WORKSHOP PROGRAMME

Tuesday April 12

All Day	Arrival of Participants
2000 - 2130 hrs.	RECEPTION by the Commonwealth Science Council and the National Science Research Council of Guyana at the UMANA YANA.

Wednesday April 13

0830 - 0900 hrs.	Registration of Participants and GROUP PHOTOGRAPH
0900 - 0930 hrs.	Official Opening by Cde. Shirley Field-Ridley Minister of Information, in the Multi-purpose Hall, Cyril Potter College of Education. Remarks by Mr. D. G. Thomas (CSC) Chairman Cde Victor Forsythe (Guyana)
0930 - 1000 hrs.	Introduction of Participants and Resource Personnel Cde. Dr. Pat Munroe
1030 - 1200 hrs.	Self introductions Mrs. J. Kimemiah (K.I.A., Kenya) Element of Communication Dr. Grant Carman (Agriculture Canada)
1330 - 1700 hrs.	Oral Presentation at Meetings, Conferences etc; and Presentation Practice Mr. D. G. Thomas (CSC) Mrs. J. Kimemiah (K.I.A., Kenya) Cde Compton Rodrigues (Guyana) Visuals Cde A. J. Seymour (Guyana)

Thursday April 14

0830 - 0900 hrs.	Review
0900 - 1730	Oral presentation to the public (Press Conference, radio & TV interviews) Cde C. A. Nascimento (Guyana) Cde Rafiq Khan (Guyana) Mr. Jones Madeira (Caribbean Community Secretariat)

Friday April 15

0830 - 0900 hrs.	Review
0900 - 1030 hrs.	Written Communication 1 - Planning and Production Mr. D. G. Thomas (CSC) Cde C. A. Nascimento (Guyana) Cde Oliver Hunter (Guyana)
1100 - 1230 hrs.	Written Communication 11 - Scientific Writing & Editing Prof. Mark Vahrman (University of Guyana) Dr. Grant Carman (Agriculture Canada)
1400 - 1500 hrs.	Writing for Technical Journals Dr. Grant Carman (Agriculture Canada) Cde Arlington Chesney (Guyana)
1500 - 1600 hrs.	Non-technical Publications - Press Releases, Feature articles Cde Victor Forsythe (Guyana) Cde Mohamed Hamaludin (Guyana) Cde Pat Brandon (Guyana)
1630 - 1730 hrs.	Pooling Experiences in Meetings and Practical Sessions Mrs. J. Kimemiah (K.I.A., Kenya) Cde Dr. Pat Munroe (Guyana)
1730 - 1800 hrs.	Film: "Leadership Dynamics"

Saturday April 16

0830 - 0930 hrs.	The Use of Audio-Visual Materials Mr. D. G. Thomas (CSC)
0930 - 1730 hrs.	Submissions to Committees - and Practical Sessions Mrs. J. Kimemiah (K.I.A., Kenya) Mr. D. G. Thomas (CSC) Dr. M. N. G. A. Khan (CSC) Cde Victor Forsythe (Guyana) Cde C. A. Nascimento (Guyana)
1900 - 2330 hrs.	BAR-B-Q and Dance at Thirsk Park, East Bank Demerara, through the kind courtesy of Banks D.I.H. Limited.

Sunday April 17

0830 - 0900 hrs.	Review
0900 - 1030 hrs.	Information Systems and Services in Science and Technology - An Overview Cde Chris Knee (NSRC; Guyana)

	Dr. Grant Carman (Agriculture Canada)
1100 - 1230 hrs.	International Information Systems Dr. M. N. G. A. Khan (CSC) Dr. Grant Carman (Agriculture Canada) VTR Shows: "An International Information Systems"
1400 - 1545 hrs.	Organising National Information Systems (Brief Presentations of background papers) Cde A. J. Seymour (Guyana) Cde A. McMurdoch (National Library, Guyana) Cde V. Kallicharran (University of Guyana Library) Cde Y. Stephenson (U.G. Library) Cde J. Craigwell (Guyana Archives) Mrs. Beverly Taylor (Bahamas) Mr. Godsman Ellis (Belize) Mrs. O. Lewis (Jamaica) Mr. G. O. Davis-Isaacs (Barbados)
1600 - 1730 hrs.	Organising National Information Systems: A Case Study
Monday April 18	
	Linden Programme arranged through the kind courtesy of the Guyana Bauxite Company Ltd
0700 hrs.	Leave Turkeyen for Linden
0900 hrs.	Arrive Linden
0900 - 1030 hrs.	Workshop session at Lichas hall: Planning and organisation of Conference, Workshops, Exhibitions, Open Days and Tours. Mr. D. G. Thomas (CSC) Mrs. J. Kememiah (K.I.A., Kenya) Cde Gwen Parris (Guyana) Cde Victor Forsythe (Guyana)
1030 - 1215 hrs.	TOUR OF GUYBAU MINES
1600 - 1730 hrs.	AND PLANT
1800 - 2000 hrs.	DINNER and Panel Discussion " Development of Science Communication in the Caribbean". - Guest Speakers (7 minutes survey each) Prof. J. J. Niles (Guyana) Cde Joel Benjamin (University of Guyana)

	Chairman: Cde Claude Saul Deputy Chief Executive, Guyana Bauxite Co., Limited
2015 hrs.	Leave Linden
2215 hrs.	Arrive Turkeyen
Tuesday April 19	
0830 - 1230 hrs.	Open
1400 - 1530 hrs.	Evaluation of the Workshop Dr. M. N. G. A. Khan (CSC) Mr. D. G. Thomas (CSC) Cde Dr. Pat Munroe (Guyana)
1600 - 1630 hrs.	Closing Session by Cde Hetram Haraj Permanent Secretary Ministry of Economic Development and Co-operatives
1930 hrs.	FAREWELL DRINKS offered by the Acting High Commissioner for Jamaica in Guyana and Mrs. A. H. Thompson, in the Multipurpose Hall, Cyril Potter College of Education.
Wednesday April 20	Departure of Participants

SOME WORKSHOP HIGHLIGHTS

Among the highlights of the workshop was the daily issue of Workshop Press Release prepared by different teams of participants who were able to see their work published in the national newspapers.

