekly or more frequently, using geometrical shapes and lines to indicate individuals and relationships. Demographic and cocaine use data were collected for each network member. This design permits testing of validity of results not only by criteria commonly applied within methods, but also by comparison of results across methods. Questions regarding appropriateness of translation of results from one method to another are addressed, as well as the strengths and weaknesses of network analysis in this context.

STUG, David (Rutgers). *"Social network analysis: Implications for alcoholism rehabilitation."*

Social network analysis has not been systematically utilized by researchers interested in the aetiology of alcoholism and its treatment although the influence of significant others on the drinking behaviour of problem drinkers and whether or not problem drinkers seek rehabilitation is apparent. Attachment of problem drinkers to large, dense social networks composed of some confidants (intimate friends) appears favourable to problem drinkers coming into contact with the formal rehabilitation system while attachment of problem drinkers to small, diffuse social networks lacking in confidants appears unfavourable. Implications of this network analysis for alcoholism rehabilitation are outlined.

NISHIO, H. K. (Toronto). *"An application of network analysis for the study of social adaptation of Asian immigrants in Canada."*

After a methodological and theoretical critique of studies of social adaptation among the Asian immigrants North America, the use of social network analysis to develop ideal adaptation typologies for Chinese, Japanese, Koreans and appropriate for a comparative analysis. The forms and types of "social linkages" reveal distinct cultural orientations, socio-economic needs and ways of responding to the "opportunity structure." Social linkages also describe the modes and mechanisms of self-preservation and self-perpetuation. We shall discuss a number of hypotheses and propositions about social adaptation in the next generation.

REEDER, S. J. (California-Los Angeles). *"Social networks and the use of health services: A longitudinal analysis from the Los Angeles Health Survey."*

This paper presents an analysis of longitudinal data regarding the influence of an individual's social networks on their utilization of health services. The data derive from a one-year panel study (1976-1977) of adult households conducted as part of the Los Angeles Health Survey. Twelve hundred adult respondents were selected by means of a three-stage random probability sample of Los Angeles County. They were interviewed regarding a variety of health-related matters.

In this analysis, we examine three hypotheses: 1) greater involvement with one's social networks will be associated with lower use of health services; 2) family networks will be more inhibiting to the use of health services than friend networks; and 3) network advice to see a physician will be associated with greater use of health services.

WARHEIT, George (Florida). *"Family and social network patterns among four different racial and ethnic groups."*

Black sociologists in the U.S. argue that the "community" serves as a surrogate family. The purpose of this paper is two-fold: First, it will analyze, describe, and compare the structure and functions of family networks (both conjugal and extended) among four different racial and ethnic populations (white native-born Americans; Blacks; Mexican-Americans; and Guamians); second, to analyze, describe, and compare the structure and function of social networks between the same four groups. Data were obtained from field surveys in 24 counties in the U.S. Data are presented in two ways: within group descriptions and comparisons and between group descriptions and comparisons.

Selected Abstracts from the Annual Meeting, ASSOCIATION OF AMERICAN GEOGRAPHERS, Los Angeles, April, 1981.

HUFF, James O. (Illinois). *"Patterns of residential search."*

As a household searches for a new residence, a sequence of vacant dwellings is visited or seen. Each dwelling has a location and the set of locations corresponding to the set of vacancies seen constitutes a search pattern which may be represented as a point map. Each of the models discussed in this paper is designed to generate a search pattern. The generating rules are the assumptions concerning the nature of the search process occurring within a spatially dispersed set of vacancies. The resulting patterns are summarized and compared in terms of measurements taken on salient or important characteristics of the point map. Observed search behavior in the San Fernando Valley of Los Angeles serves as the empirical basis for discriminating between competing models.

CHRISTOPHERSON, Susan (California - Berkeley). *"Female labor force participation and urban structure."*

As Juarez, Mexico has become industrialized during the past fifteen years, particular areas of the city have become dominated by households composed of women and children. Based on the characteristics of the labor force employed in the major industrial activity, electronics assembly, it can be hypothesized that the evolving socio-spatial form of the city reflects a type of industrial economy. This study will articulate how industrial activities which utilize highly segmented production processes and a specific labor force affect the composition of worker households and, more generally, the social and physical structure of the city.

SHEPPARD, Eric (Minnesota). *"Regional production and development under capitalism."*

Drawing on recent attempts to analytically model the relations of production as represented in Marx's transformation problem, there exist possibilities for extending this analysis to a multi-regional economy. The results allow comparison with other (Sraffian) production-oriented models of capitalist economies. In a dynamic context, the general equilibrium implications of these models are untenable since uneven development is precluded. However, by introducing social and behavioral relations, a theory of population, and inter-regional interactions, then links between the myriad causes of uneven development can be identified. The importance of this last factor in generating inequalities is of particular interest.

CONWAY, Dennis (Indiana). *"Rural movers and stayers in Nepal: what they move to and what they stay for."*

In recent decades there has been an increase in permanent rural-to-rural migration to land colonization areas in the Tarai. Conventional notions relate this "new" process of redistribution to population pressures in the hill source areas and to the availability of land in the malaria-free Tarai. Overlooked are the structural and behavioral constraints which persist in Nepal's rural economy. Using micro-level data at the household level, sub-groups of movers and stayers are identified and an analysis is conducted in which structural and behavioral dimensions of the decision to move or stay are highlighted.

CROWLEY, William K. (Sonoma State). *"The other Palestinians: The merchant class of Honduras."*

Palestinians began coming to Honduras nearly a century ago. Starting out as ambulant tinkers, they quickly amassed sufficient profits to open stores in the main trade centers of Honduras' banana producing areas, and in the capital city of Tegucigalpa. By 1930 Palestinians were a dominant force in Honduran merchandizing. In response, the national government began to pass restrictive immigration laws. Despite such impediments Palestinians continued to enter the country and to increase their economic power. As manufacturing grew in Honduras, particularly after 1960, Palestinians, and those of Palestinian descent, became a major force in factory ownership. The Palestinians have particularly concentrated their economic might in San Pedro Sula, the leading industrial center of the country.

