本田財団レポート　No.6

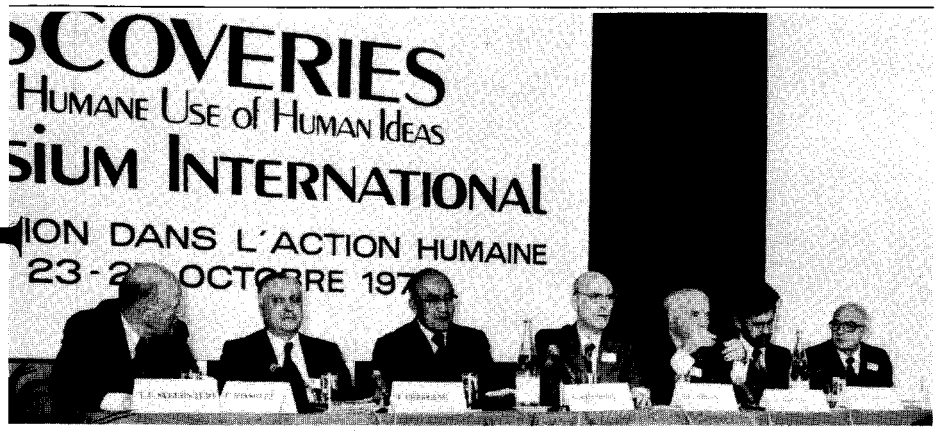
「ディスカバリーズ国際シンポジウム　パリ1978」の報告

本田財団レポート

このレポートは1978年10月23日～27日にパリ市のメリディアンホテルで本田財団が主催した第3回ディスカバリーズ国際シンポジウムの会議内容をまとめたものです。

Honda Foundation Report

第3回ディスカバリーズ国際シンポジウム



Le Comité Scientifique

Président 1978
Pr **J.C. Simon,**
Université Pierre et Marie Curie - Paris

Vice-Président 1978
Pr **E. Caianiello,**
Université de Salerne - Italie

Secrétaire Général 1978
Pr **S. Aida,**
University of Electro-Communications - Tokyo

M. **A. Danzin**
Directeur de l'IRIA Rocquencourt - France

Pr **G. Hambraeus**
Directeur Général I.V.A. Stockholm

M. **Y. Jaigu**
Directeur de France Culture, Radio France - Paris

Pr **J.F. Le Ny**
Université de Paris VIII, Vincennes - France

Pr **S. Takashina**
Université de Tokyo

Pr **A. Touraine**
Ecole des Hautes Etudes en Sciences Sociales - Paris

M. **J. Voge**
Direction Générale des Télécommunications - Paris

Liste des participants au 3e Symposium Discoveries

シンポジウム参加者

Pr **S. Aida** - Electronique et Informatique
University of Electrocommunication - Tokyo (Japon).

Pr **M. Allen** - Chimie Physique
Professeur à l'Université Libre de Belgique - Bruxelles.

Pr **M. Alliot** - Sciences Humaines
Laboratoire d'Anthropologie Juridique - Paris (France).

M. **M. Borillo** - Informatique
Directeur de Recherches au C.N.R.S. (LISH). - Marseille (France).

Pr **G. Caglioti** - Physique Nucléaire
Istituto di Ingegneria Nucleare - Milano (Italie).

Pr **E. Caianiello** - Physique et Informatique
Facolta di Scienze - Universita di Salerno (Italie).

Pr **M. Castells** - Sciences Humaines
Centre d'Etude des Mouvements Sociaux - Paris (France).

Pr **I. Chiva** - Sciences Humaines
Laboratoire d'Anthropologie Sociale du Collège de France et de l'Ecole des Hautes Etudes en Sciences Sociales - Paris (France).

Dr **J. Cloutier** - Sciences Humaines
Directeur Général de l'Institut International de la Communication - Montréal (Canada).

Pr **Z. Damjanovic** - Bio Informatique
Director of Center for Multidisciplinary Studies - Belgrade (Yougoslavie).

M. **A. Danzin** - Physique et Informatique
Directeur de l'IRIA - Rocquencourt (France).

Dr **L. Dumont** - Sciences Humaines
Directeur d'Etudes à l'Ecole des Hautes Etudes en Sciences Sociales - Paris (France).

Pr **M. Eden** - Informatique et Biologie
Instrumentation National Institutes of Health - Bethesda Maryland (USA).

Pr **D. Ekong** - Chimie
Vice Chancellor of the University of Port Harcourt (Nigeria).

Pr **H.E. Gunning** - Chimie Physique
President of the University of Alberta - Edmonton (Canada).

Pr **U. Himmelstrand** - Sciences Humaines
Uppsala Universitet (Suède).

Pr **T. Ishii** - Sciences Humaines
University of Tokyo (Japon).

M. **Y. Jaigu** - Philosophie
Directeur de France-Culture, Radio-France - Paris (France).

Pr **P. Laconte** - Sciences Humaines
Université Catholique de Louvain (Belgique).

Pr **K. Lang** - Sciences Humaines
St Antony's College - Oxford (G.-B.).

Pr **J.P. Lévy** - Médecine
Service d'Hématologie de l'Hôpital Cochin - Paris (France).

Pr **J.F. Le Ny** - Psychologie
Université de Paris VIII Vincennes - Paris (France).

Pr **H.A. Linstone** - Sciences Humaines
Futures Research Institute of Portland - Oregon (USA).

Pr **J.L. Lions** - Mathématiques
Collège de France, Directeur du Laboria - Rocquencourt (France).

M. **F. Margulies** - Sciences Sociales
Austrian Federation of Trade Unions of Salaried Clerical, Commercial and Technical Employees - Wien (Autriche).

Pr **M. Marois** - Médecine
Université Pierre et Marie Curie, Paris VI - Paris (France).

M. **L. Mehl** - Droit
Maître des Requêtes au Conseil d'Etat - Paris (France).

Pr **L. Mendia** - Chimie
Faculty of Engineering - Napoli (Italie).

Pr **R. Narasimhan** - Linguistique et Informatique
Director at the Tata Institute of Fundamental Research - Bombay (Inde).

Pr **H.J.B. Nevitt** - Télécommunications
Center for Culture and Technology - University of Toronto - Ontario (Canada).

Pr **Y. Novozhilov** - Sciences Humaines
Deputy Assistant Director-General for Science, Unesco - Paris (France).

Pr **P. Omodeo** - Biologie
Istituto di Biologia Animale - Padova (Italie).

Pr **U. Pellegrini** - Industrie
Presidente della Fast - Milano (Italie).

Pr **I. Prigogine** - Prix Nobel, Physicien
Université Libre de Belgique - Bruxelles.

Pr **B. Rybak** - Biosciences
Institut d'Etudes Linguistiques et Phonétiques - Paris (France).

Pr **A. Sauvy** - Sciences Humaines
Collège de France - Paris (France).

Pr **A.C. Scott** - Physiologie
University of Wisconsin - Madison (USA).

Pr **T.T. Segerstedt** - Sociologie
Directeur Uppsala Universitet (Suède).

Pr **R. Shirane** - Sciences Humaines
Président de la Fondation Electrocommunications - Tokyo (Japon).

Pr **J.C. Simon** - Mathématiques et Informatique
Université Pierre et Marie Curie, Paris VI - Paris (France).

Pr **M. Siniscalco** - Biologie
Member of Sloan Kettering Institute for Cancer Research - New York (USA).

Pr **I. de Sola Pool** - Sciences Politiques
M.I.T. - Cambridge (USA).

Pr **H. Tajfel** - Sciences Humaines
University of Bristol (G.-B.).

Pr **P. Tannenbaum** - Sciences Humaines
Broadcasting House - London (G.-B.)

Pr **A. Touraine** - Sciences Humaines
Directeur d'Etudes à l'Ecole des Hautes Etudes en Sciences Sociales - Paris (France).

Pr **A. Tsujimura** - Sciences Humaines
Faculty of Letters - University of Tokyo (Japon).

Pr **J. Vidal Beneyto** - Sciences Humaines
Président du Comité International de Communication, Connaissance et Culture (I.S.A.) - Madrid (Espagne).

M. **J. Voge** - Télécommunications
Directeur Délégué pour les Relations Internationales à la Direction des Affaires Industrielles et Internationales - Direction Générale des Télécommunications - Paris (France).

M. **A. Willener** - Sciences Humaines
Directeur de l'Institut de Sociologie des Communications de Masse - Université de Lausanne (Suisse).

シンポジウム・スケジュール

	セッションテーマ	No.	講演 テーマ	講演 講演者	No.	ラウンド テーブル テーマ	ラウンド テーブル 司会	ラウンド テーブル パネリスト	合同セッション 議長
10月23日	コミュニケーションとは何か？	Ⅰ	交換から交流へ	A. TOURAINE（フランス）	1	コミュニケーションと誤解	Y. JAIGU（フランス）	B. RYBAK（フランス） I. CHIVA（フランス） M. ALLIOT（フランス） U. HIMMELSTRAND（スウェーデン）	M. MAROIS（フランス）
		Ⅱ	異文化間のコミュニケーション	L. DUMONT（フランス）	2	コンピューターによる表現	A. DANZIN（フランス）	J. L. LIONS（フランス） L. MEHL（フランス） J. P. LEVY（フランス）	
10月24日	コミュニケーションの発達	Ⅲ	技術革新のコミュニケーションへの影響	M. EDEN（アメリカ）	3	遺伝情報と人間行動	T. ISHII（日本）	M. SINISCALCO（アメリカ） S. AIDA（日本） E. CAIANIELLO（イタリア）	Y. NOVOZHILOV（ソ連）
		Ⅳ	言語によるコミュニケーションの研究	R. NARASIMHAN（インド）	4	メディアの発達	J. VIDAL BENEYTO（スペイン）	R. SHIRANE（日本） K. LANG（イギリス） P. TANNENBAUM（イギリス） M. BORILLO（フランス） A. WILLENER（スイス）	
10月25日	コミュニケーションその理解	Ⅴ	階層間のコミュニケーション	J. F. LENY（フランス）	5	マスコミ情報	H. TAJFEL（イギリス）	P. OMODEO（イタリア） T. SEGERSTEDT（スウェーデン） A. TSUJIMURA（日本）	H. E. GUNNING（カナダ）
		Ⅵ	人工知能の発達	J. C. SIMON（フランス）	6	異文化間の技術移転	Z. DAMJANOVIC（ユーゴースラビア）	J. CLOUTIER（カナダ） D. EKONG（ナイジェリア） H. A. LINSTONE（アメリカ） A. C. SCOTT（アメリカ）	
10月26日	コミュニケーションと社会的、経済的現象	Ⅶ	未来学的にみた予測	I. de SOLA POOL（アメリカ）	7	都市問題への応用	I. PRIGOGINE（ベルギー）	M. CASTELLS（フランス） P. LACONTE（ベルギー） P. ALLEN（ベルギー）	A. SAUVY（フランス）
		Ⅷ	コミュニケーションと経済	J. VOGE（フランス）	8	社会に及ぼす影響	E. CAIANIELLO（イタリア）	U. PELLEGRINI（イタリア） H. J. B. NEVITT（カナダ） G. CAGLIOTI（イタリア） L. MENDIA（イタリア） F. MARGULIES（オーストリア）	

文化と技術のコミュニケーション

—ディスカバリーズ国際シンポジウム パリ1978の報告—

電気通信大学教授 合田周平

1．実践への舞台づくり

人間からはじまる科学文明の復権をめざすことは、われわれ現代人にとって、ひとつの願望である。それは、現代に生きる多くの知識人の「希望的な考え」（wishful thought）を実現することで、ひとつの「共感的行為」（acte de sympathie）をおこすことで、可能にすることができよう。

われわれが実践している一連の〝ディスカバリーズ〟国際シンポジウムは、こうした考えのもとに、東京にはじまり、ついで文明のふる里ローマで開催され、1978年10月にパリで開かれ、1979年8月にストックホルムに引きつがれる予定である。ローマ・シンポジウムの内容は、『科学文明の復権——巨大危機からの脱出』（本田財団編・日本経済新聞社）という著書にまとめてある。つまり、現代文明に内在するカタストロフィ（破局）について討論し、巨大危機への認識を深めてきた。

ここで報告する、パリ・シンポジウムは、これらの危機に対処するため、〝文化と技術のコミュニケーション〟について論じた。これまでのシンポジウムによるさまざまな経験をもとに、ストックホルムでは、インフォメーションの基本的課題を、総合的に論じる予定である。われわれの活動目標は、人間の英知を結集する舞台をつくり、ひとつの共感的行為を実践に移すことにある。