Oral Presentation to the Public

On April 14, the eighty participants, resource personnel and observers attending the Caribbean Workshop on Science Communication broke up into three (3) workshop groups and looked at the practical ways in which science communication can benefit people.

The Workshop groups took up the challenge thrown out the previous day to communicators and scientists at the opening of the Workshop by Information Minister, Cde Shirley Field-Ridley when she asked them to lift the veil of mystery surrounding science in the Region, and thereby help restore the people's self respect and confidence.

Leaders of the day's group were Cde C.A. Nascimento, an Institute of International Communication Trustee and Minister of State in the Office of the Prime Minister Cde Rafiq Khan, Director/General Manager of Radio Demerara; Cde Jones Madeira, Communications Officer of the Caribbean Community Secretariat; and Dr. Grant Carman, Director of Information, Agriculture Canada.

The Workshop on radio, handled by Cdes Madeira and Khan, saw Caribbean Broadcasters accepting that there is need for them to read more material related to science with the hope of improving their background knowledge on sciences related to Caribbean development.

The Workshop felt that there is need for scientists to break-down their 'language' so that communicators would find less difficulty in relaying to the public what is required of them for technological changes, improvements and development. The Workshop felt that the scientists and communicators should meet more often with a view to solving communication difficulties and misunderstanding which arise from time to time.

Describing communication as "understanding" in his major presentation on press conferences, Minister Nascimento pointed out:

> "In essence, we use a press conference to share what we have to say with our audience in a manner that is likely to attract their attention and hopefully win their assent. If we succeed in having our audience understand us and through understanding establish a common bond with them, we will have communicated".

After outlining steps for planning a successful press conference, the Minister stressed the essential need for credibility: "Let us never forget that the message which seeks to persuade will be successful only to the degree that the audience is convinced that its source is reliable and trustworthy and that the persuader is generally committed to the welfare of the audience".

Dr. Grant Carman in his presentation said that television can be highly supportive in science communication but was falling into third place in the scheme of things because of its high costs and the need for its high selective usage.

The day's session began with the participants viewing with keen interest a film on public speaking entitled, "The Floor is Yours". Later, the participants were all exposed to, and participated in discussions on, the techniques of the press conference, conducting radio and television interviews which were all filmed or recorded and played back for self-criticism.

The evening's session involved films on science and communication in addition to a slide sound programme by the Upper Mazaruni Development Authority DSC Unit and the Ministry of Health on Guyana's hydro-project entitled, "The Beginning of the Challenge".

WRITTEN COMMUNICATION

During the sessions on Friday April 15, University of Guyana Professor, Mark Vahrman, stated that Guyanese and the Caribbean scientists could be more effective by doing more scientific writing.

In presenting a paper on "Scientists Writing for Scientists" during the third day's sessions of the Caribbean Workshop on Science Communication, he also stressed:

> "The more important problem for Guyana, however, is for a greater scientific output particularly devoted to the development of indigenous resources".

He added that only in the last 50 years in the West did scientific opinion come to the forefront. Using this analogy for the Caribbean, he stated that it would probably take another 50 years for scientific opinion to have an impact on Caribbean people. In the Caribbean, Professor Vahrman added, scientists regrettably were not involved in policy-making at every level. This could be due to their small numbers, he said.

He was supported on this last point by Dr. Grant Carman of Canada, who expressed the hope that politicians would take note.

Earlier in the day's session on "Written Communication", Minister of State, Cde Kit Nascimento had outlined the main variables to be considered when producing written scientific communication.

Cde Oliver Hunter, Chief DSC Specialist, U.M.D.A., outlined, with examples, the planning and production of Written Communication for a difficult cross-cultural audience involving Akawai and Arecuna Amerindians, Porkknockers and Islanders in the Mazaruni Hydro Project Region.

Other speakers in the day's sessions were Workshop Director, Cde Victor Forsythe, on Press Releases; Mohamed Hamaludin, Chief Reporter, on Non-Technical Feature Articles; Cde Pat Brandon, Senior Health Education Officer, giving examples of non technical publications; Mrs. Joy Kimemiah (K.I.A. Kenya) and Dr. Pat Munroe, NSRC Secretary General on "Pooling Experiences in Meetings".

Commonwealth Science Council
Commonwealth Fund for Technical Cooperation
National Science Research Council, Guyana

CARIBBEAN WORKSHOP ON SCIENCE COMMUNICATION

Greater Georgetown, Guyana
April 1977

ASSESSMENT FORM

A critical assessment of the Workshop was made with the view of improving the quality and relevance of future National and Regional endeavours. Participants were requested to rank their respective evaluation of aspects of the Workshop by selecting a number, on a scale of 1 to 5, which most closely agreed with their assessment.

The number of participants who selected each number is shown in parenthesis following each ranking number.