CLIFF, A. D. (Cambridge), and P. HAGGETT (Bristol). *"Historical changes in the diffusion velocity of epidemic waves in island communities."*


Study of major epidemics of infectious diseases for the island of Iceland between 1916 and 1974 showed a convergence in epidemic wave velocity between urban and rural areas. Most of the parameters used to measure epidemic velocity showed an apparent slowdown over the 60-year period of wave transmission within the urban area and a relative acceleration of wave speeds in rural areas. Evidence suggests improved communication may lead to a speeding up of virus transmission at one geographical scale, while effective public health measures lead to a slowdown of transmission at another scale.

GHOSH, Avijit (N.Y.U.) *"Spatial organization of itinerant traders."*

Many services are provided by itinerant traders who visit a number of places at periodic intervals. The paper presents a dynamic location model to determine the optimal itinerary of such traders. A simulation procedure is used to study the spatio-temporal organization of multiple traders under different environmental conditions. Results show: (1) the similarity of locational arrangements resulting from both cooperative and competitive strategies; (2) the existence of free-entry equilibrium where the existing firm earns pure profits and yet a new firm is assured of a loss; and (3) the possibility of side and rental payments in agglomeration decisions.

ROSE, Damaris (West Virginia). *"Primitive accumulation in modern America: the central Appalachian Case."*

It has recently been suggested that the 'marginal' Appalachian mountain farm was an outgrowth of industrialization in the region rather than a lingering relic of a 'backward' society. This paper is concerned with small-scale farming by coalminers in Central Appalachia up to the 1930s. This activity, and its economic and political implications, will be investigated in relation to both worker aspirations and company policies. These historical questions lie within the theoretical context of forces eroding people's independence from capital and the impact of worker struggles on the routes travelled by capitalist development. The specific interplay of these processes in central Appalachia created new relationships between wage-labour in the mine and unwaged work in the field.

SMITH, Rebecca (Minnesota). "The urban neighborhood: Geographical contributions." 

The neighborhood is a subregion of the larger urban environment. Unlike the related concept of "community," neighborhood is placebound. It is a geographical entity par excellence. Recent interests in such disparate topics as place perception, historic preservation, and community development have given the neighborhood a pervasive presence in a wide range of research efforts. Yet geography has contributed less than other disciplines to the definition and study of the neighborhood. This paper critiques the contribution geographers have made to neighborhood research and outlines possible modes in which the geographical nature of the neighborhood concept can be explored and developed.

ALLEN, Michael Patrick (Washington State). 1980. "Power and Privilege in the Large Corporation: Corporate Control and Managerial Compensation." *American Journal of Sociology* 86 (5): 1112-23.

The research presented here investigates the relative utility of a power theory versus a functional theory of organizational stratification as they pertain to managerial compensation in the large corporation. Concretely, it examines the effects of different types and levels of corporate control, adjusted for the effects of corporate size and performance, on three dimensions of compensation among 218 industrial corporations during 1975 and 1976. In order to assess the power of the chief executive officer in relation to other directors, the analysis employs a hierarchy of control configurations based on the distribution of stock ownership among the members of the board of directors. In general, the results confirm the hypothesis that the remuneration received by a chief executive officer is directly related to his power within the corporation. A major exception to this pattern involves chief executive officers who are also principal stockholders in their corporations and receive dividend income from their stock.

BERKMAN, Lisa F. (Yale) and S. Leonard SYME (California-Berkeley). 1979. "Social Networks, Host Resistance, and Mortality: A Nine-Year Follow-up Study of Alameda County Residents." *American Journal of Epidemiology* 109 (2): 186-88.

The relationship between social and community ties and mortality was assessed using the 1965 Human Population Laboratory survey of a random sample of 6928 adults in Alameda County, California and a subsequent nine-year mortality follow-up. The findings show that people who lacked social and community ties were more likely to die in the follow-up period than those with more extensive contacts. The age-adjusted relative risks for those most isolated when compared to those with the most social contacts were 2.3 for men and 2.8 for women. The association between social ties and mortality was found to be independent of self-reported physical health status at the time of the 1965 survey, year of death, socioeconomic status, and health practices such as smoking, alcoholic beverage consumption, obesity, physical activity, and utilization of preventive health services as well as a cumulative index of health practices.

CAULKINS, Douglas (Grimell). 1980. "Community, Subculture and Organizational Networks in Western Norway." Paper presented to the First World Congress of IVAR/VOIR. Brussels. June.

The purpose of this paper is to describe several models of community social structure, to trace their implications for interorganizational networks formed by overlapping leadership, and to test hypotheses derived from each of these models using data from a survey of 80 formal voluntary organizations in a small coastal town in Western Norway. An examination of this interorganizational network will reveal important areas of cohesion and lines of division in the community.

CHASE, Ivan D. (SUNY-Stony Brook). 1980. "Social Process and Hierarchy Formation in Small Groups: A Comparative Perspective." *American Sociological Review* 45 (December): 905-924.

The author investigates the theory, methods, and findings of animal behaviorists and social scientists studying dominance hierarchies in small groups. In both disciplines: (1) the literature argues that the explanations of hierarchy structure are based upon differences in individual characteristics among group members; (2) although critical examination reveals that these explanations require stringent conditions to account for commonly occurring kinds of hierarchies in humans and animals, the available data indicate such conditions are not met; and (3) the hierarchy-formation process has not been adequately studied. In an attempt to alleviate the current problems in hierarchy research, I present the results of a particular animal study and develop a general explanation as to how hierarchy structures arise. This approach applies to both humans and animals and serves as a model of how the cumulative patterns of interactions among individuals produce group social structure.

CLOGG, Clifford C. (Pennsylvania State). 1981. "Latent Structure Models of Mobility." *American Journal of Sociology* 86 (4): 836-88.

This paper proposes several latent structure models for the analysis of mobility tables and examines the relationship of these to some earlier mobility models (e.g., the "perfect" and the "quasi-perfect" mobility

models). Data from the classic Danis (5 x 5) and British (5 x 5 and 8 x 8) mobility tables are used to illustrate the utility of these methods in comparative analysis. A model designated as a quasi-latent structure is suggested as a plausible rendering of the structure of mobility for each set of data, and this model is used to derive various kinds of substantive inferences.