パリのシンポジウムには、〝COMMUNICATION DAN L'ACATION HUMAINE〟というタイトルのもとに開催され、日本語では〝文化と技術のコミュニケーション〟におきかえた。全体のスケジュールおよび参加者は、はじめにかかげた通りである。シポジウムは、パリ実行委員長のパリ第6大学 J．C．シモン教授により開会あいさつがあり、ついで主催者側を代表して、下田武三氏のつぎのような開会宣言が述べられた。

「文化と技術」活発に論議

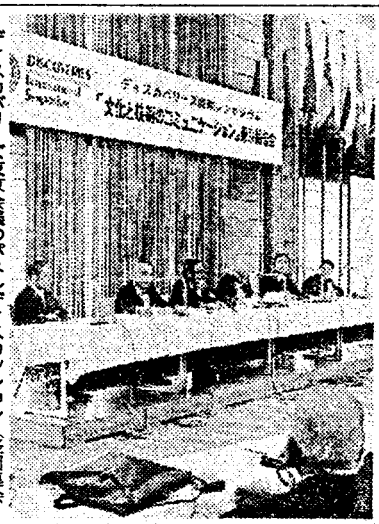
ディスカバリーズ東京会議

「文化と技術のコミュニケーション」をテーマに、高度に発達した現代文明の問題点を探りながらその解決の方法を考えようという「ディスカバリーズ国際シンポジウム東京会議」（本田財団、日本経済新聞社共催）が十六日午後、東京・大手町の経団連会館国際会議場で開かれた。

このシンポジウムは、高度化した科学技術文明の中で科学者が自らの専門領域に閉じこもろうとする弊害を打破し、自然科学、社会科学、人文科学の英知を集めた学際的、国際的な活動を通じて新しい文明に寄与しようというのがねらいで、今年で発足三年目。

この日はE・カイアニイロ・イタリアサレルノ大副学長、J・C・シモン・パリ第六大学教授、白根礼吉電機通信科学財団理事長、石井威望東大教授、辻村明東大教授、合田周平電気通信大教授のパネルディスカッション参加者に加え、内外の学者、研究者ら二百五十人が出席した。

下田武三本田財団理事長の「国際社会における日本の役割」と題した講演のあと、パネルディスカッションに移り、先月二十三日から五日間パリで開かれた国シンポジウムパリ会議の詳細な報告に続いて脱工業化社会論、コミュニケーション論などをめぐり活発な論議が展開された。このあと同財団顧問で本田技研最高顧問の本田宗一郎氏が「ディスカバリーズ活動に期待するもの」とのテーマで講演し、会議を終えた。



ディスカバリーズ東京会議のパネルディスカッション（経団連会館で）

1978年11月17日東京で開催されたディスカバリーズ東京会議。
（日本経済新聞 1978年11月17日）

開会の辞

本田財団理事長

下田武三

本日パリにおける第3回ディスカバリーズ・シンポジウムの開会式に御出席下さいました各位に対し、深厚な謝意と歓迎の意を表し度いと存じます。

私共は、このシンポジウムの事業に後援を与えて下さいましたピエール・エーグラン科学研究担当大臣と、福田総理大臣のメッセージを携えて、この式に御参加下さいました北原日本大使に対し、特に謝意を表し度いと思います。

さて、本年1月末、カナダ北西部の無人地帯に、ソ連の人工衛星が突然墜落したことは、なお皆様の御記憶に新たなところでありましょう。先週のニュースによれば、過去9ヶ月間に、数千個にのぼる衛星の破片が回収され、その中には、今なお強力な放射能を発撒しているものがあるということであります。

この衛星の墜落箇所が、無人地帯であったことは、不幸中の幸いというべきでありましょうが、しかし、このような衛星の墜落が、人口密集地帯——例えばニューヨーク、東京、パリのようなところに絶対起らないとは、何人も保障し得ないのであります。そして過去四半世紀の間に打ち上げられた人工衛星は、既に 3,000個以上に達し、これ等の衛星は、夜昼となく地球の周囲を廻って、わらわらの頭上を飛んでいるのであります。

このような恐るべき事態は、人類がも早や自分自身の発明したものに対する支配力を喪失して了ったこと、自分自身が実現した技術的・科学的進歩によって人類が無惨にも叛かれ、脅かされていることを、明瞭に示すものであります。

しかし、人工衛星の墜落が呼び起したこのような恐怖は、実は今日人類全体が直面している深刻で困難な問題の一側面にしか過ぎません。

まことに、科学技術の急速な進歩と、それがもたらした産業、経済の巨大な発展は、今世紀における人類の驚くべき繁栄を実現する一方、過去の世紀において末だ経験したことのない深刻な諸困難の淵へと人類を誘導してしまったのであります。その諸困難とは、例えば環境の悪化、大気と水の汚染、人口過剰、食糧問題、等枚挙に遑がありません。

これ等の問題を克服するためには、全く新しい思考方法の上に立った、新しい解決が探し出さなければならないことは明らかであります。本田財団の創立者たる本田宗一郎氏は、つとにこのような新しい解決方法を採択することの必要性を強調し、やがてディスカバリーズ運動を創始し、国際的及び学際的なレベルでの総合的な行動を追求して来られました。

かくて、ディスカバリーズ国際シンポジウムが組織され、第1回を1976年東京で、第2回を昨年ローマで開催して来たのであります。これ等のシンポジウムで、新たに採用された学際的な討議方法は、参加者をして、彼等の専門分野では未だかつて触れたことのない新しい題目について、非常に自由でおおらかな気持で討議することを可能ならしめました。このような知識の新しい境界の発見は、参加者に対し、もはや限られた研究分野の拘束を離れ、全く新しい広範な学問的探究に従事せしめるような刺戟を与えたのでした。

そして本日「人間の行動におけるコミュニケーション」をテーマとして、この新しい性格を持つ第3回目のシンポジウムの討議に参加するため、私共は、西欧文明の中心地たるこのパリに参集したのであります。

私共は、ピエール・エ・マリー・キュリー大学のシモン教授を今次シンポジウムの実行委員会議長として迎えることが出来たことを幸いとします。同教授の主宰の下に、シンポジウムの事業が実り多く、意義深いものとなることを確信しております。

また私共は、ローマ・シンポジウムの科学委員会議長であったカイアニエロ教授始め、多数の参加者各位が、それぞれの専門分野における重要な御職分を差しおいて、恐らく人類の将来の運命にも関連すると思われる題目を討議するため、本日ここに御参集下さったことに厚く感謝するものであります。

それでは、ここに第3回ディスカバリーズ国際シンポジウムの開会を宣言いたします。

1978年10月23日パリにて

ついで、駐仏北原日本国大使より、当時の福田総理からのメッセージが伝達され、国際会議にふさわしい雰囲気をかもしだした。

メッセージ

1978年・ディスカバリーズ国際シンポジウム開催にあたり、本シンポジウムの成功を心からお祈り申し上げます。

わたくしは、21世紀の明るい展望を持つために、世界人類の英知を結集するディスカバリーズ活動の成果に、大きな期待を寄せるものであります。とくに、今回の『コミュニケーション』に関するパリ・シンポジウムは、文化と技術の調和ある新たな文明社会の時代を招来するために、ひとつの役割を果すものと確信しております。

大きな変化の時代のなかで、現代文明がもつ諸問題を直視し、新しい時代に向けて、自ら進んで困難な分野にいどむ、ご列席者各位の熱心な研究討論の成果に心から期待します。

1978年10月23日
日本国内閣総理大臣
福田赳夫

2．コミュニケーションとは何か

シンポジウムの第1セッションは、わが国でもいくつかの著書で知られる、フランスのパリ大学　A.トゥレーン教授と、L．デュモン教授の講演ではじまった。テーマは、コミュニケーションと人間活動の基本的な問題について、それぞれの立場から考察するものであった。

A．トゥレーン教授は、西洋の先進諸国にみられる「意識的危機」について、その原因の追求と、それが発達しつつあるプロセスを、把あくすることの重要性について指摘した。トゥレーン教授は〝交換からコミュニケーションへ〟と題する論文のなかで、現代社会に於いて「自己変容」を可能にする諸条件を調査した自己の経験にもとづいて、歴史的性格の強い社会は、自己変容が容易におこり得ることを示した。一方、周囲とのコミュニケーションが均衡のとれた状態にある社会は、自己変容が生じ難いことを述べた。今日の社会にみられる一連の危機感は、過去にわれわれが直面した危機とは、全く異質のものであり、ただ単に経済的な問題よりも複合的な諸問題が関与していることは明らかである。これらの根本的な原因として、これまでの3世紀にわたるヨーロッパの文化的支配が終りに近づいていることをあげた。その結果として、現代の危機は、支配権にかかわる分野だけではなく、イディオロギーにも大きく関与している。このことは、文化にかかわる諸問題の危機であり、これを回避するため、つぎの3つの課題に注目すべきことを提示した。すなわち、

(1)　未来社会の構想よりも、今日の消費主義を享受することによる社会的衰退。

(2)　人類の生存を理由に、より原始的な文化へのあこがれを旗じるしとした反文化運動。

(3)　量的社会よりも、質的社会を重視しようとする動き。このことは、社会的にみて重要な変化であり、社会における生産部門の一部を、その社会が適切に変化するために保有していく必要がある。このプロセスは、農耕において、将来の収穫のため、つねに種を保有することに類似している。

A．トゥレーン教授は、これら3つの課題を念頭において、産業上の生産と分配のみならず、産業の組織的構造、つまり〝経営〟の分野で、もっとも事務的な情報手段として、コミュニケーションに注目すべきことを強調した。すなわち、脱工業化社会のめざすものは、コミュニケーション社会であることを指摘している。

社会に於けるさまざまな組織には、個人の活動を管理・調整する必要が増大している。このことは、今日の都市における、道路交通の課題と似ている。つまり、コミュニケーション社会が強化されるにつれて、初期段階として、民衆の苦しみは増大し、管理・調整機構に対する反発を生み出すことにもなる。マスコミの発達は、権力の集中を可能にし、権力の質が低下すると、民衆の幸福は破壊され、社会不安を引き起こすことになる。

この結果として、新しいイデオロギーが生じ、社会のエリート層の質的変化がおこる。具体的には、これまでのビジネス・エリートを追放して、〝プログラム化された社会〟に仕組まれる非人間的な集団がエリート化し、彼等による機構の活性化は社会のなかに大きな危険性を含むことになる。

L．デュモン教授は、社会人類学の立場から、異文化間コミュニケーションの例として、インドでの西洋的価値感の認識と普及のプロセスについて述べた。論題を〝個人の歴史〟としたデュモン教授は、ある文化が他の文化に吸収されるとき、その文化思考を新しい社会環境のなかで、どのように活かすかについて、いくつかの解釈を示した。その基本例として、フランス革命における〝ドイツ化〟に焦点をあて、ドイツが他国家に大きな影響を与えうる、いく

つかの特徴を推測している。このことは、歴史がその正当性を物語っているが、ドイツの卓越性と全体主義の思想は、あらゆる文化に、自然なものとして受け入れられる可能性が大きいことを示している。

情報化社会の今日において、異文化間の文化吸収は、かなりの程度進行していると考えられる。このことは、西欧型先進諸国と、発展途上国との間にもみられる現象である。いずれにしても、人間活動にとって、均衡のとれた情報交換の仕組をつくるとき、その構造はそれぞれの社会なり集団の歴史と文化に大きく左右される。したがって、コミュニケーションは、経済や数値の伝達や変換だけではなく、もっとも人間の本質に根ざした営みなのである。

わが国でも、言い古された観のある、脱工業化社会の体質は、実はこうした意味のコミュニケーションを社会のなかにつくることなのである。社会において、お互いに意志を伝達し合うことは、人間の根本的な欲求であるが、今日のメディアの使用の多くは、その人間的欲求の濫用であるといえよう。したがって、ノン・コミュニケーション、つまり伝達不能というより、むしろ伝達拒否の状況をつくりあげることは、文化的社会での個人の保護、あるいはプライバシーを守る権利のために必要なことであると信じる自由主義者が増加しつつある。

さらに、異文化間のコミュニケーションのギャップを、多少なりとも取り去るために、多くの努力を重ねることの重要性は言うまでもないが、その具体化のために民衆のアイデンティティを基本とした相互理解と協力は、欠くことのできないことである。

3．コミュニケーション—発達のプロセス

コミュニケーションの発達は、社会的、文化的側面とともに、技術的側面が大きな役割を演じているが、それらを総合して論じることはここでは困難である。したがって、第2セッションは、必然的にいくつかの特定な課題に限定された。