WORKSHOP AIMS

	Completely				Not at all
Did the Workshop achieve its stated objectives?	5(2)	4(16)	3(8)	2	1
To what extent were your specific aims met?	5(5)	4(13)	3(9)	2(1)	1

COURSE CONTENT

	Too advanced			Too elementary	
Course subject level	5(1)	4(9)		3(20) 2(1)	1

COURSE LENGTH (7 days)

	Too long			Too short	
Was the Course	5	4(8)	3(16)	2(5)	1

TEACHING AIDS

	Very satisfied			Not satisfied	
How satisfied were you with the Equipment (visual aids etc)?	5(3)	4(6)	3(11)	2(7)	1(3)
Literature (lecture notes etc)?	5(8)	4(10)	3(10)	2(1)	1

WORKSHOP ADMINISTRATION

	Very satisfied			Not satisfied	
How satisfied were you with the Planning and organization of the Workshop?	5(7)	4(14)	3(11)	2(4)	1
Teaching accommodation (seating, audibility etc)?	5(12)	4(13)	3(3)	2	1
Living accommodation (rooms and meals)?	5(14)	4(8)	3(2)	2(1)	1

SUBJECT MATTER

	Extremely relevant				Irrelevant
Which are the subject matters you consider Elements of communication	5(18)	4(9)	3(4)	2	1
Oral Presentation.....					
- Meetings etc	5(16)	4(9)	3(5)	2	1
- Radio, TV, Press	5(15)	4(11)	3(4)	2	1
Written Communication.....					
- Planning and Production	5(17)	4(10)	3(3)	2	1
- Scientific Writing and Editing	5(13)	4(7)	3(5)	2(4)	1
- Writing for Technical Journals	5(15)	4(9)	3(4)	2(2)	1
-Writing for Non-Technical Publications	5(17)	4(11)	3(8)	2	1
- Submissions to Committees	5(12)	4(8)	3(1)	2	1
- Pooling Experience in Meetings	5(15)	4(8)	3(3)	2	1
Information Systems and Services in Science and Technology.....					
- Overview	5(7)	4(16)	3(6)	2	1
- International Information Systems	5(9)	4(13)	3(7)	2(1)	1
- Organization National Information Systems	5(14)	4(7)	3(6)	2(2)	1
- Planning and Organization of Conferences etc	5(14)	4(10)	3(3)	2(2)	1
-Panel Discussion - Development of Science Communication in the Caribbean	5(10)	4(9)	3(7)	2(2)	1
- Evaluation of the Workshop	5(15)	4(5)	3(1)	2	1

GENERAL COMMENTS

(Including suitability and effectiveness of programme)

A summary of the general comments is given on pages A.10 to A.12

ASSESSMENT.

GENERAL COMMENTS

1. Program was indeed suitable to situation with respect to Science Communication in the Caribbean. Its effect was reduced by the absence, from the workshop, of many practising scientists.

2. Extremely suitable and effective; a few more natural and applied scientists should have been present. (Gained a great deal).

3. Participation would have been better if accommodation was provided for all or those participants living more than six miles from Cyril Potter College of Education.

4. The workshop was extremely suitable and well-timed. There were minor slips - e.g. in audio-visual preparation. Participation was high and rapport among participants very good. Too few Scientists. Too many floating participants and observers.

5. There should have been more Caribbean participants apart from Guyanese.

6. (1) Workshop was composed of too many local participants. It appeared to be a Guyanese instead of Caribbean.

   (2) Too many participants were involved therefore sessions were not as practical as they were obviously planned to have been.

   (3) Schedule was too tight - organisers attempted to cover too much material in such a short time.

   (4) Case studies related to organisation of conferences, workshops, field trips, and exhibitions should have been presented as practical work for the participants.

   (5) Open morning for participants should have been allowed before the last day of the Workshop.

   (6) Topics presented were most suitable but some presentations contained material that was only related to local situations.

7. TEACHING AIDS

   Not all literature of lecture notes received - in some cases there seemed to be an insufficiency.

NOTE

Staff member responsible for preparing and setting up visual aids did not even make a note for assisting herself at future conferences.

8. COURSE CONTENT

Too much repetition or emphasis on objectives. This would have been appropriate in a course on communication "per se".

COURSE LENGTH

Bearing in mind comments in section two, however participant found that the course was crammed into too short a time.

TEACHING AIDS

Literature - (Adequate and Informative)

Participant thinks that the course was suitable for the wider cross section of interests represented by the participants (previous comments notwithstanding). To him/her, the immediate effect of the programme has been to crystallise one's intuitive awareness of the problems of communication or to inform one of these problems. The long term effect will be seen by the effectiveness of the participants in bringing about a greater awareness of all their organisations or departments of the need for effective communication.

9. (1) Participant found the packed programme a bit tiresome. Feels a Monday-Friday conference would have been ideal.

(2) Learned much from the workshop and simulated situations and found them quite interesting. Thinks it is safe to say that the few days exposure have forcibly brought to mind:

(a) the TARGET audience
(b) the "extension" (intermediary between the technical and the (target) man
(c) the MESSAGE

(3) It was difficult after a tiring day to return to the film shows in the evening. So participants missed most of those.

10. Could suggest that time should be given for really thinking in practical terms of application of the training received and be prepared to expand on this statement if requested.

11. As a Communicator who is at present on a Public Communication Course, participant found there were some areas which personally had not been exposed to. Participant has learnt immensely. More such seminars should be held.

12. Overall good but weak points existed e.g. Pooling experiences in meetings. No one (participant felt) realised that the workshop was intended to utilise a Meeting form in the true sense until told so after the exercise. Also, so very often some of participant's lectures gave real examples of

Not to do e.g. in presentations to the Committees (the second day). Some of the Commissioners (one in particular) just did not listen to the answers really. May be it was just a question of role playing.

In spite of the comments participant feels that this workshop met a serious need. However, he also feels that the NSRC MUST soon organise a National Workshop involving Scientists only. It should be suitably tailored.

13. Participant feels this workshop has achieved its goal. It has given him a working knowledge of what is expected on the various areas of scientific communication.

14. A great job done. Workshop experiences on the whole were very good only that at times it caused physical fatigue during the long and late sessions. Duration could have been extended.

15. Methodology followed in workshop very effective. Daily attendance should be taken.

16. In general the conference probably came close to meeting the needs of the host country in particular.

17. As a contributor, or resource person, participant was dissatisfied with his own input, and particularly its quality. Another time, participant would have his material organised. This is however, a personal disappointment.

    We really did not stick to the topic on "scientific" information - there were no scientists; we did, however, carry on a far more constructive program for this venue and area by not doing so.