COHEN, Jere (Maryland-Baltimore County). 1980. "Rational Capitalism in Renaissance Italy." *American Journal of Sociology* 85(6):1340-55.

Although Max Weber believed that rational capitalism developed initially and primarily under Protestantism, it was born and developed extensively in pre-Reformation Italy. Protestant Europe borrowed its rational business techniques from Italy, then later made its own contribution. Thus, capitalist rationality advanced under both Roman Catholicism and Protestantism, and the religious factor had little effect on its early development.

COLLINS, Randall (Virginia). 1981. "On the Microfoundations of Macrosociology." *American Journal of Sociology* 86 (5): 984-1014.

Detailed microsociological studies of everyday life activity raise the challenge of making macrosociological concepts fully empirical by translating them into aggregates of micro-events. Micro-evidence and theoretical critiques indicate that human cognitive capacity is limited. Hence actors facing complex contingencies rely largely upon tacit assumptions and routine. The routines of physical property and organizational authority are upheld by actors' tacit monitoring of social coalitions. Individuals continuously negotiate such coalitions in chains of interaction rituals in which conversations create symbols of group membership. Every encounter is a marketplace in which individuals tacitly match conversational and emotional resources acquired from previous encounters. Individuals are motivated to move toward those ritual encounters in which their micro-resources pay the greatest emotional returns until they reach personal equilibrium points at which their emotional returns stabilize or decline. Large-scale changes in social structure are produced by aggregate changes in the three types of microresources: increases in generalized culture due to new communications media or specialized culture-producing activities; new "technologies" of emotional production; and new particularized cultures (individual reputations) due to dramatic, usually conflictual, events. A method of macrosampling the distribution of microresources is proposed.

CRENSON, Matthew A. 1978. "Social Networks and Political Processes in Urban Neighborhoods." *American Journal of Political Science* 22 (August): 578-594.

Crenson presents a study of working class neighborhoods in Baltimore exploring the relationship between friendship and social interaction patterns and the operation and internal politics of community organizations.

D'ABBS, Peter (Western Australian Institute of Technology). 1980. "Forms of Co-operation in Social Networks." Paper presented to the Sociology section, Jubilee ANZAAS Congress, Adelaide, May 12-16.

In this paper I wish to present some initial findings from a study, still underway, of patterns of informal co-operation among residents of an inner suburb of Melbourne. The research is concerned with the ways in which, and the processes by which, a person's position in society affects his/her capacity to provide and receive resources informally. I shall argue that two ideal-typical patterns of informal co-operation, or co-operative styles, can be identified, each with a male and female variant. In the first, which I shall call a diversified co-operative style, informal day-to-day co-operation takes place through a diversified network of 'middle-level' relationships, that is, relationships with people who are more than acquaintances but less than close friends. The co-operative interaction which occurs in these relationships tends to be governed by fairly clearly specified mutual obligations. Emotional support, when required, tends to be sought, not through these middle-level relationships, but from others. In the second, or concentrated co-operative style, a person relies on a small number of supportive relationships for a wide variety of needs, such as help on day-to-day practical issues, information, emotional support and companionship. The people involved usually consist of one or two close friends of the person concerned, plus sometimes some kin; mutual obligations in these relationships are relatively unspecified.

I shall further argue that each of these two styles can best be explained as a response to distinct types of subjectively-perceived needs, and that these needs can in turn be related to social position.

DANNHAEUSER, Robert. 1980. "The Role of the Neighborhood Store in Developing Economies: The Case of Dagupan City, Philippines." *Journal of Developing Affairs* 14 (2).

In an article which is intended as a contribution to larger theories of economic and social development, Dannhaeuser explores the role of neighborhood businesses in developing nations' efforts to achieve economic integration. From a case study, he concludes that local retail institutions do serve a vital function in linking the general populace to "the upper economic circuit" in bifurcated economies like the Philippines.

EKELUND, Robert B. (Auburn) and Robert D. TOLLISON (Virginia Polytechnic). 1980. "Mercantilist Origins of the Corporation." *Bell Journal of Economics* 11 (Autumn).

In this paper we present a new hypothesis about why the corporation was invented. The traditional argument stresses the importance of limited liability in the emergence of the corporate form. In contrast we stress the advantages that transferable shares hold for cartel owner-managers in the early companies.

EVANS, Ron L. (VA. Medical Center, Seattle) and Lawrence K. Northwood (Washington). 1979. "The Utility of Natural Help Relationships." *Social Science and Medicine* 13A: 789-95.

This article explores research pertinent to network analysis and substantiates its use as a necessary method of medical sociology. The concept of social support reflects a type of influence or resource derived from network relationships. Other aspects of social support are seen as critical to the functioning and adaptation of the individual especially in times of crisis when supportive relationships can mediate the effects of stress. A theory of mutual aid investment is proposed based on sociomatrix analysis.

We also examine the relationship between the availability and nature of particular social support networks and willingness and capability of the individual to make use of them. This approach bears on the now unsatisfactory connection between studies of ordinary human relationships in the community and the literature studying relationships involving health care specialists. The function of mutual aid among neighbors varies by type of crisis, age, structure of the mutual aid chain, and as a product of neighborhood characteristics.

FELD, Scott L. (SUNY-Stony Brook). 1981. "The Focused Organization of Social Ties." *American Journal of Sociology* 86 (5): 1015-35.

Sociologists since Simmel have been interested in social circles as essential features of friendship networks. Although network analysis has been increasingly used to uncover patterns among social relationships, theoretical explanations of these patterns have been inadequate. This paper presents a theory of the social organization of friendship ties. The approach is based upon Homans's concepts of activities, interactions, and sentiments and upon the concept of extra-network foci organizing social activities and interaction. The theory is contrasted with Heider's balance theory. Implications for transitivity, network bridges, and density of personal networks are discussed and presented as propositions. The focus theory is shown to help explain patterns of friendships in the 1965-66 Detroit Area Study. This paper is intended as a step toward the development of integrated theory to explain interrelationships between networks and other aspects of social structure. Implications for data analysis are discussed.