まず、アメリカ公衆衛生院のM．エデン博士が、〝技術のコミュニケーションに与えた影響〟について論じた。技術の影響は、従来まで情報伝達に於ける人間と機械の問題のみではなく、情報とその機械による伝達という関連で考察されてきた。情報伝達にともなう「変形」たとえば自然の言葉が、書物に文字として印刷されるとき、情報は持続的な普遍性をもつものとして、人々に伝達される。書物は、読者によって好きなとき、どこからでも好きな速さで読み理解することができる。読者は、時間的な拘束もなく、くり返し同じページを読むことも可能である。さらに、どんな場所でも何時でも、読書にふけることができ、周囲の人々にもさして影響を与えることもない。

読破した書物は、蔵書として保存し、その内容はつぎつぎと自らの発想のなかに、活かすことができる。また、物質的には紙として、様々な用途も考えられる。書物は、安値であるが、その内容は、知的な人々にとって審美的なものである。しかし、書物そのものが、その情報的価値からみると、コピー機械の発達、マイクロ・フィルムの普及により、多少のゆるぎが見えてきた。とくに、テレビやラジオという、音声や映像によるマスコミの挑戦には、かなりの影響を受けつつあるといえる。たとえば、わが国でも時折みられる現象であるが、テレビの人気番組のある時間帯には、街の人通りが少なくなるほどである。情報の画一的な伝達は、エレクトロニクスの発展により、急速かつ広範囲なものとなり、機器の小型化も、われわれの日常生活に大きな変化をもたらしつつある。

このような情報機器の発達が、人々に与える生理的かつ心理的な影響は、情報の発信者と受信者の双方にかかわるものである。つまり、両者にはそれなりに個別の要求、目的、優先順位などがあり、したがって、相方に全く相反する場合も生じてくる。要約すると、社会のなかでコミュニケーションにより相方の意志を統一させることは、発信者と受信者をつなぐ技術の発展により、ある程度まで決定される。

エレクトロニクス技術の急速な進歩は、電子通信の分野に大きな役割を演じ、通信衛星の発展と相まって、今後ますます革新するものと思われる。身近かなことを考えても、市民バンドといわれる、個人的な通信システムをはじめ、自動車電話、ポケット・ベルの普及など、われわれの社会は、かつて想像し得なかった分野につぎつぎと開花しつつある。

エデン博士の論文は、アメリカ型社会のコミュニケーションについて、社会的かつ技術的側面を述べたものであり、このことはわが国にも、そのままあてはまるものであった。こうした、一般的なテーマから、個人的なレベルを扱った研究発表として、インドのR．ナラシムハン教授が〝コミュニケーションと理解—言語行動への比較的アプローチ〟と題して、言語による人間行動のコンピューターによるモ

デル研究について述べた。

かつて、条件反射のパブロフが指摘したように、、動物は複雑な感覚・運動神経系により直接的に彼等が生存する環境と接している。ところが、人間はそれとともに、第2次信号系、つまり言語を有し、それが自己の環境の理解と、人間同志の意志の疎通に、大きな役割を演じている。

言語は言うまでもなく、音声によるパターンであり、ある現象を音声信号により表現するものである。さらに、言語は人間の文化とともに、伝統的に受けつがれているため、自律的に文法の仕組を、つくりあげてきたのである。このことは、言語構造から人間行動をシミュレートするとき、根本的な原則となる。一方、論理的なコンピューターの言語は、人間の自然言語のようなあいまいな性質をもたないため、不確実な推論やデータが入力として用いられると、自己修正の能力がないため、いくら長時間演算についやしても、間違った結果をはじき出してしまうのである。

自然言語が感覚的な意味をもつことを実証する研究として、東京大学の石井威望教授による〝新生児と母親とのコミュニケーション〟はコミュニケーションの基本として関心をよんだ。石井教授は、生後4日目の新生児の感覚と行動を母親の声により、またその触覚を母親との接触により求め、新生児と母親とのコミュニケーションを、ビデオテープを用いて紹介し、新しい事例研究として注目を引いた。このことは、生物のパターン認識の基本的課題であることをいくつかの例で示した。ついで新生児は、出生以前から、母親の音声を識別することができ、さらに母親は、新生児の泣き声により乳分泌が刺激される、という相互コミュニケーションがあることをこれまでの実験データーにより論じた。

これらの現象は、一般的にも言い伝えなどにより認識されてはいたが、科学的に実証されたのははじめてであり、人間の言語構造とコミュニケーションの研究に、ひとつの分野を開くものとして注目された。

生物のコミュニケーションには、個体内の生理的なもの、遺伝レベルのものから、個体とその環境とのコミュニケーションなど、さまざまなレベルのものが考えられる。社会的にも、コミュニケーションは慣習に左右されることもしばしばである。とくに、男女の愛の言葉などには、日本とアメリカでは全く異なる表現形式などがある。いずれにしても、言葉のやりとりが、新しい感覚を人間に生みだすこともしばしばである。

わが国の山本七平氏も述べていたが、情報に言語的な〝翻訳〟が存在するとき、真のコミュニケーションが存在しえるか……、という問題も提起された。しかし、逆にみると翻訳なしには、あらゆるコミュニケーションが存在しないことも事実なのである。ここで、翻訳とは単なる言葉の変換だけではなく、それまでの長い経験を経て、つちかわれた解釈の基準であるといえる。この解釈というのがまたくせものなのである。

カナダの雪原に迷い込んだ地理学者が、道案内のインディアンにわれわれは迷ってしまったとつげると、インディアンは〝そんなことはない〟と答えた。彼等の解釈によると、自分達はここにいるではないか、これは明らかな事実である。したがって、迷ってしまったのは、われわれのテントなのである。ということになる。

われわれ人間に、コミュニケーションのさまざまなプロセスが、文化的にも技術的にも何をすることかを理解しない限り、このプロセスを人間がコントロールすることは不可能だろう。

技術的側面でのコミュニケーションのプロセスは、まさにエレクトロニクスの産物である。電気通信科学財団理事長の白根禮吉氏は、相互コミュニケーションの増大について、ミディアム・メディアを活用すべきことを述べ、ついで日本のコミュニケーション技術に関する、研究開発の映画を公開し好評であった。

4．コミュニケーション―相互理解と社会

人間それ自身に対する人間の好奇心は、人類が地球上に誕生したときからはじまった。このことは、自己の存在理由（ raison d'etre ）の探究のはじめでもある。第3セッションは、人間のコミュニケーションのプロセスを分析し、これを科学的手法でシミュレートする試みとともに、自己の内部に構築されているコミュニケーションによる相互理解の仕組を、説き明かそうとするものである。このことは、コミュニケーション機構の理論と実践を論じることでもある。

パリ第8大学教授のJ．F．ル・ヌイ教授は、〝個人、クラス、グループ間のコミュニケーション〟という論文のなかで、コミュニケーションによる、人

間相互の理解とは、〝アルゴリズム（algorism 註）的活動〟であると仮定し、その基本的要素としてつぎの項目をあげた。すなわち、

(1) 基本的理解のアルゴリズムは、人間や動物の脳のなかに蓄積されている。

(2) アルゴリズムの操作は、〝意味論的記憶〟に依存している。

(3) 発信者の意志を理解する能力は、受信者と発信者との意味論的記憶の等価性に依存している。

これらの基本的考察を、個人およびグループのコミュニケーションに適用して、社会行動のコミュニケーションに対する重要性を指摘するとともに、たとえば学習により得られる能力に対し、生まれつきや直感的能力も重要な要素であることを論じた。

さらに、グループ・コミュニケーションに於ては、つぎの2つの観点から論じられた。つまり、

(1) グループの内部構造がもつ機能としての情報受理能力。

(2) より広範囲な社会構造のなかで、他のいくつかの社会集団との情報受理能力。

これらのうち、社会にとって重要なのは(2)の項目で、こうした情報受理能力の増大は、社会の安定を潜在的に乱す可能性につながるからである。

いずれにしても、コミュニケーションによる相互依存は、それぞれのグループの歴史と文化により、その度合が決まるものである。古い慣習に関する情報は、速やかにその道の権威の判断をあおぐことができるが、新しい分野の情報については、その道の権威もなく、また一般的な規範もないのが現状である。

このことは、異文化間のコミュニケーションについても言えることで、他の文化では、明確な規模が存在することでも、一方の文化にはすべてが新しく、なんの規範もないことが多い。これらのことは、東洋と西洋の思考の相異にもあてはまることで、東京大学の辻村明教授は、日本式思考に及ぼす禅の影響について述べ、多くの人々に感銘を与えた。デカルトは〝われ思う、故にわれあり〟という哲学的思考を展開したが、この西洋思考は、自我（エゴ）を何よりも優先して認めることからはじまっている。他方、禅は自我の観念を放棄することからはじまる。この世界観の相異は、そのまま生活形式や文化の違いとなって表われている。

〝技術移行〟を考えるとき、このことは重要なポイントである。技術移行については、ニカラグアで中央医療センターより、無線を用いて、各地の患者に臨床の助言ができるシステムの報告があった。また、ラゴスとナイジェリアの田舎町で、自動車修理の技術的質が、問われはじめた話題などでにぎわった。この地方では、まず自らの自動車修理の技術を身につけた実例などが紹介され、一口に技術移行と言っても、地域の文化程度により、さまざまな形態があることを示した。

発展途上国での技術は、まだまだ初歩的な段階にあり、技術修得のプロセスに独自性があるが、文明を積極的に受け入れ、使いこなそうとする意欲と好奇心がみなぎっている。しかし、技術移行の問題となると、それが展開される地域の文化的諸問題を、現実的に把あくすることは、きわめて困難である。それ故に、技術移行それ自身を総合的に論じることは容易なことではない。

5．コミュニケーション—分散と集中

産業活動が、第3次産業化するにつれて、物質生産に従事する労働者より、情報活動に属す労働者の方が格段と増加してきた。このことは、社会の諸構造が大きく変化しつつあることを示している。この変化は、コミュニケーションの未来を考えるとき、きわめて根本的なものである。

マサチューセッツ工科大学のデ・ソラ・プール教授は、〝将来のコミュニケーションの発達〟と題して、先進諸国でのつぎのような世界環境の変化が、コミュニケーションを大きく変えつつあることを強調した。すなわち、

(1) 世界経済の相互依存性の増大につれてグローバルな経済へと導く。

(2) 人や物の迅速かつ能率的で安価な輸送。

(3) エレクトロニクスによる宇宙通信技術。

(4) 人工知能技術の発達。

これらのうち、21世紀に向けて興味ある技術として、人工衛星によるコミュニケーション技術の進歩があげられる。とくに、通信衛星は赤道上空36,000kmの位置に静止しているため、地球への情報伝達の範囲を拡大化することにより、さまざまな利点を与えるとともに、国際的には大きな問題を引き起こすこととなろう。

(註)きちんと定義された関数をもつ数学的方式のことで、論理的に定義づけられた構造による活動をさす。

一般に、静止衛星を利用した通信衛星あるいは放送衛星の機能は、年ごとに向上し、ニュースの伝達は勿論のこと、経済的、技術的データの交換に、国境を超えてネットワークを構成することが可能となる。

こうした側面をも考慮して、フランス電子通信総局のJ．ヴォージュ博士は、〝経済とコミュニケーション〟という論文のなかで、今後の課題として、国家的背景をもとに、世界がコミュニケーションについての最適なネットワークを検討すべきことの重要性を指摘し、デ・ソラ・プール教換の発言に数量的データを与えながら解説した。

コミュニケーションのネットワークには、いわゆる線形につぎつぎと接続していくのも、中央のステーションから星形に各地域に伝達されるもの、それぞれのステーションが網状に連結されているものがある。勿論、非集中化を排した網状システムがもっとも効率性が高く、地球上の災害にも強く、効果的なネットワークである。このことを、地上局のみで実現することは、設備などにかなりの投資を必要とするが、通信衛星を利用すると、きわめて容易にシステムを実現することが可能となる。

このような、エレクトロニクスの総合的な発展により、コミュニケーション・システムが個人的レベルにまで分散化されてきたので、これまでのように、都市へ人口集中をいやが上にも増大させた原因のひとつは、消滅しつつある。

ところが、通信衛星によるコミュニケーションとコンピューターを総合化したシステムは、地域的には情報の分散化を果たしつつあるが、より地球的レベルでみると、さらに強力な集中化が起こりつつあることを意味している。たとえば、超大型コンピューターを、通信衛星を介して、どこの国のどの都市からでも、容易に利用可能となっている現実に、思いをはせるとよい。このことは、世界的規模で、集中化が進みつつある証拠である。