    Also, there was one very big hole that participant is sorry and distressed that we missed i.e. press relationships. Another time if he is around he would like to cover this - no matter who the attending personnel are.

18. Participant thinks the course content was of a very high standard. He learnt quite a lot, but keeping sessions from Wednesday to Tuesday without a day's break was unfair. This aspect should be considered.

19. Not sufficient scientists. Too much emphasis on written course - too little on information systems for scientists.

20. (1) The topics were extremely relevant: the subject matter in some (very few) areas was satisfactory.

    (2) Unfortunately very little information reached local delegates as to their participant in the workshop. For example, were they required all the time? Or only at some sessions?.

PARTICIPANTS (OTHER THAN RESOURCE PERSONS) ATTENDING THE WORKSHOP

(a) Overseas

Mrs. Beverly Taylor	Senior Education Officer, Bahamas
Mr. G.O. Davis-Isaacs	Ministry of Agriculture, Barbados
Miss Melzina Branch	Barbados attached to Ministry of Health, Guyana
Mr. Godsman E. Ellis	Principal Agricultural Officer, Belize
Mr. Soterios Afrodisis	Cyprus
Mrs. O. Lewis	Technical Information Officer and Librarian, Scientific Research Council, Jamaica
Miss Sandra John	Librarian, Caribbean Epidemiological Centre, Trinidad and Tobago
Cde Hubert Williams	Guyana-based Correspondent, Caribbean News Agency, Headquartered in Barbados

(b) Guyana

Cde Cynthia Willis	Communications Officer Ministry of Agriculture
Cde Irma Lewis	Agricultural Field Officer, Ministry of Agriculture
Cde Rosemond Underwood	- do -
Cde Alec Farley	Co-ordinator, Integrated Science, Ministry of Education
Cde Olive Lyken	Principal Cyril Potter College of Education

Cde E. Chalmers	Curriculum Worker, Curriculum Development Unit
Cde D. Sharma	Lecturer, In-service Teacher Training Programme
Cde B.N. Kumar	President Science Teachers' Association
Cde Dyhraj Ramphir	Chemist and Geologist, Forestry Department
Cde James Alexander	Geologist, Geological Survey and Mines
Cde Balgobin Persaud	Assistant Librarian, University of Guyana
Cde Shirley Alonzo	Senior Assistant Librarian, University of Guyana
Cde Oscar Edwards	Public Relations Officer, University of Guyana
Cde Keith Richards	Chief Planning and Construction Engineer, Guyana Electricity Corporation
Cde Ngozi Onvoha-Moses	Scientific Officer National Science Research Council of Guyana
Cde June Henry	- do -
Cde Sandra Plummer	Research Assistant, National Science Research Council of Guyana
Cde Leslie Chin	Factory Manager/ Director Guyana Pharmaceutical Corporation
Cde Alfred B. Ramrattan	Public Relations and Education Officer, Guyana Rice Board

Cde M.G. McIntosh	Secretary, Small Industries Corporation
Cde Clarence E. Daniels	Electro-Mechanical Engineer, Upper Mazaruni Development Authority, (UMDA)
Cde Maurice Veecock	Co-Project Manager (ag), UMDA
Cde Michael Granger	Agricultural Co-ordinator, UMDA
Cde M. Haniff	Project Director, UMDA
Cde Chander Persaud	Engineer, Hydronet Division Ministry of Works and Transport
Cde Nelroy Jackson	Bio-Chemist Guyana Sugar Corporation
Cde Clarence Mahadeo	Chief Analyst, Guyana Sugar Corporation
Cde Eric Humphrey	Manager, Bauxite Process and New Products, Guyana Bauxite Company, Limited.
Cde Nathaniel S. Pagnauth	Communications Manager, Guyana Bauxite Company, Limited.
Cde A.M.B. Sankies	President, Guyana Association of Professional Engineers
Cde Maureen Wren	Librarian, Medical Science Library, Ministry of Health
Cde Joy Duncan	Senior Librarian National Library
Cde Joan Christiani	Deputy Chief Librarian, National Library
Cde Tommy Payne	Government Archivist, National Archives

Cde Henry Skerrett	Assistant Editor, New Nation (Newspaper)
Cde Grace Deebrah	Guyana National Service
Cde Florence Thompson	- do -
Cde Clinton Williams	Engineer (Training) Guyana National Engineering Corporation
Cde Fitzroy Collins	Executive Officer National Science Research Council of Guyana (NSRC)
Cde B.A. Gibbs	Senior Scientific Officer (NSRC)
Cde R. Persaud	Scientific Officer (NSRC)
Cde Oscar Pollard	Upper Mazaruni Development Authority
Cde Henry Josiah	Public Relations Officer Guyana Water Authority
Cde Barbara Osman	Guyana Bauxite Company Limited

RESOURCE PERSONS, as they appeared on the Programme, were

Mr. D.G. Thomas, B.Sc. (Hons) M.Sc.	Deputy Secretary Commonwealth Science Council
Cde Victor Forsythe, B.Sc. (Hons), M.Sc. (Director of Workshop)	Chief Information Officer Ministry of Information, Guyana
Dr. M.N.G.A. Khan, Ph.D. (Co-director of Workshop)	Assistant Secretary Commonwealth Science Council
Cde Dr. Pat Munroe, Ph.D. (Administrative Arrangements)	Secretary General National Science Research Council of Guyana
Mrs. J. Kimemiah	Kenya Institute of Administration
Dr. G.M. Carman, Ph.D.	Director Information Division Agriculture Canada