FOMBRUN, Charles J. (Pennsylvania). n.d. "Strategies for Network Research in Organizations." Unpublished paper.

This paper describes three sets of strategies for the analysis of transactional networks, with an emphasis on their application to both intra-organizational and inter-organizational research. The author contrasts the three strategies by discussing the strengths and weaknesses of each, discusses some of the tradeoffs in choosing analytic algorithms, and goes on to suggest how organizational research might benefit from an application of these network strategies.

FRANK, Ove (Lunds). Two papers. 1980. "On Random Planar Graphs," unpublished paper, and "A Survey of Statistical Methods for Graph Analysis," unpublished paper.

1. Let the vertices and edges of a planar graph G be randomly deleted, and let \bar{G} be the subgraph consisting of the edges which remain between the remaining vertices. We investigate the random planar graph \bar{G} and find bounds for the expected values and some of the variances of its number of vertices, edges, faces, triangles and components. An application is given to a statistical estimation problem for a plane map.
2. This survey gives a unified presentation of some results in statistical graph theory. The emphasis is on inference from sampled subgraphs of various kinds and on models for randomly deformed graphs and digraphs which can be used for investigating empirical structures.

GABARINO, James and Deborah SHERMAN. 1980. "High-Risk Neighborhoods and High-Risk Families: The Human Ecology of Child Maltreatment." *Child Development* 51 (1): 188-198.

The authors test a hypothesis that the risk of child abuse and neglect is an indicator of the "social impoverishment" of a neighborhood in two neighborhoods that are highly similar economically and racially. They collected data from a survey of residents and interviews with key informants about family life in the two communities. They conclude that in the high-risk neighborhood, community conditions aggravated rather than ameliorated family situations that lead to child maltreatment. Strong social support networks in the low-risk neighborhood had the opposite effect.

GERBER, Linda M. (Guelph). 1979. "The Development of Canadian Indian Communities: A Two-Dimensional Typology Reflecting Strategies of Adaptation to the Modern World." *Canadian Review of Sociology and Anthropology* 16 (4): 404-21.

Canada's Indian reserves are usually considered to be pockets of rural poverty; existing differences, in degree and type of adaptation to modern conditions are generally ignored. Measures of institutional completeness and personal resource development suggested here reveal substantial developmental variation among Indian bands and provide the basis for a two-dimensional typology of reserve communities. Inert, pluralistic, integrative, and municipal bands are shown to vary significantly on a wide range of community characteristics and to cluster geographically. Comparative analysis of more than five hundred bands suggests that it is highly misleading to stereotype Indian communities.

GRANDJEAN, Burke D. (Virginia). 1981. "History and Career in a Bureaucratic Labor Market." American Journal of Sociology 86 (5): 1059-92.

This paper presents a synthesis of theoretical statements on the determinants of socioeconomic achievement within bureaucratic (internal) labor markets and an empirical examination of the resultant predictions. The study focuses on careers in the U.S. civil service from 1963 to 1977, using official personnel records on a 1% sample of white-collar federal employees, along with secondary survey data. The career is viewed as an outcome not only of individual attributes but also of both organizational and historical contexts. The empirical strategy used to disentangle the individual, organizational, and historical effects is cohort analysis. Five successive entering cohorts are differentiated, and for each a model of socioeconomic achievement is estimated which incorporates key characteristics of bureaucratic labor markets not heretofore considered in such models. The considerable power of the model to account for variations in occupational prestige and salary supports a Weberian view of bureaucratic labor markets as highly rationalized personnel systems, although ascriptive characteristics also affect career success in the federal service. The cohort analysis reveals important organizational and historical effects which are interpreted as demonstrating the influence of variations in opportunity structure on socioeconomic achievement. The paper concludes with a call for greater sociological attention to the interrelationship of individual biography and societal history.

HILDUM, Donald C. (Oakland). 1979. "An Oblique Factor Theory of Social Relationships." Journal of the Communication Association of the Pacific (7): 24-41.

It is possible that much data on group functioning may be subsumed by a two-dimensional model containing three oblique factors with equal negative relations to each other: Superiority, Identity, and Diversity. This paper describes the hypothesized interactions among the dimensions, citing past and current data, several similar theoretical formulations, proposed methods of measurement, and a sample of hypotheses for testing. The conclusion discusses the application of the model to communication in organizations.

HUBERT, Lawrence (Wisconsin). 1977. "Evaluating the Conformity of Sociometric Measurements." Harvard-Yale Reprints in Mathematical Sociology. No. 8.

The problem of comparing two sociometric matrices, as originally discussed by Katz and Powell in the early 1950s, is reconsidered and generalized using a different inference model. In particular, the proposed indices of conformity are justified by a regression argument similar to the one used by Somers in presenting his well-known measures of asymmetric ordinal association. A permutation distribution and an associated significance test are developed for the specific hypothesis of "no conformity" reinterpreted as a random matching of the rows and (simultaneously) the columns of one sociometric matrix to the rows and columns of a second. The approximate significance tests that are presented and illustrated with a simple numerical example are based on the first two moments of the permutation distribution, or alternatively, on a random sample from the complete distribution.

HURD, G. S., B. W. LEX and E. M. PATTISON. 1980. "Congruence of Personal Social Networks and Marital Satisfaction." Unpublished paper.

Analysis of the composition and structure of personal social networks demonstrated the existence of three modal network types. Type 1 networks are comprised of predominantly involuntary, role-bounded relationships such as those found within nuclear families. Type 2 networks are constituted of voluntary, non-role bounded relationships such as cohorts of extended kin or friends. The Type 3 network exhibits a balance between Types 1 and 2, incorporating about equal social participation in involuntary and voluntary relationships.

Marital dyads are embedded in a social network composed of relationships that are maintained independently from each spouse and those that are shared by both partners. The networks of marital dyads also may be categorized as having membership in one of the network types that have been defined for the networks of individuals. The impact of conflicting network styles upon marital satisfaction is examined for three populations: happily married couples, couples in the process of divorce, and couples where one or both of the partners are heroin addicts.