以上のことを考慮して、デ・ソラ・プール教授は、コミュニケーションの未来像を確立するためにも、同時に進行しつつあるコミュニケーションによる情報の分散化と中央集中化について、それぞれのレベルで厳密な調査・研究が必要であることを示唆した。この指摘は、きわめて重要なことであるが、分散化と中央集中化の基本的な最適値、あるいは最適配分を、単なる物理的システムの最適問題として取扱うべきではない。この種の問題へのアプローチは、まさに今回のパリ・シンポジウムの標題である〝人間の行動におけるコミュニケーション〟の本質的な課題で、人類全体の未来社会への設計、価値感という、人間それ自身の要求からくる諸問題を、抜きにして論じることは不可能であろう。

これはまさに、文化と技術のコミュニケーションにより、はじめて考えられ、構築される問題なのである。

6．コミュニケーション―都市問題のなかで

先進諸国にとって、都市問題は大きな課題である。都市は理論優先の科学的成果ではなく、人間による常識の集積である。ノーベル化学賞を受賞し、ディスカバリーズ・シンポジウムには常連の一人となったベルギーのI．プリゴジン教授の講演からはじまった。

都市とコミュニケーションを考えると、都市とは周囲の環境と相互に影響しながら、外に向って発展するとともに、都市内の人口増加や道路交通量の増加などの内部要因などから構成される複雑な社会である。この意味で都市は、分散型の構造をもち、その一部がコミュニケーションの機能をもつと、都市というシステムがもつ発展プロセスの方程式が、時折線形な発展から、非線形的な状況を示すので、全く予想外の変化をもたらすことがある。この発展プロセスの特性のわかれる点を、プリゴジン教授は、〝分岐点〟とよんだ。

都市システムに内在する、非線形的な要素が都市に生き生きとした活力を与えることにもなる。プリゴジン教授は、自らの専門である化学プロセスにおける、カタストロフィー問題を、この種の課題にあてはめ、〝ベルギーの主都ブリュッセルの事例研究報告〟にまとめている。1960年にブリュッセルにEEC（欧州経済共同体）本部が設立されたことにより、同市に重大な変化が生じ、その後、国際的な行政、産業の中心地としてのコミュニケーション機能をもつに至っている。この発展プロセスにおいて、ブリュッセルには、さまざまな諸問題が出現したので、その動的分析は今後の都市問題を考える課題として、きわめて重要であることを指摘している。

コミュニケーションが都市に与える影響については、さまざまな見解が提示された。とくに都市のもつ文化的側面と、その発展プロセスで要求される技術的側面からの充実というバランスをとることの必

要性がある。このバランスがくずれると、反社会運動化していく要因を、それだけ多く内在することになるのである。

都市内に於ける、コミュニケーションを総合的にとらえると、通貨の最適発行量、公務員や軍隊や警察の数と配置の最適化などが考えられる。さらに、産業排棄物による環境汚染などの公害問題とともに、それに対するグローバルな公害防止対策や、自然災害対策などの問題も、都市とのコミュニケーションの課題として把えるべきである。つまり、公害問題は住民と産業という相互に、それぞれのレベルでのコミュニケーションが、欠陥していたため生じた問題なのである。

イタリア科学技術連盟会長U．ペリグリーニ教授は、都市とコミュニケーションを考えるとき、つぎの3要素の相互関連のあることを主張した。

(1) 情報
(2) 理論的な科学技術
(3) 労働力

都市に於ける労働者の多くは、近代化されたオートメーション工場の作業に、従事する人々が多い。この種の労働力は、人間の英知と責任感により、漸進的な発展を遂げてきた。つまり、一世紀前には、肉体労働者が労働人口の大半を占めていたが、現在ではエリート技術者が大勢を占めるようになった。そこで、この発展傾向が存続することを考えると、今後のコミュニケーションにおいて、労働者・管理者と社会が、円滑な運営ができるような〝規範〟を考えるべきであろう。これこそ、ディスカバリーズ国際シンポジウムの基本理念である〝Humane Use of Human Ideas〟にもとづくものとなろう。

7．ディスカバリーズ活動の意義

ディスカバリーズ活動の目的は何か？〝Humane Use of Human Ideas〟という言葉は感動的で、人々の心をうつ表現であるが、その意味を実際に理解するには、具体的な説明が必要である。たとえば、「Humane Use」とはどういう意味なのか、それを実行するにはどうすればよいのか、ということである。この2つの問題こそまさに、一連のディスカバリーズ国際シンポジウムが、解決しようとしている課題なのである。その意味でコミュニケーションを論じたパリ・シンポジウムは、重要な会議であった。今回はとくにコミュニケーションと情報（後者が存在しなければ、前者は事実上無意味となる）に関する討論が行われたわけだが、全体としてコミュニケーションと情報という意味の解釈とその実践を考える場であった。

最終日の総括セッションは、J．C．シモン教授を議長として、パネラーは下田武三氏（本田財団理事長）、E．カイアニエロ教授（サレルノ大学、シンポジウム実行委員会副委員長）、I．プリゴジン教授（ブリュッセル・フリー大学）、T．セゲルステッド教授（ウプサラ大学）、A．ソービー教授（フランス・パリ大学）の参加メンバーとともに、来賓としてフランス産業省のM．M．ターピン氏も出席した。同氏は前日のいくつかのセッションにも出席し、M．アンドレ・ジロー大臣からのメッセージを続み上げた。

下田氏は主催者である本田財団を代表して、パリ・シンポジウムに満足していると挨拶し、今大会の成功に寄与したすべての人々に賛辞を述べた。本田財団がシンポジウムに期待する成果は、即答でも具体的な結論でもなく、財団の今後の活動を決める指針を求めるとであると力説した。

この言葉を受けついで、プリゴジン教授は大半の参加者の考えを代弁して、「私達の捜し求めている〝具体的な行動〟とはこれだ、と見極めて実行に移せるようになるにはどうすればよいのか」という問題を提起した。さらに、コミュニケーションと「情報蓄積」（informatique）はいかなる社会構造にとっても、必要不可欠なものであるから何よりも実行に移すべきである。しかも民主主義社会ではその2つが万人に「公開」されていなければならない。問題はそれをどのように実行するかである。このような専門的なテーマについて、素人とコミュニケートすることは、決してなまやさしいことではないからである。そして、この問題が 未解決のまま放置されていることが、少なくとも現在の「科学の危機」の一因なのである。パリ・シンポジウムに出席した知識人同士が、円滑にコミュニケートすることはもちろん必要不可欠であるが、それだけでは不十分なのである。つまり、「一般大衆」とのコミュニケーションや、科学研究活動の予算をつかさどる政府当局者などとのコミュニケーションも同程度に必要不可欠なのである。「巨額の研究開発費を提供している機関は、当然その研究成果を知る権利がある」とプリゴジン教授は締めくくった。

ソービー教授は、今回発表された一部の論文や発

言が、極めて専門的で難解であったことを指摘し、現代社会はボードレールが詩った「アホウドリ」に似ていると語った。アホウドリは他のどの鳥よりも空高く舞い上がるが、巨大な羽が邪魔で地上を歩くことができないという。同教授は各専門分野が最高の域に達することに反対しているのではなく、実際面で非常に重要な意味をもつ、より基本的な問題を無視すべきではない、ということを主張したいのであると述べた。パリ・シンポジウムは、コミュニケーションという一般的課題で、この種の問題を無視しがちであったことを指摘した。

カイアニエロ教授はソービー教授に同感の意を示しながらも、パリ・シンポジウムの内容が、極めて専門的であったことを弁明して、次のように語った。前回のローマ・シンポジウムが一般的課題を求めたので、今回は、ディスカバリーズ・プロジェクト自体にとって、必要不可欠と考えられる、コミュニケーション（専門知識の交換と交流）に重点を置いたことは当然の成りゆきであった。未来への性急な結論は避けるべきで、従来のローマ・クラブや同種の団体が、それなりに有意義であることは認めるが、ディスカバリーズはそれらの団体とは異なり、東洋と西洋の知識や英知と哲学を結集して、新しい人間による文明創造に役立てることを目的としている。ディスカバリーズの最大の関心事は、その分野と目標達成のための方法論と手法を見出すことにある。ここで注意すべきことは、過去の歴史を見れば明らかなように、研究活動の成果が、当初の期待からかけ離れることが実に多いという点である。ディスカバリーズ活動は、そうした事態を避けるべく努力すべきであり、その意味で、コミュニケーションは前進のための基本手段であるばかりでなく、進路を見失わずに着実な活動を展開するために必要なフィードバック・ループとして役立つものである。

セゲルステッド教授は、社会学的立場から目的と手段は切り離して考えるべきであるが、コミュニケーションは、手段かつ目的の相方を含むと述べ、学際的なアプローチの有効性が立証された以上は、より一層、科学専門用語の統一を図り、非標準「用語」（および非標準文法）による誤解を避けるべく努力することが、必要であると繰り返し強調した。また、若い世代の知識人たちが、彼らの親の青年時代には、考えられなかった新分野を背景として、意思決定の重責を担うようになろう。したがって、彼らとのコミュニケーションをはかり、強い信頼関係を築くことも、極めて必要であると力説した。

8．異文化を超える技術

異文化を考えるとき、東洋と西洋の文化的相違と、同程度の相違が、東洋や西洋に属する国々同士の間にも見られることを認識すべきである。科学技術が異文化間の相互理解に、多大な貢献をしていることは明白であり、少なくとも現在では、科学技術の専門用語は、明確な定義がなされ、万国共通語となりつつある。

ディスカバリーズ活動はその設立の主旨から、あくまでも日本色を出さず、異文化を超えて知的エリートを結集する舞台づくりである。この活動理念が理解されてか、パリ・シンポジウムはル・モンド紙に二回、約1ページにわたって紹介され、また週刊誌のレクスプレス誌は東京までM．ガロー氏を取材に派遣し、その特徴を報じ、テレビ、ラジオのインタビューもにぎわった。

ところで、今回はパリ大学教授でコミュニケーションの技術面で著名なJ．C．シモン教授を委員長とする国際委員会が、実質的にシンポジウムを主催したが、不思議にも、もっともコミュニケーションに欠けたのが、フランス人同士の意識であった。彼等の間には、日本のような平均的平等はなく、階級制を潜在した平等、つまり異文化性がありありと存在しているのである。

ガンコ一徹ながら、長年尊敬していたシモン先生などは、遂にわが親友たちのフランスの若きエリートと対立し、自分をどうするつもりかと私に迫った場面もあり、ディスカバリーズ活動のよき理解者であり、元駐日フランス大使館文化参事官だったド・ボッセ氏の出入りまでさし止めてしまい、ことあるごとに感情的な本音をぶつけてくれた。しかし、これがまた、異文化を考える私には好意的にさえ思えたのも、さすがパリであったと言えよう。

異文化間のコミュニケーションは、まさに言葉や思考のみでは不可能である。それは共同してひとつの手づくりのものをつくることからはじまる。かつて、コンコルドやエアバスの工場を見学したとき、それらがフランスを中核にイギリス、西ドイツ、スペイン、オランダ、ベルギー、アメリカなどの人々による手づくりのコミュニケートされた産物であることを思い出しつつ、シンポジウム運営で、むき出しにされる異文化間のイザコザに私は技術屋として異

文化間コミュニケーションについての明るい展望を学んだ。

人間はやはり、頭と手を使った共同作業から、さらに広い文化のコミュニケーションを可能にするのではあるまいか……。このことを実践するのが、わがディスカバリーズ活動の目的で、今夏は学術の香り高いストックホルムでその『活動宣言』を予定している。

(註)本文の一部に拙著〝文化と技術のコミュニケーション〞サンケイ新聞文化欄 1978年11月13日付夕刊を引用した。

Communication in human activity

1st day: What is communication?

1. Morning
Lecture I: From exchange to communication.
Lecturer: A. TOURAINE, Directeur d'Etudes à l'Ecole des Hautes Etudes en Sciences Sociales.
Lecture II: Communication between cultures.
Lecturer: L. DUMONT, Directeur d'Etudes à l'Ecole des Hautes Etudes en Sciences Sociales.

2. Afternoon
Round Table 1: The impossible transfer, misunderstanding.
Chairman: Y. JAIGU, Directeur de France Culture.
Round Table 2: Evolution of expression: interactions with computers.
Chairman: A. DANZIN, Directeur de l'IRIA.

3. Next day
Joint session.
Chairman: M. MAROIS, Professeur à la Faculté de Médecine (Paris VI).
Panel: A. DANZIN, L. DUMONT, Y. JAIGU, A. TOURAINE.

2nd day: The development of communication

1. Morning
Lecture III: Consequences of technology for communication.
Lecturer: M. EDEN, Professor, Chief biomedical engineering and instrumentation branch, National Institutes of Health, Bethesda.
Lecture IV: Communication and understanding, a competitional approach to language behaviour.
Lecturer: R. NARASIMHAN, Director at the Tata Institute of fundamental research, Bombay.