Cde Compton Rodrigues	Art Director Design of Graphics, Guyana
Cde A.J. Seymour, A.A., F.R.S.A.	Chairman, National Commission for Research Material on Guyana
Cde C.A. Nascimento, B.Sc.	Minister of State, Office of the Prime Minister, Guyana
Cde Rafiq Khan, M.S.	Director/General Manager, Radio Demerara, Guyana
Mr. Jones Madeira	Communications Officer Caribbean Community Secretariat
Cde Oliver Hunter	Chief D.S.C. Specialist, Upper Mazaruni Development Authority, Guyana
Prof. Mark Vahrman, D.Sc., Ph.D.	Professor of Chemistry, University of Guyana
Cde Arlington Chesney, M.Sc.	Chief Agricultural Officer (ag), Guyana
Cde Mohamed Hamaludin	Chief Reporter Guyana National Newspaper, Limited.
Cde Pat Brandon, M.P.H.	Senior Health Education Officer, Ministry of Health, Guyana
Cde Chris Knee, M.Sc.	Technical Co-operation Officer National Science. Research Council, Guyana
Cde A. McMurdoch, A.L.A.	Chief Librarian National Library, Guyana
Cde V. Kallicharran, B.Soc. Sc.,Dip.Lib.	Assistant Librarian, University of Guyana
Cde Yvonne Stephenson, A.L.A., M.L.S.	Librarian University of Guyana
Cde J. Craigwell, A.L.A.	Assistant Archivist Guyana Archives

Cde Gwen Parris, B.Soc.Sc.	Permanent Secretary, Ministry of Information, Guyana
Prof J.J. Niles, B.A., B.Sc.	Vice President, Caribbean Conservation Association
Cde M. Cox, A.L.A.	Assistant Librarian, University of Guyana
Cde J.P. Benjamin, M.A., M. Litt.	Assistant Librarian University of Guyana

ELEMENTS OF SCIENTIFIC COMMUNICATION

P J Boyle

Introduction

The theme of this Workshop is effective communication in the context of science and technology. By communication is meant the whole process of producing, transferring and receiving information by means of the written or spoken word or by pictorial illustration.

The importance of scientific information as a major resource essential to progress at all levels of science and technology is now universally acknowledged. But just as scientists and technologists need access to information from their colleagues and elsewhere, both within and outside their subject specialities, so also do they need to be able to communicate the results of their own work to other scientists generally and to contribute to the flow and exchange of information within their own group or organization.

In most countries scientific and technological activities operate on various interrelated levels and in some developed countries may present an extremely complex picture. Basically, however, the communities involved may include scientists in academic institutions for whom the emphasis is on the search for fundamental knowledge with no particular end use in view. Many other scientists work in governmental and industrial research organizations and for them the emphasis may be on applied research aimed at obtaining knowledge of direct or indirect practical value. Technologists, who are mainly concerned with processes, techniques, development and similar work, will usually have strictly practical and tangible objectives in view.

In addition to those actually conducting research and development work are research managers and administrators, information personnel and many others with scientific or administrative support roles or who may be involved in interpreting and disseminating information, whether on a crop variety, a laboratory technique or industrial process, among end users. Each of these groups within the total scientific community has its own particular information needs and patterns, depending on its functions and interests. Among scientists proper, the chief need is to communicate the results of their research and be informed about the results of work done by other scientists. In addition scientists, technologists, research managers and administrators, information officers and others may all from time

to time be called on to write reports of various kinds, policy documents, present and argue cases at meetings, organize work demonstrations and communicate with the general public.

Communication among the scientific community therefore goes on at many levels, involves exchange between many different types of information, uses various formal and informal media and may have limited or wide circulation.

Every type of information to be communicated has to be presented in terms the audience or recipients can understand. For example, there is little point in presenting non-scientists with the full details of a scientific paper or with material that assumes background knowledge they do not possess - it must be interpreted into language and terms they can grasp.

All modes of communication, whether oral or written, whether among scientists or non-scientists, to live audiences or not, have their own potentialities and limitations, advantages and disadvantages. They also have their own principles, techniques and rules that must be taken into account if communication is to be effective.

Formal and informal modes of communication

Within the overall communication process, a primary distinction can be made between formal and informal modes.

1. Formal modes. Being formal, these modes employ forms prescribed by custom and practice and follow established rules set by the community to which they apply. In the scientific community the most important communication need is to report the results of research done. This is usually done in formal scientific papers written for publication in established scientific journals, books or other publications. When published, such reports become permanent records that can be examined at any time. Similarly, many forms of internal reports, memoranda, extension literature, etc. also constitute formal publication in prescribed forms. Elements of formal communication in science and technology are set out in Figure 1.

   In common with most people, scientists often have difficulty in communicating effectively by means of the formal written or spoken word. To organize and prepare material for publication is often an arduous, time-consuming business and many scientists have problems in expressing themselves clearly. Some scientists, of course, achieve proficiency with experience and others are fortunate enough to have an innate ability to write or speak well. For others, however, the problem remains. It needs to be stressed, however, that much of the art of effective communication can be defined and can be learned.