KNOKE, David (Indiana). 1981. "Commitment and Detachment in Voluntary Associations." American Sociological Review 46 (April): 141-58.

Membership commitment to and detachment from voluntary associations is hypothesized to be affected by the degree to which the organization's political structure facilitates social control by members, in the sense of mutual self-regulation. Three components of the polity--decentralization, communication, and total influence--are analyzed for their impact on members of 32 noneconomic voluntary associations in Indianapolis. Using a contextual-effects model, communication and participation in decisions are found to increase commitment and to reduce detachment net of other organizational and individual factors. An interaction between communication and decision participation suggests that communication can compensate for lack of direct involvement in making decisions in strengthening member support for the collectivity.

LEE, Gary. "Effects of Social Networks on the Family," in *Contemporary Theories about the Family, I*, Wesley Burr et al. (eds.) New York: Free Press. Pp. 27-56.

In this chapter we shall focus our attention on certain aspects of the exchanges between the family and its social environment. First, our concern is with social networks rather than all extrafamilial structures or systems. I intend to employ the concept in a rather broad sense. Second, we are interested in effects on the family, not of the family. (Third, we will deal with the effect of differential rates of participation in the various types of social networks on the family and its members. We will treat extent of interaction with kin as an independent variable and concentrate upon those of its correlates which are presumed or demonstrated to be consequences (for the family) of such kinship involvement. (Excerpted and editorially rearranged.)

MERRY, Sally Engle. "Racial Integration in an Urban Neighborhood: The Social Organization of Strangers." 1980. *Human Organization* 39 (1): 59-69.

The author tests the hypothesis that, "residential racial integration leads to increased social contact which produces assimilation and more tolerant attitudes" through the study of an unidentified multi-racial housing development in a U.S. city. From observation and interviews she concludes that in this case racial integration not only failed to have the hypothesized effect, but reduced residential satisfaction, undermined community social control, and increased racial isolation, prejudice and hostility in some cases. She attributes these effects to the fact that this was an artificial community in which integration was achieved through administrative decision rather than individual choice, and explores the policy implications of the findings.

MUELLER, Daniel (Jewish General Hospital, Montreal). 1980. "Social Networks: A Promising Direction for Research on the Relationship of the Social Environment to Psychiatric Disorder." *Social Science and Medicine* 14A: 147-161.

The role of personal social networks in the occurrence and course of psychiatric disorder is considered. The social network concept is seen as providing the basis for an integrating framework in which to view the contribution of the social environment to psychiatric disorder. Evidence linking network variables to psychiatric disorder is reviewed in the following 3 areas: (1) network structure, (2) the supportiveness of network relationships, and (3) recent change or disruption of the network. Findings indicate that social networks may be particularly important in onset and course of depression. Issues raised by the literature are identified. Results from many of the studies reviewed are more suggestive than definitive. It is concluded that there is a need for systematic investigations of the relationship of social network characteristics to specific psychiatric disorders, particularly depression. A number of considerations in designing such research are discussed.

MULLINS, Nicholas C., Lawrence S. WOLFARTH and Timothy J. SEVENER (Indiana). 1980. "Structural Characteristics of a Particle Physics Cocitation Group." Paper presented at American Sociological Association, August 28.

The social organization of science connects scientists with different statuses, locations, and training. Those with similar approaches are in structurally equivalent positions. Ties between these positions are created by location and acquaintance, with block I, composed of those who are in the dominant theoretical position now, also being connected by coauthorship, strong interaction and cocitations by others. The changes in the citation ties show how the structure can change seemingly in response to changes in the success of various theoretical approaches.

NICHOLSON, Beryl. 1980. "Is a migration decision a migration decision?" Paper presented at the Fifth World Congress for Rural Sociology, Mexico City, August.

One of the continuing problems in migration research is to find models of migration behaviour which are generally applicable across different types of migration and different cultures. There are those who have felt forced to conclude that it is not one phenomenon but several. However, to distinguish one from the other empirically leads to difficult problems of definition.

The root of this problem seems to lie in the conceptualisation of migration itself. It is defined purely on the basis of its significance as a demographic event. This is a *post hoc* rationalization of just one common element in actions which might be so varied as to differ widely in their sociological significance. Yet this is what a sociological conceptualisation of migration must be based on.

This paper argues that migration should be considered as a variable common to many different kinds of decisions and actions, rather than the object of the decision itself. The decision concerns a desire on the part of individuals or groups to change one or more aspects of the niches they occupy. The niche is the position occupied in relation to the (social) environment. Strategies adopted towards it are conceptualised within Hirschman's exit, voice and loyalty framework. Loyalty is a decision to do nothing, that is make no change; voice refers to making a change to the niche itself; exit is to abandon the niche, or part of it, for a new one. This last option can result in migration, but will not necessarily do so, while moves classified according to certain administrative criteria as migration need not be the result of exit decisions.

Exercise of the voice and exit options depends on the availability of the means of change or of entry to new niches, that is, channels of access. The decision to make a change, or not, can then be analysed in terms of the structure of access, which is socially determined, and the factors which influence choice within that structure. Thus a way is opened up to the application of sociological concepts to the study of migration in a way which has hitherto not been possible.

OLIVER, Pamela (Louisville). 1980. "Rewards and Punishments as Selective Incentives for Collective Action: Theoretical Investigation." *American Journal of Sociology* 85 (6): 1356-75.

Positive and negative selective incentives are shown analytically to have different structural implications when used to induce collective action. Positive selective incentives are effective for motivating small numbers of cooperators and generate pressures toward smaller, more "elite" actions, unless the incentives have jointness of supply. Negative selective incentives are effective for motivating unanimous cooperation, but their use is often uneven and cyclical and may generate hostilities which disrupt the cooperation they enforce. Examples of these dynamics are found in many arenas of collective action and social movements.

PADGETT, John F. (Harvard), two papers. 1979. "Managing Garbage Can Hierarchies." Unpublished.

This paper operationalizes garbage can theory into a stochastic process model for the case of a traditional Weberian bureaucracy. The purposes of the model are two: a) to illustrate how ambiguity may impinge on decision-making within a structural setting more familiar to classical organization theorists, and b) to derive the managerial implications of garbage can theory.