2. Afternoon
Round Table 3: Communication between human beings.
Chairman: T. ISHII, Professor at the University of Tokyo.
Round Table 4: Communication and the media.
Chairman: J. VIDAL BENEYTO, Professeur à la Faculté des Sciences Politiques et de Sociologie, Madrid.

3. Next day
Joint session.
Chairman: Y. NOVOZHILOV, Deputy Assistant Director-General for Science, UNESCO - Paris.
Panel: T. ISHII, J. VIDAL BENEYTO, M. EDEN, R. NARASIMHAN.

3rd day: Communication, understanding and society

1. Morning
Lecture V: Communication between individuals, classes and groups.
Lecturer: J.-F. LE NY, Professeur à l'Université Paris VIII.
Lecture VI: Machines as models of perception and comprehension.
Lecturer: J.-C. SIMON, Professeur à l'Université Pierre et Marie Curie (Paris VI).

2. Afternoon
Round Table 5: Problems of group acceptance of information.
Chairman: H. TAJFEL, Professeur à l'Université de Bristol.
Round Table 6: Cultural problems of technology transfer.
Chairman: Z. DAMJANOVIC, Professeur à l'Université des Sciences de Belgrade.

3. Next day
Joint session
Chairman: H.E. GUNNING, Professeur et Président de l'Université d'Alberta.
Panel: H. TAJFEL, Z. DAMJANOVIC, J.-F. LE NY, J.-C. SIMON.

4th day: Communication and socio-economic phenomena

1. Morning
Lecture VII: Development of communication in the future perspective.
Lecturer: I. de SOLA POOL, Professor, M.I.T. Cambridge.
Lecture VIII: Economy and communication.
Lecturer: J. VOGE, Directeur délégué pour les Relations Internationales à la Direction des Affaires Industrielles et Internationales - Direction Générale des Télécommunications - Paris.

2. Afternoon
Round Table 7: Urban problems, messages from town and politics.
Chairman: I. PRIGOGINE, Prix Nobel, Professeur à l'Université Libre de Bruxelles.
Round Table 8: Social consequences of economic and technological modifications resulting from communication.
Chairman: E. CAIANIELLO, Professeur à l'Université de Salerne.

3. Next day
Joint session.
Chairman: A. SAUVY, Professeur, Collège de France, Paris.
Panel: I. de SOLA POOL, E. CAIANIELLO, I. PRIGOGINE, J. VOGE.

THIRD DISCOVERIES SYMPOSIUM, PARIS "COMMUNICATION IN HUMAN ACTIVITY" 23 – 27 October 1978

The tremendous changes in modern society - and the inversion (or disappearance) of many of the relationships which over the past three hundred years had become accepted as the essential basis of a stable and expanding economy, are due to enormous and irreversible forces accompanying the gradual erosion of Europe's hitherto worldwide industrial and financial supremacy. At the same time there has been a veritable explosion in the production and circulation of information, and in the divers uses made of this - on the one hand by the "controlling classes" to maintain their control, on the other hand by individuals to resist the expanding "technocracy". This profoundly challenging theme was presented by the first two speakers in the third international "DISCOVERIES" Symposium, organised by the Honda Foundation, which opened in Paris on Monday morning 23 October 1978.

The DISCOVERIES series of Symposia, devoted to "the humane use of human ideas" began two years ago in Tokyo, was continued last autumn in Rome and, after the present meeting in Paris, will next year move to Stockholm. The objective, originally conceived by Dr. Soichiro Honda at the creation of the Honda Foundation, is to bring together top world humanists and scientists from a wide range of disciplines to examine together the present and future problems of our world, to discuss and debate their characteristics and dangers, and to arrive at new approaches and ideas which - it may be hoped - will permit their resolution.

The Paris meeting, held under the high patronage of Monsieur Pierre Aigrain, French Secretary of State for Scientific Research, was opened by Dr. Takeso Shimoda, President of the Honda Foundation. Dr. Shimoda was introduced by Professor Eduardo Caianiello of Salerno University, Vice-President of the Symposium's Scientific Committee (and Chairman of the Organising Committee of the 1977 meeting in Rome). Referring to the growing conflict between the benefits and disadvantages of developing technology, Dr. Shimoda emphasised the increasing problems of humanity in controlling its inventions, and cited the recent accidental disintegration of a Russian nuclear-powered satellite over Canada, leading to fears of radioactive pollution in that country. He called for a new mode of thinking, treating the entire world as a single "village" in which no activity in one area could be without its influences in others. These influences could only be understood by a full exchange of views and ideas from all the intellectual disciplines involved, and Dr. Shimoda paid tribute to Dr. Honda for his vision in this direction.

Monsieur Pierre Aigrain, on behalf of the French Government and of the French Minister for Universities, then welcomed all participants and also paid tribute to Dr. Honda's initiative. DISCOVERIES, he said, was a major step in the Great Debate on Civilisation. We were seeking world unification without the obligation of world uniformisation, and the contributions to be made by different cultures, especially the contrasting ones of East and West, were essential for the achievement of this objective. These contributions could not be realised without communication - hence the title of the present Symposium "Communication in Human Activity". Today, instant "real time" electronic communication throughout the world gave the human race a tool which so far surpassed older inventions based on the written or printed word, that it could easily lead to a tremendous advance of humanity, or to its destruction.

Monsieur Aigrain was followed by His Excellency Ambassador Kitahara, Japanese Ambassador to France, who read a message from his country's Prime Minister, Mr. Takeo Fukuda, congratulating the organisers of the Symposium and wishing it every possible success.

Professor J.C. Simon, of the Pierre and Marie Curie University in Paris, and Chairman of the Scientific Committee of the Symposium, then introduced some of the subjects to be discussed by noting that, today, nearly 50% of current working occupations were concerned with the manipulation of information. This was a further important reason why it was indispensable to examine its influence on our present and future well-being.

Finally Professor Caianiello, who had played a leading role in both the Tokyo and Rome Symposia, reminded the meeting that it was not true (as some maintained) that the evils brought about by technology and civilisation could be overcome without resort to technology and civlisation. Technology, in fact, was neutral - use of it depended on the will of man.

THIRD DISCOVERIES SYMPOSIUM, PARIS "COMMUNICATION IN HUMAN ACTIVITY"
First Working Session : Monday 23 October 1978

The first Working Session of the Paris Symposium was sub-titled "What is Communication?", but in fact comprised a great deal more than the definition which this suggests. In the morning, two papers by Professor Alain Touraine and Professor Louis Dumont, of the French Ecole des Hautes Etudes en Sciences Sociales, provided more than an introduction to the links between communication and "operational life", Professor Touraine sketching the causes and development of today's "crise de conscience" in the advanced countries of the west, while Professor Dumont examined (as examples of "communication between cultures") the process of "acculturation" of India to western values, and the interpretation or "translation" into German, by the philosophers Johann Gottfried Herder and Johann Gottlieb Fichte, of the French Revolution.

Professor Touraine's paper was entitled "From Exchange to Communication". It began by examining the conditions under which societies tended towards self-modification, showing the tendency to be strongest where there was a high degree of historical character (historicity) and weakest in societies where communications with environments had the nature of "balanced exchange". Today's crisis (or series of crises) could not be explained in the same terms as those of the past - far more was involved than purely economic problems, and in fact the basic cause was the ending of three centuries of European cultural domination of the world. The resulting crisis was not only hegemonic but ideological - a crisis of civilisation - and Professor Touraine saw three possible courses for the future: decadence (as evidenced by preference for immediate consumerism rather than preparation for the future); various counter-cultural movements implying changed values (preoccupation with more "primitive" cultures); or a growing movement towards a qualitative rather than a quantitative society - an important change for which a part of production would need to be retained within a society to enable it to modify itself appropriately (rather like preserving seeds to ensure future crops).

Professor Touraine certainly favoured the third of these courses, involving important changes not only in industrial production and distribution but also in industrial organisation. . . involving far more attention than hitherto to "management", and to the advanced information and communications systems which alone could bring about a revolution in this field. In short, the preferable post-industrial society would be a *communications society.*

Meanwhile, there were alarming trends in the increasing need for systems to regulate and control individual activities (a not entirely trivial example was the proliferation of traffic control signs on our road networks) and this was giving rise to a special form of popular anguish and resistance to the regulatory system (see also later, under the Round Table discussions). There was a growing concentration of power in mass-communication (via mass-media) and growing apprehension that information and communication - the keys to future well-being - could also be, in the wrong hands, the keys to disaster. As a result, a new ideological (and often "ecological") elite was today becoming ever more prominent, tending to displace the business elite of former years. "Programmed society" could raise many fears, and would be more and more resisted unless the "programmers" were (in the terms of DISCOVERIES) devoted to the humane use of human ideas.

Professor Dumont's paper was a full and detailed account of "case histories" showing the extent to which ideas absorbed by one culture from another are re-modelled and re-interpreted within their new social contexts. Examining the "Germanisation" of the French Revolution, he deduced certain traits in the former nation's culture which could approach a reasonable apologia for some recurrent trends in its relations with others. It became amost possible to understand - if not to accept - ideas of superiority and totalitarianism as natural and justifiable.* It was also possible to discern some of the many faces of national superiority, and so to infer that communication between cultures leading to mutual "acculturation" had far more to offer to the world of today than it did in the times of Herder and Fichte.

* Though Professor Dumont did not suggest it, there seemed to be implications here for the developing relations between some developing countries.

Following these two impressive papers by two very impressive sociologists*, the second (afternoon) part of the Session was devoted to two Round Table discussions, on "Misunderstanding (the impossible transfer)" and "Interactions with Computers (the evolution of expression)." These were chaired respectively by M. Yves Jaigu, Director of the French radio programme "France Culture" and by M. André Danzin, Director (inter alia) of the French Institut de Recherche d'Informatique et d'Automatique (IRIA).

M. Jaigu, introducing his discussion programme, remarked on the proliferation in the mass-media of esoteric "languages" relating to different specialist activities, and the overwhelming quantities of widely assorted classes of information which nowadays constantly bombard the listener (or indeed the newspaper reader and the television watcher). Public selectiveness was not renowned for its intellectual basis, and education had hardly kept pace with technical progress in the field of media reproduction. M. Jaigu was by no means sure that reporters - and information purveyors generally - always appreciated their responsibility to make their subject matter accessible, meaningful and clear to the unavoidably heterogeneous public which they served. He was sure the "more serious" radio programmes (such as "France Culture") were aware of this problem, and hoped they were overcoming it.

Professor Boris Rybak, Director of "NATO-ASI sur la Technologie" spoke of the considerable dangers of assuming that majority opinions, because they were of the majority, were necessarily the most deserving of attention; "responsible people" were often in the minority on major questions of the hour, yet their opinions could well be more valid than those which overrode them. Proliferation of and in the mass-media did nothing to ease this situation, and Professor Rybak went so far as to assert that our survival could depend on our timely diversion from reliance on majority opinions. He also warned against the encouragement of "institutionalised aggressive rivalry... which has confused liberty and licence" calling on all society to avoid "becoming a mad, ant-like mass, leading to entropic obliteration of all human personality".

Professor M. Alliot, of the French Laboratoire d'Anthropologie Juridique (Paris), reminding his colleagues that all human beings have a basic need to communicate with each other, suggested that much of today's media use was an abuse of this need. The use of "non-communication" (the refused rather than the impossible transfer) to protect cultural individuality had many champions among today's liberal thinkers, who believed strongly in individual rights to secrecy about many personal matters.

Greater efforts to improve inter-cultural communications were called for by Professor Isac Chiva (Laboratoire d'Anthropologie Sociale, Collège de France) who pointed out the particular importance of the implied rather than the obvious content of such communications, which meant that meanings could depend substantially on *both* cultures involved, and the relationships between them.

Lastly, Professor Ulf Himmelstrand, of Uppsala University, Sweden, called attention to the fact that all communication, when received, was interpreted by reference to any existing framework of connected information. This was why an uniformed public was unable to assess satisfactorily an item of information in a novel or unexplored field . . . or in a field where there had been previous misinformation. Many examples could be found in media handling of related news events over considerable time periods - such as of the Nigerian War from 1967 to 1970. These events were all too often (invariably?) given media treatment according to their "market-value" or saleability to the public, and not according to intrinsic value or importance.

Whilst this Round Table panel offered few suggestions for improving a situation which it seemed generally to deplore, it did highlight a number of basic problems which would doubtless be further elucidated in later sessions of the Symposium. It was perhaps to be regretted that, for a panel treating so important a subject, the disciplines represented seemed rather heavily weighted towards sociology... itself a discipline which some might consider too important to be left entirely to sociologists.

* Professor Dumont is in fact a social anthropologist.