2. Informal modes. As in any human community, much communication and information exchange goes on by

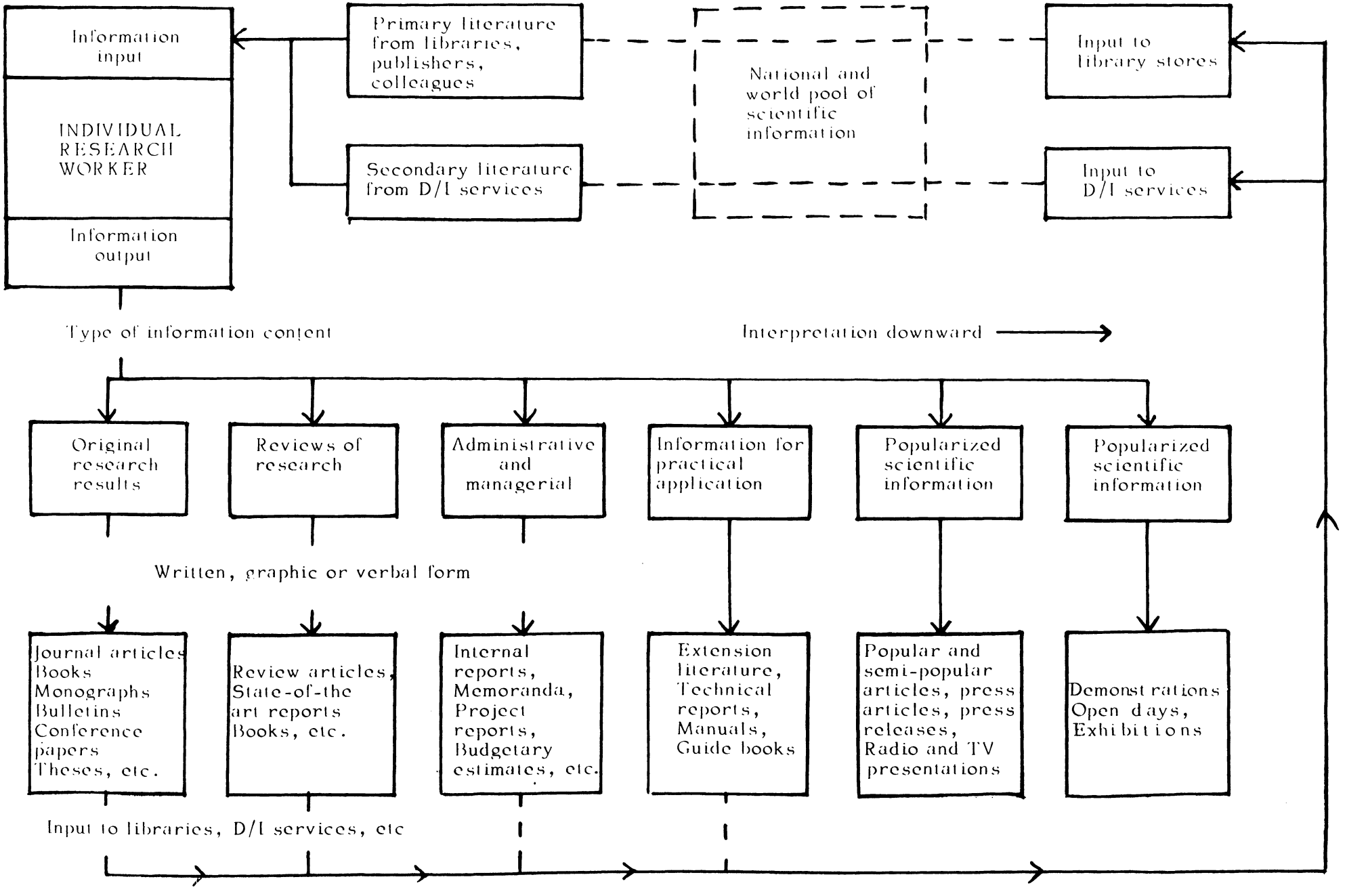


Fig. 1 Formal elements of the communications cycle in science and technology

informal person-to-person contact in the course of daily work, but because it is informal and of necessity unregulated, its significance is hard to quantify. However, all studies of the information gathering habits of scientists have stressed the importance of this mode. Much research and development work is carried on as a group activity, as indeed is the work of any research organization as a whole, and as in any group activity, its efficiency depends greatly on free, effective and positive informal communication among the personnel concerned. At one level, such communication can be regarded as belonging to the realm of sociology, but where inter-personal relationships between individuals or groups are poor or where there are other personal or organizational obstacles to free transfer of information, then both morale and research efficiency will certainly suffer.

Meetings, seminars, conferences and symposia

These have been included at this point because they share elements of both formal and informal modes of communication. Within organizations, meetings and seminars are variants of one another, seminars being meetings held specifically to discuss or review given topics and at which participants may present formal or semi-formal written or spoken material. Meetings proper are generally less formal than seminars and their content of informal communication among participants is correspondingly greater. Meetings can take up much valuable staff time to little purpose unless they are well organized and conducted, but at best are extremely important means of information exchange within organizations and groups.

In contrast to meetings and seminars, conferences and symposia are more formal affairs which bring together individuals from a much wider area to discuss or review a specific scientific subject or subjects. It is usual for formal written or spoken material to be presented on these occasions, often in the form of progress reports or short research papers which may subsequently be published in book form for wider circulation. Often as important as the formal side of conferences is the informal communication among professional colleagues that is such a prominent and essential feature of such occasions and which makes possible the exchange of views and information among individuals who may otherwise meet only infrequently.

Communication of information - the outward flow

It is useful first to consider in more detail the audiences with which scientists and others will communicate and the forms which that communication may take. It must also of course be remembered that transfer of information by informal person-to-person contact can take place with any of the audiences encountered.

1. Practising scientists will expect to write up the results of their work for publication and circulation outside their

group or organization. This will normally take the form of journal articles, bulletins, monographs, scientific conference papers, books, etc. They may also write reviews of research. Their audience here will mainly be other scientists and information services.

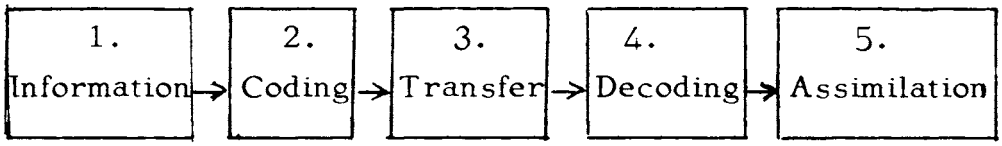
2. Within their own organization scientists will participate in the communication flow among scientific colleagues, research managers, policy makers, etc. Communication may take the form of internal reports, memoranda, policy documents, etc. They may also have to present and argue cases involving policy and decision making, budgets, etc. Most of this flow will be internal, but may at times extend outside the organization.