Garbage can demographic flows of issues are explicitly embedded within a differentiated chain-of-command hierarchy, and are affected by centralization and personnel policies, subunit conflict, information processing routines, and standard operating procedures. The Presidential control implications of the model amount to unobtrusive management in the extreme. Structural design is emphasized more than tactical machinations.

1980. "Bounded Rationality in Budgetary Research." *American Political Science Review* 74.

Two bounded rationality theories of federal budgetary decision-making are operationalized and tested within a stochastic process framework. Empirical analyses of Eisenhower, Kennedy and Johnson domestic budget data, compiled from internal Office of Management and Budget planning documents, support the theory of serial judgment over the theory of incrementalism proposed by Davis, Dempster and Wildavsky. The new theory highlights both the structure of ordered search through a limited number of discrete alternatives and the importance of informal judgmental evaluations. Serial judgment theory predicts not only that most programs most of the time will receive allocations which are only marginally different from the historical base, but also that occasional radical and even "catastrophic" changes are the normal result of routine federal budgetary decision-making. The methodological limitations of linear regression techniques in explanatory budgetary research are also discussed.

RICH, Richard C. (Virginia Polytechnic). 1980. "A Political-Economy Approach to the Study of Neighborhood Organizations." *American Journal of Political Science* 24 (4): 560-91.

Neighborhood organizations are becoming increasingly important political institutions in U.S. cities, and there has been considerable debate over the institutionalization of their role in urban governance. This article employs concepts from collective-goods theory to develop a theoretical framework by which neighborhood organizations can be analyzed as mechanisms for mobilizing communities for collective action. The framework is then employed in analyzing how community-level associations in Indianapolis mobilize resources and apply them to the production of benefits for neighborhood residents. The analyses show that structurally more powerful forms of neighborhood organization are more effective in mobilizing resources and applying them to the production of collective goods than are less "institutionalized" forms of association; a finding which has significant implications for both national and local neighborhood policies.

SEIDMAN, Stephen (George Mason). n.d. "LS Sets as Cohesive Subsets of Graphs and Hypergraphs." Unpublished paper.

For social scientists, a "clique" has long been seen as a subset of a population whose members are more tightly linked to other members of the subset than they are to non-members. Similar ideas have arisen in clustering theory. Most approaches to the problem of defining such subsets have concentrated either on maximizing the number of intra-subset ties or minimizing the number of inter-subset ties. LS sets in graphs or hypergraphs provide a way of addressing simultaneously both intra-subset ties and inter-subset ties. A new characterization of LS sets is given and used to derive simple proofs of several important results on LS sets.

SEIDMAN, Stephen (George Mason) and Brian FOSTER (Arizona State). 1980. "Network Structures Derived from Collections of Overlapping Subsets." Paper presented to the Annual Meeting of the American Anthropological Association, December.

Social networks have long been seen as a tool which is of considerable use in the analysis of urban situations. The analysis has centered on the study of the networks generated by one or more binary relationships (e.g. friendship, rendering aid, communication), while the networks themselves have been seen either as egocentric, emanating from a fixed individual, or sociocentric, including all people in a specified set. To varying degrees, network analysts have used the substance of the mathematical theory of graphs, but even the most mathematically informal studies have implicitly regarded a network as composed of one or more graphs. Although such analyses have yielded substantial insights, they have overlooked a class of relationships that form an important part of urban social life--relationships that are essentially non-binary. These relationships are most naturally characterized as corresponding to membership in subsets of a population. Three useful examples of relationships of this type are:

- (i) those defined by common attendance at an event (e.g. a wedding or funeral)
- (ii) those defined by membership in a group or organization (e.g. a fraternal organization)
- (iii) those defined by shared attributes (e.g. ethnic attributes).

Relationships of this type define a collection of variously labeled, overlapping subsets of a population. If the relationships are used to define a social network by postulating a link between each pair of members of each subset, an extremely complex graph will be produced. Not only will this graph be difficult to study, it will have obscured the fact that the subsets themselves have an identity that should not vanish in a mathematical representation.

In this paper, a mathematical formalism is proposed that will permit the direct study of the structure derived from a collection of overlapping subsets of a set. The fundamental concept is that of a hypergraph, which is defined to be a set along with a collection of its subsets. The utility of the hypergraph concept is not that it provides a name for this type of structure, but that the formalism of the mathematical theory of hypergraphs makes it possible to investigate the formal implications of properties of collections of overlapping subsets. These properties can be chosen to have social-structural significance, and mathematical results can be obtained that may suggest hypotheses about social structure which can be tested.

For example, just as the concept of cohesion in social networks led to various definitions of clique-like objects, cohesive objects can be defined in hypergraphs. It now becomes possible to ask how these cohesive objects fit into the structure of overlapping sets. It can be hypothesized that different modes of inclusion have implications for social structure, and this hypothesis can be tested.

This example has illustrated the most important advantage of the hypergraph approach - the ability to regard the subsets themselves as socially significant, identifiable objects. Other, more complex applications of hypergraph formalism draw their strength from the same source. Since collections of overlapping, socially significant subsets of a population comprise an important aspect of urban social structures, it can be expected that the hypergraph approach to the analysis of urban networks will prove to be very useful.

SKVORETZ, John (South Carolina) and Thomas J. FARARO (Pittsburgh). 1980. "Languages and Grammars of Action and Interaction: A Contribution to the Formal Theory of Action." Behavioural Science 25.

The language of action and interaction studied in this paper arise from a formalization of the concept of a "production system" found in several recent empirical studies of human action. From a systems viewpoint, the concern is with the temporal structure of the activity of living systems--organisms, groups, and/or organizations. The theory is applicable at any of these levels to the extent that actions of units at each level can be appropriately specified.

The article starts with the idea that acts of an acting unit are evoked only when certain conditions are satisfied. An action is identified as an act together with the class of conditions under which it is evoked. Formal interest centers on action strings (concatenations of actions that meet criteria derived from episode constraints relating actions) and how well-formed they are. An episode constraint holds between two actions if one of the associated acts establishes a condition in the class evoking the other act. Two basic types of episode constraints are identified and several propositions are proved and conjectures advanced about the type of automaton that will accept only well-formed action strings under various assumptions about the type and number of constraints which obtain. The approach is then generalized to n -party interaction.