The second Round Table discussion, on "Interactions and Computers" had a more catholic participation, comprising a lawyer (M. L. Mehl, Maître de Requêtes in the French Conseil d'Etat); a medical doctor (Professor J.P. Lévy, Cochin Hospital, Paris); and a mathematician (Professor J.L. Lions, Collège de France). The Chairman, M. André Danzin, is a physical scientist, and he also proved most adept at launching a fruitful discussion on what might have been entitled "talking with computers". Perhaps the most vigorous debate concerned whether today's tendency towards a computerised society (central data banks holding and constantly up-dating large quantities of information about individual citizens) was to be welcomed or deplored. Strongly advocating the former reaction, M. Mehl suggested that it must lead to greater fairness and uniformity in the treatment of citizens for, e.g. tax assessment. He believed in fact that the greater "transparency" resulting from computerised tax assessment and payment would not only eliminate illicit avoidance but would, for that reason, be welcomed by most of society.

This view was not however generally accepted, notably in a spirited intervention from the floor by Professor Harry Gunning (President and Vice-Chancellor of Alberta University, Canada) who declared that many individuals felt themselves assaulted and victimised by computers, which they sensed were depriving them of both privacy and individualty. The desire to be a unique human being, said Dr. Gunning, was no less strong than the desire to live, and he implied that much of today's resistance for even the most "innocent" use of computers was due to this desire being unrecognised.

M. Danzin, with support from M. Mehl, remarked that the much feared encroachment by computers on personal liberty was somewhat illusory, and further that acceptance of some "restraints to life" at this level could be compensated by greater freedom at higher levels. Thus, for example, the very considerable limitations to complete freedom in the use of a road system (speed limits, obligatory directions, etc.) were essential to guarantee to all road users that they could in fact use the roads. The more general theme, that complete freedom for one must mean strict controls for all others, though not evoked was clearly not far below the surface of thought.

On a further suggestion, that computers were essential to resolve the complexity of life today, Professor Murray Eden (National Institutes of Health, Bethesda, USA*) commented that computers could very easily make complexity worse. Furthermore, every complex problem which might be resolved could usually be guaranteed to point to an even more complex problem as yet unresolved. There was, in many areas of planning and analysis which could be submitted to computers, a saturation point beyond which additional data processing could not be expected to yield improved practical results.

Dr. Lévy gave some details of a medical diagnosis data bank which was being developed in France and which was yielding useful results in time saving and accurate diagnosis from predetermined standard medical tests. Neverthless, Dr. Lévy was neither optimistic nor enthusiastic towards wider applications of such systems, which he explained had several inherent limitations and were not generally well received within the medical profession.

This Round Table discussion was hardly starry-eyed about computers in what might be called the non-mathematical sciences, and it was left to the mathematician Professor Lions to give an assessment probably no less realistic than disappointing to the devoted computer enthusiast. Pointing out that many of the successes of computers were not due to new methods of calculation, but rather to their making possible - by their speed of action - calculations which would otherwise be too tedious (and expensive) to carry out, Professor Lions listed various mathematical methods which had been proposed as long as a century ago, but had then been abandoned because their use would have been more difficult than worthwhile. The fact that computers had now made these methods practicable was certainly welcome, but it did not necessarily entitle the computer to be attributed supermental powers. Nevertheless the computer offered some very important advantages in modelling certain complex social and similar systems.

---

* US Dept. of Health, Education & Welfare

THIRD DISCOVERIES SYMPOSIUM, PARIS "COMMUNICATION IN HUMAN ACTIVITY"

Second Working Session : Tuesday, 24 October 1978

The second Working Session of the Paris Symposium was devoted to "The Development of Communication", a subject vast enough to occupy a series of symposia and still remain barely broached. The papers and discussions were therefore necessarily devoted to a few specific aspects, most having strong and close links with computers and computer programming; and the casual observer might have been forgiven for wondering how the world had survived, and had even developed a civilisation (of sorts) during the thousands of years before the advent of these now ubiquitous benefits of esoteric thought and high technology.

The Session at least began with its feet on the ground, when Professor Murray Eden, of the US Department of Health, Education and Welfare, presented a review of the "Consequences of Technology for Communication". These consequences had in the past mainly related to information transmission, rather than to its transformation or use after receipt by man or machine; and Professor Eden noted the persistent universality and still unrivalled versatility of the written word, particularly in printed books. Books could be read at any desired rate, chapters and pages in any order the reader chose; reading could be in periods of any duration, with omission of some sections and repeats of others as desired; reading could be indulged in virtually everywhere, with negligible environmental effects (particularly no noise); and when a book had been read it could be easily stored, preserved, used for a multitude of non-literary purposes - even firelighting - or simply and quickly disposed of. And above all, books were comparatively cheap, therefore widely accessible and, to some people at least, they were things of beauty. Although books had generally survived the rivalries of electronic communication - and even profited in areas such as library operation, micropage recording, and invaluable current developments such as print-to-speech conversion for the benefit of blind people - there was no denying the challenges of radio and television, and Professor Eden remarked that the streets of American cities nowadays are deserted in the evening because so many are watching TV.* Nor could it be denied that information transformation after receipt was now a growing field for electronics, a field where miniaturisation and microcircuitry had revolutionised so much of our lives. On the physiological and pyschological planes, Professor Eden drew attention to relationships between the needs, priorities and goals of an information sender and of the receiver of that information - which might be similar, complementary or even antagonistic. "Intention on the part of the participants in communication" he said "plays a critical role in shaping both the directions which the technology has taken and the evolution of their social impacts".

The paper offered a vast amount of extremely interesting information, not the least being a reminder that many of the great inventions in electronic communications - the telephone, radio, TV itself and others - had come from "backroom amateurs". Professor Eden thought there was a good chance that this flowering of individual intellect would continue even in the much more scientifically-advanced world of tomorrow : it would certainly be encouraged by the fact that basic components - even for quite complex and powerful computer systems - could be bought on the retail market for prices within the reach of most "ordinary" citizens.

The Professor concluded his talk with a fascinating account ("case study") of the development in the United States of the phenomenon known as CB (Citizens' Band) Radio, which has manifest itself through the installation of nearly 14 million low-power VHF (27 Mc/s) transceivers mostly in private motor cars. The "big business" aspect of this aside, the really intriguing part-consequence/part-cause is the widespread use of these devices for citizens to establish anonymous radio relationships - talking together of matters which they would never mention within their own circle of recognised friends and relations. Here, surely, is the proof that man today needs a confessor no less than in the past.

Going from the general to the highly particular, the Session then heard a paper, no less fascinating but very much more esoteric, entitled "Communication and Understanding : a comparative approach to language behaviour". The speaker was Professor R. Narasimhan, of the Tata Institute of Fundamental Research in Bombay (India), who gave an extremely detailed account of computer modelling techniques applied to the study of human behaviour dependent on language. As noted by Pavlov, animals relate to their environment directly, via a complex "sensory-motor" system, while human beings make use of a "sec-

* This effect had been both unforeseen and unintentional : another unforeseen but (according to Professor Eden) hardly unintended effect was the "selling" of election candidates over the media by the same techniques as used to sell toothpaste. This was a highly lucrative market for marketing technology.

ondary signalling system", namely language, which profoundly affects apprehension and comprehension of a given situation, enabling - inter alia - experience to be stored for future reference. Language is acquired by example, by identifying sound patterns with certain situations and not, as traditionally supposed, through "internalised" grammatical systems. This is of fundamental importance when simulating situations from which to deduce behavioural patterns: if a computer is fed with incorrect assumptions or data as basic information, it cannot normally correct the error and so must deliver false conclusions.

The first of the two afternoon Round Table discussions, under the title "Communication between Human Beings" had much relevance to professor Narasimhan's paper. It was enlivened at the start by the projection of a teletape recording (incidentally noteworthy for the technical excellence of its production) showing the reactions of a 4-day old baby to sensory (mother's voice) and tactile (mother's touch) communication. This preceded a paper by the Round Table Chairman, Professor T. Ishii of Tokyo University, which dealt with experiments on pattern recognition in living beings and attempts to model these on computers. Significant results had shown that babies were able to appreciate their mother's voice long before birth* also that communication was "two-way", in that her baby's cry will stimulate a mother's secretion of milk. Understanding the mechanisms of these (clearly not unreasonable) phenomena, and those governing a baby's subsequent acquisition of its first fragments of language and language structure, are of great interest for the developers of computer simulation of language learning, right to the most sophisticated levels of what (pace Descartes) is becoming known as Artificial Intelligence.

The genetic transmission of (genetic) information has now been examined and investigated by very many researchers, prominent among them being Professor Marcello Siniscalco of the Sloan Kettering Institute for Cancer Research in New York, who gave a brief discourse on communication within molecular biology (storage, replication, translation and transmission of genetic information) and its relationship with the ecological environment in which it must take place. Professor Siniscalco, who was already familiar to many DISCOVERIES participants,** brought a welcome breath of "real" (i. e. non-modelled) science to the discussion, not to mention the welcome observation that "cultural communication" can be looked upon as the most sophisticated biological feature developed by Homo Sapiens (over and above societal instincts equivalent to those in other mammals) and that this feature is seen by many as the factor which will eventually enable mankind to direct the course of his own evolution.

Professor S. Aida of the University of Electro-Communications in Tokyo (and incidentally Secretary General of the Paris Symposium) noted the distinction between "internal" human communications (physically inside the body) and communication between the body and the environment. Assembling a valid model of the combined communication structure was a fascinating, important and difficult task, additionally complicated by the fact that traditional regional customs (he cited the American practice of telephoning daily between husband and wife to confirm continuing affection) could also affect the overall structure.

Next Professor Eduardo Caianiello (Salerno University and Vice-Chairman of the Paris meeting) reminded his colleagues that - as had been said many times already - communication was above all a matter of translation of information, and that without this there was in fact no communication. He was today, he said, after some 40 years of scientific activity, trying to "unlearn" much of the conditioning which his early training had given him, for he realised how much this conditioning could affect the way in which he would translate incoming information. As a simple (though certainly not trivial) illustration of the different interpretations which could be put on the same event, Professor Caianiello remarked how a geologist, once lost in the snows of Canada, had said to his Indian guides that he believed they were all lost. "Not so", came the reply, "we know very well that we are here: it is our tent that is lost".

Finally in this discussion, Professor Barrington Nevitt of Toronto University (also well-remembered from the 1977 Rome Symposium) took further forward the appreciation by babies before birth of their mother's voice, saying that a baby's first knowledge and mental formulation of his mother tongue (so correctly termed!) had also been shown to begin before birth.* Professor Nevitt saw the human learning process as comprising three simple factors : rhythm, rhyme, and reason . . . which were acquired in the order given. He also insisted - as he had done at previous meet-

* Some have maintained this is true from the moment of conception.

** He and his colleague, Dr. Luzzatto, presented papers at the 1977 Rome Symposium dealing with the role of genes in the transmission of heredity and resistance to disease.

* This would seem to restrict those validly claiming to have several mother tongues to children of linguists.

ings - on the importance of distinguishing between concepts and percepts, and of recognising how much the former depended on the framework (cultural, intellectual, mathematical, etc.) in which they were conceived. All "learning models" were necessarily conceptual also, and he pleaded for more attention, in trying to understand communication between living beings, to percepts . . . not only visual or audibly acquired percepts, but also those involving the important sense of touch. "We must", Professor Nevitt concluded, "understand what the communication process is doing to us, or we can never hope to control it".

The Second Round Table discussion, under the title "Communications and the Media", was chaired by Professor J. Vidal Beneyto, President of the International Committee on Communications, Knowledge and Culture. Professor P. Tannenbaum (BBC London) introduced the subject by emphasising the importance of the media in entertainment and in providing escape from everyday life to new or at least different horizons. He suggested that the supply of information to the public (news bulletins, educational programmes, etc.) although important should normally be subordinate to entertainment . . . which in practice it usually was.

Professor Kurt Lang (Oxford University) spoke of the political uses of the media, insisting on their importance in the formation of public opinion. Information inevitably plays a considerable part in establishing, modifying or qualifying our opinions, political or otherwise, and it is via the media (and usually the mass-media) that we normally acquire this information.

Dr. A. Willener (of the Institute for the Sociology of Mass Communication in Lausanne, Switzerland) described various practical experiments with local television, which evidently must usually have greater relevance for the local population than could national networks. Experience to date in several countries (on both sides of the Atlantic) had shown that local TV was by no means as simple as it appeared at first sight : it was often difficult (and costly) to cater specially for local tastes; in industrial areas most viewers were most of the day at work and therefore not available either to produce programme material or even to watch the programmes; and both stage and transmitting equipment was expensive.