3. Scientists must communicate their research results and experience to technologists in industry or public services or to extension personnel responsible for advising farmers and others. They may at times have to communicate directly with end users in talks, lectures, literature, etc. without benefit of such intermediaries.

4. Finally, scientists, research managers and information officers may have to communicate with the general public and other lay audiences such as non-professional groups, schools, societies, the press, etc.

Scientists writing original research articles are usually writing for other scientists and their presentation will reflect their scientific training and analytical approach. As scientific information is progressively interpreted downwards to audiences with less and less scientific background, so must the presentation change accordingly.

The basic sequence common to all visual and auditory communication, whether scientific or not, can be summarized as follows:



1. Start of sequence. Information present in the mind of the person wishing to impart it.

2. Coding the information in terms of words or pictorial illustrations.

3. Transfer by means of the printed or spoken word, or by pictorial illustrations or audiovisual means.

4. Reception and decoding of the printed or spoken word to extract the meaning.

5. End of sequence. Analysis of the information and committal to memory or other record, i.e. written notes, etc.

Because this sequence is a human process, faults that hinder communication or distort the message can be introduced at any stage. The following are examples:

Stage 1. The originator may have given insufficient thought to matching his material to the target audience. He may lack the time or ability to organize his material to best advantage.

Stage 2. The originator may make a poor choice of words, grammar or other modes of expression to convey his information. The graphics used may be inadequate.

Stage 3. The medium used to transfer the message may be inadequate, defective or inappropriate. Printed material may be difficult or uncongenial to read. With verbal delivery, sound quality, acoustics, voice projection, intonation, etc. may be unsatisfactory. A stuffy auditorium and a dull speaker may send the audience to sleep or at least make them inattentive.

Stage 4. The recipient may misunderstand words or lack the scientific background to understand concepts, assumptions, scientific jargon, etc. if these are not properly explained. In some cases there may be language difficulties.

Stage 5. Where the presentation has been uninteresting and the information content not clear or readily understandable, recall of the information content may be poor and short-lived.

These examples of obstacles to communication differ with the medium used. For effective communication it is necessary not only to know what faults to avoid but what positive methods there are to aid reception and comprehension for each medium and how to use them.

The sequence of communication starts in the producer's mind and, obviously, he or she should have something worthwhile to express. But once the decision to communicate has been made and with it the decision of how best to match message, medium and audience, then all possible art and artifice must be employed to give maximum impact and comprehension.

For the communication of original research results, the medium of communication may be more or less self-evident and other questions, such as which journal to place it in, may be more important. For communication to administrators, technologists and non-scientists, the best choice of medium and style of presentation may be less obvious, since the communicator may have to simplify and interpret his information to a greater extent and keep his audience much more actively in mind.

Communicators need to know the potentialities and limitations of the different media and thus need guidance on how to present their material to different audiences and what aids

and techniques, graphic or historic, they can use.

In some contexts, particularly commerce and politics, the term "public relations" has dubious overtones. Nevertheless, communication with the public and with persons in public and political life can be highly important. Scientists, research managers, administrators and information officers may all at times become involved in the public relations aspect of communication. They therefore need to know how best to present the case for their group or organization and to ensure that when opportunities arise to describe work or achievements, this is done to maximum effect. They need to know, for example, how the same statement made in print in a newspaper can differ in impact and interpretation from that made orally over the radio. Also, what points in a public statement may be liable to be picked out for emphasis in a newspaper report and possibly misinterpreted or distorted. Understanding of techniques and approaches for dealing with the press, press releases, radio and television interviews and talks and also the use of graphics and the various methods or presenting visual material are all important and will be singled out for further attention in this Workshop.

Communication of information - the inward flow

Scientists and technologists are both producers and consumers of information. They must communicate the results of their work if it is to add to the total sum of world knowledge or make its contribution to scientific and technological progress in their own national community. In publishing their work, therefore, scientists contribute to the world pool of information; at the same time, they need access to this same pool of information if they are to keep abreast of progress made elsewhere in their own or related subject fields.

In this sense scientists are part of a circular flow of information among the scientific community generally. For those engaged in fundamental research with no particular applied objective in mind, this circular flow of scientific information is the major concern. For those involved in applied science this same circular flow is also of major importance, but so also is the largely one-way flow of information to technologists, extension workers and others who need to apply it to practical use. In this case there may also be feedback of other levels of information on such aspects as the usefulness of the scientific knowledge originally provided, the need for new or further research, modifications to existing programmes, etc. Figure 2.

Without access to the results of other scientists' work as published in scientific journals, to textbooks and other reference sources, etc. no scientist can do effective research for long. The problem for scientists is to find out what information they need and where and how to get it. As has been said, scientists receive a great deal of their information input from informal personal contact at work, at meetings, conferences, etc.