SMITH, Gavin (Toronto). 1980. "Huasicanchino Livelihoods: A Study of Extended Domestic Enterprises in Rural and Urban Peru." Canadian Review of Sociology and Anthropology 17 (4): 357-66.

Detailed studies of how the poor 'make out' in Third World cities have only recently emerged. Casual work must be seen within the context of the worker's relationship to large-scale capitalism. It must also be understood in terms of the relationships which exist among such labourers themselves. This paper presents material on the nature of these latter kinds of linkages both within the city and between city and country.

It is suggested that the character of linkages between domestic enterprises in the group studied have much to do with the volatile nature of the Peruvian economy. The concept of confederations of households is proposed for the description of the kind of interrelationships which occur.

SMITH, M. Estellie (SUNY-Oswego). 1980. "Crisis: The 1918 Influenza Epidemic as a Community's Turning Point." Paper presented at the Annual Meeting of the American Anthropological Association, December, Washington.

This ethnographic report has but one purpose: To call anthropological attention to the neglected significance of the 1918 influenza pandemic. That disaster--within a few brief weeks in the autumn of the year--conservatively resulted in the deaths of 20 million world-wide, and 850,000 in the United States alone. Additionally, given that entire communities were affected, the particular viral strain led to the illness having greater than normal consequences due to its extraordinarily high morbidity rate. Finally, since the illness left many too weak to perform even the most trivial of tasks for as long as two to three months after the acute phase had passed, the impact--on, say, normal patterns of subsistence getting--may have been irrevocably damaging, especially for some small-scale societies.

Catastrophes of any kind--floods, earthquakes, plagues, war, famine, and the like--have a wholesale effect on society but, most markedly, on those features we have labeled 'social networks.' Because of this, the disasters frequently constitute crises--turning points--in the lives of individuals and for the sociocultural system as a whole. From this perspective, it is surprising how little attention we have paid to such events.

The 1918 flue epidemic is a particularly apt research focus because, in addition to being reasonably well-documented and there still being some living informants who can recall it, the worldwide distribution of the illness offers us the opportunity to do a comparative analysis of responses to a specific type of catastrophe in varied sociocultural contexts.

This paper will examine the crisis created in one rural area of New Mexico, a ranching region in the middle Rio Puerco valley consisting of four villages--San Luis, Guadalupe, Cabezon, and Casa Salazar. Attention will focus on subsistence patterns and the way in which the networks of the inhabitants were impacted by the social and economic costs of the epidemic. The problem was suggested by the definition of networks offered by Whitten & Wolfe (1974), i.e. a series of linkages existing among individuals, which forms the basis for mobilization of people for specific purposes, under specific conditions. Such a definition leads us to ask such questions as: What happens to these networks when an unanticipated disaster strikes a community? If people are removed from the networks in large numbers, how do those remaining mobilize--either for the needed responses to the catastrophe or for the original purpose in the aftermath of the event? What remobilization strategies are selected when too many 'holes' appear too suddenly in the networks? Under what conditions do networks regroup vs. simply collapse, their membership dissipating?

The four-village area is especially interesting in this regard. At the time the epidemic struck, residents were already facing a challenge. Settled in the region since the 1850s, following the removal of hostile Navajos during the so-called Pacification Period, the rich grasslands had, by c. 1870, become home to roughly double the original 450-500 colonists. So 'successful' was their exploitation of the econiche, however, that by the turn of the century, the already-diminished carrying capacity of the valley was being dangerously overloaded. In perspective, we can see clear signs of an irreversible decline. Thus, subsistence risks were increasing in an initially risky environment. This, in turn, worked to expand and strengthen early networks--while, in circular fashion, heightened network demands further intensified the excessive exploitation of the econiche.

STARK, Rodney and William Sims BAINBRIDGE (Washington). 1980. "Networks of Faith: Interpersonal Bonds and Recruitment to Cults and Sects." *American Journal of Sociology* 85 (6): 1376-95.

A long tradition in social science explains recruitment to religious cults and sects on the basis of a congruence between the ideology of a group and the deprivations of those who join. A more recent approach to recruitment argues that interpersonal bonds between members and potential recruits are the essential element. In this paper we first show that these are complementary, not competing, approaches. Then, because the available evidential base for the role of interpersonal bonds is limited and qualitative, we present quantitative data pertaining to three quite different radical religious groups. In each case there is overwhelming support for the crucial role played by social networks in the formation and growth of such groups. Next we seek the boundaries of this phenomenon. Available studies suggest that not merely cult and sect recruitment, but commitment to conventional faiths as well, is supported by social networks. However, networks do not seem to play an important role in acceptance of mildly deviant occult beliefs. Belief in seances and tarot cards, for example, seems to spread via the mass media with little mediation by social networks. We discuss the implications of these findings for a theory of cult and sect recruitment.

STERN, Robert N. 1979. "The Development of an Interorganizational Control Network: The case of Intercollegiate Athletics." *Administrative Science Quarterly* 24.

The National Collegiate Athletic Association (NCAA) was transformed from a loose voluntary confederation of universities into the dominant control agent over intercollegiate athletics during the period from 1960, when it was organized, to 1952, when member schools granted it regulatory power. Network analysis provides concepts and tools to explain this transformation. However, current practice in network analysis relies heavily on the use of structural measures of network characteristics and much less on examination of the historical development of a network or of the interaction processes that link network structure and interorganizational activity. This study examines the historical transformation of the network of organizations participating in intercollegiate athletics by focusing on (1) four determinants of network structure--administration, coupling, multiplexity, and new resources--and (2) the processes that link structure to organizational interests. The explanations provided by structural network analysis are incomplete without consideration of network process. Examination of process and history reveals contradictions within the network, resistance to change by political interest groups, and the interactions among network structures.

STRIKWERDA, Carl (Michigan). 1980. "General Strikes and Social Change in Belgium." Centre for Research on Social Organisation, University of Michigan. Working Paper 215. April.