Professor Reikichi Shirane, of the Telecommunications Science Foundation in Tokyo, spoke of increasing interest in *intercommunication* between media and the people (i.e. feedback) to enable the needs of particular sectors of the population to be, first of all, made known and then accommodated. He recognised that this was not normally possible for the true mass-media, but it was being adopted – with some success – by the "medium-media".

Finally, M. Mario Borillo, Research Director on "Informatique" of the French CNRS in Marseille, postulated some wider uses for computers in Mass Communication, and also in scientific communications over wide networks. Bringing the Round Table to a close in this way was a powerful, though perhaps unintentional, reminder of the fascination that "computerology" seems to have for so many people in so many contexts. It is of course undeniable that these machines can be - and are being already - of immense help in very many areas and undertakings, and it would have been impossible for DISCOVERIES to examine the subject of communication without much attention being given to them. Nevertheless, the title of the Paris Symposium was "Communication in Human Activity", not "Inhuman Activity in Communication".

THIRD DISCOVERIES SYMPOSIUM, PARIS "COMMUNICATION IN HUMAN ACTIVITY"

Third Working Session : Wednesday, 25 October

Man's curiosity about himself surely dates from his first arrival on earth, equally surely extending yet further into the past in a simultaneous search for an explanation of his origin and for his raison d'être. The third Working Session of the Paris DISCOVERIES Symposium, looking at the most advanced attempts to analyse and simulate human communication, no less surely marked man's continuing dogged persistence - and growing success - in understanding his own inbuilt secrets and constructing analogous competitors . . . which (at least in speed and accuracy) have already shown their superiority at some levels of logical evaluation and "thought". The third Working Session, sub-titled "Communication, Understanding and Society" began with two profound intellectual exercises in the challenging tradition of their alma mater, the Sorbonne University now known as various numbered units of the University of Paris. In two largely complementary papers, Professor J.F. Le Ny (Paris VIII - Vincennes) and Professor J.C. Simon (Paris VI - Pierre et Marie Curie) provided a high-level introduction to the theory and practice of Communication Mechanics.

Professor Le Ny's paper, "Communication between Individuals, Classes and Groups", was in fact a treatise on comprehension - an activity fundamental to communication even if not always so recognised. Assuming that human comprehension is (as seemingly it must be) an "algorithmic activity", he reviewed recent work by a number of specialist teams including his own which essentially suggested :

- that basic comprehension algorithms are stored in the human (and indeed all other animal) brain;
- that the operation (execution) of the algorithms depends on a form of "semantic memory", and therefore
- that the ability to comprehend a "message" in the way intended by the person transmitting it must depend on equivalence between the receiver's and the transmitter's semantic memory.*

Applying these ideas to class and group communication, Professor Le Ny indicated the importance for communication of social behaviour (a form of communication in itself), and the importance of certain innate or intuitive abilities as opposed to those which might be acquired through (e.g.) learning.

* No summary could hope to present either Professor Le Ny's discourse or that of Professor Simon in any other way than as an invitation to those interested to obtain and study the complete papers.

Professor Simon interpreted these basic ideas in a practical demonstration - through diagrams, projections, and a remarkable recording of a totally artificial voice generated in a minicomputer from a typed input message. This most impressive performance, although it seemed still a very long way from "true artificial intelligence"* was an invaluable display, for those not frequently or closely in touch with research of this nature, of the tremendous advances which have been made not only in computer programming but also in the computing machines themselves. In particular, the ability to carry out extremely complex (and/or tedious) computations in "on-line" central equipment for, e.g., exploratory satellites investigating the solar system or further afield, is a dazzling tribute to the non-artificial intelligence of Man himself.

Descending from such heights of cerebral exercise to more earthly intellectual and cultural problems, at least some DISCOVERIES participants must have been struck by the contrast between the microscopic analysis of voice patterns displayed on an oscillograph and the macroscopic approximativity of "ordinary" discussion in the afternoon Round Table sessions . . . particularly when inter-language transfer was taking place against a noise background including powerful hammering in a nearby office and occasional disturbances from a rogue telephone bell in one of the conference rooms. Nevertheless the two sessions, on "Problems of Group Acceptance of Information" and "Cultural Problems of Technology Transfer", produced some highly interesting and illuminating discussions.

The "Group Acceptance" Session was chaired by Professor Henry Tajfel of Bristol University (UK), and the panel included Professors Louis Dumont (Paris University), Pietro Omodeo (Padua University, Italy), Torgny Segerstedt (Uppsala University, Sweden), and Akira Tsujimura (Tokyo University).

Professor Tajfel directed the attack from two viewpoints :

a) acceptance of information as a function of the (accepting) group's internal composition, structure, function, goals and ecology; and
b) acceptance as a function of the group's relations with other social groups within a wider social structure.

* However that might be defined . . . if indeed definition is possible.

He believed the second issue to be of much greater importance, and much greater potential danger to societal stability, than the first, and was particularly concerned by the possibility of complete communication blockage when conflicts occurred between groups which were basically interdependent. Unfortunately, the causes of conflict frequently included a strong desire by such interdependent groups to represent themselves as independent, an objective clearly irreconcilable with reality.

Other causes of conflict cited by other speakers included those based on the difficulty of admitting "the truth" about some particular development or event which seemed culturally unacceptable. For example Professor Omodeo described the resistance in the past to admitting that the disease of scabies could be caused by an organism so small as the accarius mite. Somewhat related was the difficulty - perhaps encouraged by many peoples' concept of the mass-media as a type of propaganda machine - of convincing the population of, for example, the real magnitudes of comparative risks associated with different methods of producing electrical power. As Professor Segerstedt remarked ; "When we receive a message which is relevant to an old custom we generally ask a person we regard as an authority, but we do not seem to have any 'real' authorities with regard to new fields of information."

A particularly interesting contribution was that of Professor Tsujimura, one of the few participants in the Symposium to go in any detail into differences between Western and Eastern thought - the bringing together of which is among the objectives of DISCOVERIES. Professor Tsujimura described the influence of Zen on the Japanese way of life and attitudes, making it clear that these attitudes could be of particular assistance when contemplating revolutionary and perhaps unexpected changes in the material world . . . the environment. The West follows Descartes' "I think therefore I am" in recognising the Ego as a fact of life through which all perceptions are made. Zen, on the other hand, does away with the notion of Ego, this being most obvious in Japanese Zen art. Objects are represented in such a way as to capture their "essence", whilst the personality of the artist is totally bypassed.

The Round Table discussion on the "Transfer of Technology", which was chaired by Professor Zvonimir Damjanovic, Director of the Multidisciplinary Studies Centre in Belgrade (Yugoslavia) brought together Dr. Jean Cloutier, Director General of the International Institute of Communication in Montreal (Canada), Professor Harold A. Linstone of the Futures Research Institute of Portland, Oregon (USA), Professor Alwyn C. Scott of the University of Wisconsin at Madison (USA) and Professor Donald Ekong, Vice-Chancellor of the University of Port Harcourt in Nigeria.

The discussion ranged from the supply of radio communications equipment to medical posts in Nicaragua, to enable clinical advice to be obtained rapidly from a central control station, to the difference between the qualities of automobile servicing in Lagos and in the Nigerian countryside (the latter was said to be much superior, due to the country garage proprietor having been obliged to "generate" his own technology by cannibalising several cars in order to build one working model).

In pronounced contrast to the technological complexity of the morning's papers by Professors Le Ny and Simon, this afternoon Round Table showed how elementary was the technology available in the developing countries. Worse, even this was mostly supplied in "package" form (witness the medical radiocommunication sets). The inevitable and unhappy conclusion in this highly intellectual Symposium where men made in God's image were busily constructing new gods in their own image, was that the cultural problems of technology transfer could hardly be discussed, for the technology transfer itself was insignificant.

THIRD DISCOVERIES SYMPOSIUM, PARIS "COMMUNICATION IN HUMAN ACTIVITY"

Fourth Working Session : Thursday, 26 October 1978

If the two opening papers of Wednesday's Session of the Symposium (Professors J.F. Le Ny and J.C. Simon) were "largely complementary", those of Thursday's Session (Professor Ithiel de Sola Pool and Jean Voge) were even more close to each other, notably in their emphasis on the much increased "information content" of modern production - with a much increased proportion of the workforce engaged in informational activities rather than material production; and in drawing attention to changing structures in information production, treatment and dissemination. Both these changes are fundamental, almost certainly irreversible, and quite certainly changes which nostalgic supporters of "the old order"* can be expected to resist for as long as possible.

Professor de Sola Pool, of the Massachusetts Institute of Technology, in a paper entitled "Development of Communication in the Future Perspective" maintained that these changes resulted mainly from four world developments :

- growing economic interdependence, leading to a "global economy";
- rapid and efficient (and cheap) transport of persons and things;
- electronic communication; and
- "intelligent" machines.

Of these the most immediately significant were electronic communication, especially via geostationary satellites, and transport . . . even though the former was likely eventually to make "business" transport less and less necessary. One result would be the inevitable collapse of national frontier controls on information transmission, and on services dependent on this such as news diffusion, interchange of cultural, technical and economic data and, for example, banking (banks anywhere in the world would be accessible "to anyone who can pick up a telephone anywhere").

In his paper "Economy and Communication" Professor Voge (French Direction Genérale de Télécommunications, Paris) added quantitative data to Professor de Sola Pool's information, in particular developing rules for "optimum" structures in communications networks and showing that a system of exchanges at several levels (subscribers being connected to "primary" exchanges which were themselves interconnected through "higher-order group exchanges" at one or more levels) required less commutable connections and consumed less power than if a single large centralised exchange were used. This demonstration that a degree of decentralisation led to greater efficiency clearly had relevance in other fields, notably that of agglomerations of "population units" in large cities as opposed to their distribution more evenly over much wider areas. The compelling reason of the past for concentrating population in cities (the need for frequent and rapid personal contacts with many other citizens) was disappearing as electronic communication made personal contacts a matter of choice rather than of necessity.

Concerning information content in production, Dr. Voge cited figures, mainly from the United States, indicating that an optimum content (information "quota" or "ratio") was 50%, and that in the US this had now been very nearly achieved. The more advanced countries elsewhere in the world were in pursuit.

The two papers of Professors de Sola Pool and Voge contained a great amount of additional information, which cannot easily be summarised and should therefore be sought in the original texts. However, one somewhat paradoxical observation may be noted : that increasing unification of communications structures (e.g. through satellites and even through large though "distributed" computer systems) may not only lead to greater physical decentralisation of much of our currently centralised society; it could equally lead to even *further* centralisation, which at least initially would probably exhibit increased efficiency. This point was raised in the discussion following the two papers, when it was pointed out that in some circumstances decentralisation could lead to paralysis and disaster. Professor de Sola Pool readily agreed that this might be so, and remarked that there seemed need for a rigorous study of the relationships between technology and decentralisation.

* In particular, according to Professor de Sola Pool, nation states, bureaucracies, cities, and a class structure in which manual labour is performed by an underclass and mental labour by an elite.

One questioner in the discussion wondered whether Dr. Voge's conclusions concerning optimum telephone networks were necessarily valid for the much more complex interconnected networks of a complete society: and another drew attention to the importance of quality (whether of products or of life) which would not necessarily follow the same type of law as Dr. Voge's paper had described. Could it be envisaged, in fact, that if eventually production growth rates became very low or even zero, being perhaps compensated by high information growth rates, a general growth in quality (presumably at least partly dependent on information quota) might also be achieved. These remarks provoked some lively and controversial discussion, leading to a characteristically philosophical concluding remark by Professor Eduardo Caianiello, to the effect that fundamental changes such as more (or less) decentralisation should not be decided only on the results of technical studies and calculated figures. These should be used as guides towards sound future planning, but at some point there should be consideration of human wishes . . . and human happiness.

For the afternoon, two Round Table Discussions had been announced : one, to be chaired by Professor Ilya Prigogine (Free University of Brussels : Nobel Prize for Chemistry, 1976) on "Urban Problems, messages from Town and Politics"; the other on "Social Consequences of Economic and Technological Modifications resulting from Communication", to be chaired by Professor Caianiello. In fact, as a result of many participants wishing to avoid exclusion from one discussion while attending the other, the two were amalgamated . . . or at least took place serially in a single room rather than simultaneously in two. Although this resulted in some rather abbreviated presentations, and allowed no time for participation from the floor, these inconveniences were probably compensated by the knowledge that "nobody was missing anything".

Professor Prigogine opened the Session with a brief exposition of his celebrated "town" model of a complex societal unit, interacting with its environment and at the same time pursuing an internal evolution due to such developments as expanding population or increasing road traffic. Towns in this sense are "dissipative structures", and when some part of the system is disturbed by a "communication", resulting nonlinearities in the various interrelated evolutionary paths of the system may provoke unforeseen changes which, Professor Prigogine's terms, are "bifurcations". Without such non-linearities the system would not of course - and could not - remain a "living system".