(Taking off from Tilly and Shorter's analysis of Western industrial strike patterns) I believe that Belgian strikes until the 1960s took an almost unique form. They most resembled general strikes: very large, moderately long, and relatively infrequent. (In the) 1960s, a peaceful labor relations system replaced it. (Excerpted.)

TILLY, Charles (Michigan), two papers. 1980. "The Old New Social History and the New Old Social History." Paper presented to Conference on New Directions in History, SUNY-Buffalo, October.

How would a set of historians pronounce on the future of history? - its promises, changes in historical practice, lessons learned. Concentrating on social history, let us pay particular attention to the historical endeavors which in the 1960s began to display the stigmata of social science: self-conscious explication of concepts and models; deliberate comparison of individuals, groups, places, or events (often many of them) placed within a common framework; fixation on reliable forms of measurement, frequently involving numerical treatment of evidence. Economic history, archeology, demographic history, urban history, plus some kinds of political, labor, agricultural and family history qualify. (Excerpted.)

1981. "Broad, Broader . . . Braudel." *American Historical Review*, forthcoming.

"Braudel's subject has become the experience of the entire world from the 15th through the 18th centuries. In 3 bulging volumes, Braudel attempts no less than a general account of the processes by which the capitalist world of the 19th and 20th centuries took shape. Complexities, nuances, contradictions and doubts fill every chapter. (In Volume 3) he remains faithful to Wallerstein's focus on conditions of exchange, rather than relations of production, as the essential features of capitalism. But in fact he neither uses the core/semi-periphery/periphery scheme as a tool of analysis nor attempts to test it by means of his vast store of information. (Excerpts.)

UNGER, Donald G. (South Carolina) and Douglas R. Powell (Wayne State). 1980. "Supporting Families Under Stress: The Role of Social Networks." *Family Relations* 29: 566-74. JK

The role of family social networks in mediating the effects of stress has been underscored in the literature. Drawing from sociological and psychological studies, this paper examines the strong positive relationship between social networks and a family's adaptation to societal crises, life transitions and family conflicts. Who helps and when, the types of support offered and given, the conditions influencing the use and effect of networks, and the implications for professional intervention are discussed.

VERDON, Michel (Cambridge). 1981. "Kinship, Marriage, and the Family: An Operational Approach." *American Journal of Sociology* 86 (4): 796-818. JK

The concepts used in the study of social organization (such as kinship, marriage, and the family) are "secondary" concepts insofar as they are derived from a more implicit, more fundamental notion of group. The notions of group which underpin current models of kinship, marriage, and the family render groups "ontologically variable" because they are ultimately reducible to considerations of interpersonal behavior and normative representations. This, I contend, makes them unfit for rigorous comparative study of social organization (the very project of social anthropology). To achieve greater rigor, I suggest a new, "operational" notion of group disentangled from considerations of interpersonal behavior and normative representations, and I consequently derive new and, I hope, more "universal" definitions of kinship, marriage and the family on the basis of this new notion of group.

WILSON, James A. (Maine). 1980. "Adaptation to Uncertainty and Small Numbers Exchange: The New England Fresh Fish Market." *Bell Journal of Economics* 11 (Autumn): 491-504.

Relatively inaccurate and slow dissemination of market information and location and ownership factors cause trading to take place under conditions of uncertainty and small numbers. The inefficiencies and inequities which might otherwise result in each individual transaction are mitigated by a pattern of very personal, long-term, bilateral agreements. These agreements deal with the efficiency and equity problems through a system of reciprocation over time. Nevertheless, the collective effect of the agreements, under certain common conditions, is to suppress further the flow of market information and seriously to impair product quality incentives and other measures of market performance.

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GRADAP REPORT

Version 1.0 of GRADAP was expected to be ready for distribution by the end of 1980. This version will operate on CDC-6000 and -Cyber computers under operating systems NOS and NOS/BE. The User's Manual is also close to being available (no price given).

For preliminary info on GRADAP see CONNECTIONS I, 2.

Further information on GRADAP is contained in the European Political Data Newsletter 35 (1980), pp. 40-46 which reports that the total amount of information on a network is stored on a GRADAP System File which makes it possible to perform the data definition phase just once. As in SPSS (on which GRADAP is modelled), subsequent runs use this labelled, stored information and may optionally modify it. GRADAP assigns attributes to both (sets of) points and (sets of) lines. Users may define subsets of both points and lines. Values are stored in a "pointinformatrix" and a "lineinformatrix." Lines are identified by the two points they connect (the problem of multistrandedness is not clear), with labelling available. GRADAP will be able to read/write SPSS files. Procedures will be able to condense points, combine lines, manipulate the direction of lines and generate new graphs by induction. Among the analytic procedures will be Centrality, Rush, Subgraphs, Reduce, Distance and Adjacency.

An IBM version is being prepared by the University of Nijmegen for July, 1981.

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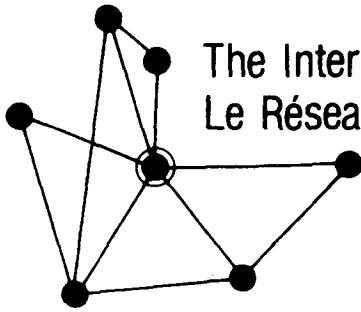
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This seminar explores the theoretical, empirical and practical issues of transactions in exchange networks. Students may get experience in collecting transactional data, computer processing of data, and applying such analyses to practical situations and groups, operation of human services and health programmes, and evaluation and planning of programmes. The basic textbook is Holland & Leinhardt, Social Networks, plus an extensive supplementary reading list (available from Alvin Wolfe). Each student prepares a 4-6 page paper on each of the seminar topics:

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 5. Positions in networks: Distance, centrality, power, dependence, autonomy, etc.
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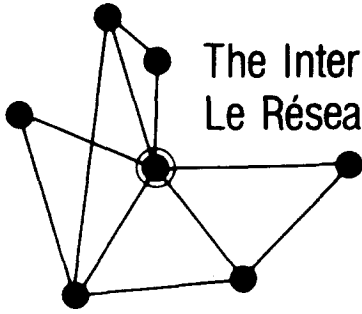
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