This type of analytical approach was mentioned in a case study of the Belgian capital Brussels, presented by Professor P. Laconte (Louvain Catholic University), who described the very substantial changes resulting from the installation of EEC Headquarters in Brussels in 1960, and the subsequent development of the city as an international centre of administration and business. Professor Laconte's account of the present situation of Brussels clearly represented the many and complex problems associated with such a development and amply demonstrated the need for and value of dynamic analyses of this type.

Two other papers, from Professors P. Allen (Brussels Free University) and M. Castells (French Study Centre for Social Movements, Paris), dealt respectively with some effects of its communications system on the growth or decline of a town (again professor Prigogine's model was relevant); and with methods for "accommodating" some of the new forms of social movement which modern urban development tended to encourage. This paper gave ample evidence of the very substantial effects which such movements can have on an entire community.

Professor Caianiello then took over the Chairmanship, delivering some penetrating reflections on such matters as the optimum values of money pieces and notes in a currency, numbers of officers and men in military and other teams, and of participants in discussions (in order to achieve valid conclusions without excessive delays). This introduction to some rather novel uses of "mathematical linguistics", as professor Caianiello described them, must have set many of those present thinking of new possibilities for the application of their professional training.

Professor Luigi Mendia (Naples University, Italy) had some remarks on environmental quality and its preservation in face of various attacks such as the unhappy pollution by mercurial compounds of the sea at Minamata in Japan, or the dioxin poisoning in the Seveso region in the north of Italy. Both these events, besides being consequences of "communication" in the sense of the DISCOVERIES Symposium, must surely also be attributed to ineffective or perhaps non-communication in an important measure.

Professor Giuseppe Caglioti (Milan Institute of Nuclear Physics) spoke about "non-resolvable ambiguities" in ordered structures, illustrating his talk with some diagrams (now well-known to his Symposium colleagues) which can exercise the perceptual sensors of the human brain in a manner which - to an engineer - is reminiscent of an electronic "flip-flop" oscillator. The rythmic inversions of Professor Caglioti's ordered structures resemble a model, based on an ideally non-linear decision equation for binary systems, which was originally proposed to schematise the observed behaviour of neurons.

Next professor Umberto Pelligrini, President of the Federation of Scientific and Technical Associations in Milan (Italy), had some interesting details of the effects on the labour forces in the electronics industry of the impact of the manufacture and use of automation equipment. He saw (as had Professors de Sola Pool and Voge in the morning session) that modern society comprised three levels of communication-related activity ;

- information;
- intelligence technology (based on theoretical modelling of systems); and
- a workforce.

This last level was of special concern to Dr. F. Margulies, of the Austrian Federation of Trade Unions, who was unfortunately obliged to shorten his address but who showed that the gradual evolution of a workforce - which a century ago comprised mostly manual labour - to what was now a technological elite, had been achived with remarkable understanding and responsibility. Nevertheless, further progress could still be envisaged, and Dr. Margulies suggested a "guiding code" for continuing successful relations between workers, managers and society in the Age of Electronic Communication. Without reproducing that code here, it may suffice to say that it was a true expression of the humane use of human ideas.

To close the Session, Professor Barrington Nevitt delivered a short and witty summary of what has become well-known as his "Course on perceptual and conceptual communications", and on the important differences between synchronic (simultaneous) and diachronic (serial) assimilations of image patterns. Recalling that these two variants of communication were discussed in great detail at the second DISCOVERIES Symposium in Rome, Professor Nevitt reminded his listeners that now, as then, a basic key to understanding lay between the two halves of the human brain, one of which was devoted to "acoustic" and artistic, the other to logical and sequential comprehension. The one dealt with poetry and the other with engineering, and as before we needed to have more people who habitually used both.

THIRD DISCOVERIES SYMPOSIUM, PARIS "COMMUNICATION IN HUMAN ACTIVITY"

Concluding Session: Friday, 27 October 1978

The Concluding Session of the Third DISCOVERIES Symposium, on Friday morning 27 October 1978, was "concluding" only in the sense of being the last session of the Paris meeting. From the viewpoint of the on-going work of DISCOVERIES, the session was a moment for taking stock - not only of the past week's work but of overall progress towards the objectives of the Honda Foundation, and of Dr. Soichiro Honda when he created it, in establishing a combined oriental/occidental and multidisciplinary approach to the problems of a world rushing ever faster into the future: a future which is neither well understood nor even well defined.

What in fact are the objectives of DISCOVERIES? "The Humane use of Human Ideas" is emotive and immediately appealing (especially to human beings) but needs qualification to become practically significant. What is meant by "humane use", and how may it be achieved? It is precisely these questions which the series of DISCOVERIES symposia (Tokyo 1976, Rome 1977, Paris 1978 and Stockholm 1979) is trying to answer, and in this sense the Paris meeting was only one contributor - albeit a most important one - to the on-going movement. Dealing specifically with Communications and Information (the former has no practical significance without the latter) the meeting was itself an exercise in both.

The Friday morning session was in the form of a very high level panel discussion*. Chaired by Professor Jean-Claude Simon (Université de Pierre et Marie Curie, Paris, and Chairman of the Symposium's Scientific Committee), it included Dr. Takeso Shimoda, President of the Honda Foundation, Professor Eduardo Caianiello (Salerno University, and Vice Chairman of the Symposium's Scientific Committee), Professor Ilya Prigogine (Free University of Brussels ; Nobel Prize for Chemistry, 1976), Professor Torgny Segerstedt (Uppsala University) and professor Alfred Sauvy (Collège de France, Paris). It was in addition honoured by the presence of M.M. Turpin of the French Ministry for Industry, who had followed some of the previous day's sessions and who presented a message from the Minister M. André Giraud.

* Given the eminence of all the participants in the Symposium, the level of the panel could not have been otherwise whatever its composition.

In reply to an introductory remark by Professor Simon, Dr. Shimoda pronounced the Honda Foundation extremely satisfied with the Paris Symposium, and paid tribute to all those who had contributed to its success. He emphasised that the Foundation had not expected "instant answers" or concrete conclusions, but rather guidance for its future work. "You" he said, with the humility typical of the oriental approach*, "you will decide what direction you want to take.

It was Professor Prigogine who, in taking this invitation further, echoed the thoughts of most (if not all) present by asking how the sought-after "concrete action" might eventually be distinguished and launched. He believed there was wide agreement that communications and "informatique" must necessarily be involved, for they were essential to any societal structure, and must be fully "open" in a functioning democracy. This was where difficulties could arise, for communication on technical matters with non-technicians raised many formidable problems - whose non-resolution was at least partly the cause of the present "crisis in science". It was of course essential that those of the intellectual disciplines, as represented in the Paris meeting, should communicate successfully among themselves, but it was not enough: communication with "the public" was no less important . . . and indeed with governmental authorities and parliamentarians, who were usually the source of the investments without which scientific work would die. "The Government which pays big research bills" said professor Prigogine "has a right to the results."

Professor Sauvy, reflecting on the very esoteric nature of some of the papers and discussions during the meeting, drew an analogy between present-day society and Baudelaire's Albatross, soaring to ever greater heights in the air, yet being unable to walk on the ground because of the encumbrance of its great wings. While he was certainly not against progress in the most sophisticated realms of research, he entered a plea that more elementary but practically very important questions should not be neglected. He was a little suspicious that the Paris meeting had tended to forget this.

* Even had DISCOVERIES done no more than introduce the Western participants to this attitude, at the basis of the contemplative approach in what Professor Barrington Nevitt has termed "acoustic space", it would surely have registered in that an extremely significant success.

Professor Caianiello, while agreeing with Professor Sauvy defended the sophistication of the Paris approach by pointing out that, following the very general nature of the preceding meeting in Rome, the next step must logically have been devoted to communication, which was vital even to the future of the DISCOVERIES Project itself. Many other meetings around the world were devoted to "immediate aspects of futurology" (if that was not a paradoxical statement) and Professor Caianiello paid tribute to the Club of Rome and similar study enterprises. Where he believed DISCOVERIES differed from these was in its proclaimed objective of trying to pool oriental and occidental knowledge, wisdom and "philosophy" for the benefit of world civilisation as a whole. To a large degree, DISCOVERIES was concerned with the means towards the ends that were sought, and it was to be noted that history had shown the results of undertakings to be very often far removed from those envisaged. DISCOVERIES must try to avoid this, and communication was an essential tool not only for forward progress but, and in particular, for providing the feedback loops necessary for maintaining stability without losing direction.

Professor Segerstedt reminded the meeting that communication was in fact a means and an end - though he agreed that the two should be recognised as separate. He reiterated the need, now that the validity of the multidisciplinary approach was proven, for efforts to bring more uniformity into scientific language, so avoiding misunderstandings due to non-standardised "vocabularies" (and grammars). He also stressed the vital need to keep in communication with (and keep the confidence of) the younger generations of intellectuals, who would soon be shouldering the immense responsibilities of decision making in fields non-existent in their parents' youth.

The discussion being thrown open to the floor at this point, Dr. Jean Cloutier (International Institute of Communication, Montreal) performed a brilliant analysis of the Paris Symposium itself - analysing the use of the time available (despite extra hours, he found the time for discussion, as opposed to listening to papers, too limited); the success of communication at the two levels of intellectual exchange and language exchange (the translation services, incidentally, had been particularly good); and the intervention, whether intentional or not, of many other factors such as individual speakers' intuitions, psychologies etc). In particular Dr. Cloutier remarked on the "filtering" of information which inevitably took place as speeches were recorded, translated, retransmitted and published . . . and he saw these various stages as giving rise to "noise" in which meanings of insufficient amplitudes could be lost. He believed there was a need for a profound and extensive study of all the phenomena of "communication".

Professor Barrington Nevitt (Toronto University) agreed with the "noise" analogy but believed that, in addition to the sources mentioned, some noise was due to differences in cultures, notably between those of east and west. He called for greater efforts by representatives of each to understand the other "without" as he said "reducing one to the other". Professor Prigogine appeared to be unsure of this, saying that differences between some eastern cultures were at least as great as those between eastern and western: he believed an important contribution of science to intercultural understanding was precisely that the language of science - at least for the present - was more rigorously defined and more universal.*

A further remark from Professor Prigogine, in reply to a question (from Professor Alwyn Scott, Wisconsin University) concerning the application of his theories in the realm of pure physics, recalled a remark during the Rome Symposium when Professor Simon had questioned the *necessary* validity of "Occam's Razor**. Professor Prigogine, while not denying the value of "simplistic models" without which much scientific understanding could not have evolved, believed that today physicists (and others) were recognising that "reality" was usually extremely complex, and that much effort could be lost in seeking a simplistic "general pattern" which did not exist. A further comment (from Professor Marcello Siniscalco, Sloan Kettering Institute, New York) lent support to a thought which - though not publicly aired during the Symposium - had not been absent from some of the private discussions: it was at least not unimaginable that some aspects of nature might be so complex as to be beyond the comprehension of

* In fact, these two professorial opinions must surely be complementary rather than mutually exclusive.

** "Entities must not be multiplied unnecessarily" - ie. - the simplest explanation compatible with observed phenomena should always be adopted. The dictum is due to the English Franciscan monk William of Occam (1300–1350)

man, even man equipped with all his panoply of "peripherals" including those of informatique in its fullest sense.

In contrast to this, and certainly encouraging to anyone beginning, at this stage of the meeting, to sense incipient intellectual indigestion, Professor Harold Linstone (Futures Research Institute, Portlant, Oregon) drew attention to a typical case - an exercise in urban planning in Athens - where the application of "common sense" had produced greater efficiency in energy use than had a highly intellectual "first principles" study.

One final intervention, from Professor Luigi Mendia of Naples University, concerned the possibilities that modern communications systems offered for "manipulating" information made available to the public, and in some cases even those with intellectual and/of public authority. This aspect - the deliberate misuse of science and technology - had certainly been in the minds of many participants, particularly during the discussions of "high-level" machine handling of information. At least for the moment, however, there was no suggestion that the manipulation could result from any but human stimulation. The idea that a *Deus ex Machina* might itself engage in such an activity was not considered.

There is little doubt that this Paris Symposium was a highly stimulating experience for all who participated and no one can have gone home without many new thoughts and ideas to reflect upon. It is just as well they will have a whole year ahead of them before they will have to come together again for a new exercise in Stockholm.

REFLECTION

If those who would communicate
Should pause awhile to contemplate
Precisely what they had to say
to others, and in just what way . . .
They'd spend their lives in cerebration
Abandening communication
To those rash fools who went ahead
And spoke what came into their head.

By Bruce M. Adkins
Paris, October 1978.