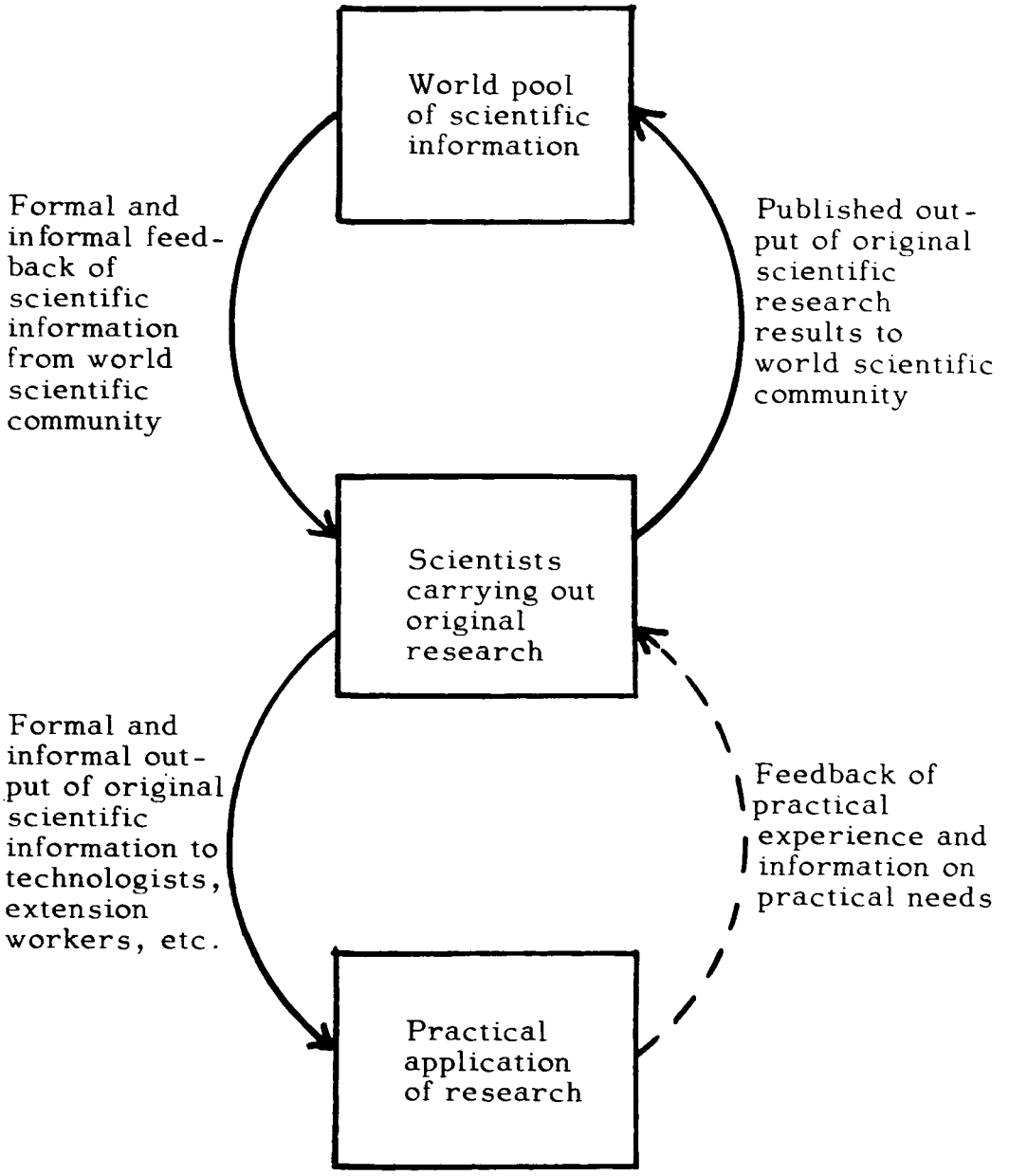


Fig. 2 Flow and feedback within scientific information

Most research or academic organizations will have libraries containing the more important publications relevant to their subject area. However, most scientists generally have only limited amounts of time to devote to scanning the literature.

To keep abreast of developments reported in the literature they do not normally see or which their library may not receive the library may take one or more of the so-called secondary documentation services in which abstracts or other notices of research articles are presented in a form in which they, or someone on their behalf, can scan and extract items of interest. The library resources can then be used to obtain the original article or a copy of it.

These secondary services thus enable libraries to increase greatly their effective literature coverage and they are now a prominent and established feature of the documentation scene in all scientific disciplines and technologies.

At one time, scientists did most of their own literature scanning and searching and generally maintained their own private card or other index files to the literature. Many still do so, but there is now an increasing trend towards the appointment of information officers to carry out part of this function on their behalf and generally to act as a middleman between the information source and the scientist.

In many developed countries there exist large national libraries and library networks covering virtually all areas of science and technology. Similarly, there has been a tremendous growth of documentation and information services, some using sophisticated computerized processing and publishing methods, designed to meet the information needs of particular scientific communities. These developments have been paralleled in recent years by initiatives towards the establishment of international information systems, such as AGRIS to cover agriculture, UNIDO industrial development, etc. These services have been designed with the needs of developing countries especially in mind. In addition, there are various international agencies, such as UNESCO, that actively promote and aid the development of scientific information services in these countries. Many developing countries are actively seeking to develop and improve their own national information and documentation services and to provide their scientific communities with better access to the common world pool of scientific information. The development and organization of national information systems will therefore also be dealt with in this Workshop.

A glossary of a few terms commonly used in the field of scientific information is appended.

GLOSSARY OF TERMS

Annotated bibliography. A list of titles of documents relevant to a specific, usually narrow subject area, with each title supplemented by annotations in the form of abstracts or other brief notes giving details of the contents of the documents.

Bibliographic information. Information about documents, typically details of their titles, authors' names, year volume and page numbers and other relevant information enabling the documents to be identified and retrieved.

Data base. In the information and documentation context, the whole store of bibliographic material, typically titles plus abstracts plus index entries, or other referral data, assembled by a documentation and information service.

Document. Any permanent record carrying information, usually in written form, but which may be on film, magnetic tape or other medium.

Documentation. That which has to do with documents, especially their arrangement for retrieval and presentation and the process of handling them for this purpose.

Documentation centre. An organization that (a) selects, acquires, stores and retrieves documents, (b) announces, abstracts, extracts and indexes the contents of documents, (c) disseminates documents or information about documents or their contents, (d) organizes and coordinates information services and facilities.

Documentation and information (D/I). A compound term denoting the whole process of recording documents and condensing, indexing and processing of their information content for presentation.

Extension service. Body of professional people who, working under or in cooperation with the government, provides technical advice to specific groups of users on a non-remunerative basis (government officials, technical experts from universities, etc.) Extension officers may also be called liaison/advisory officers, or information officers.

Information. The factual, numerical or other content of knowledge convened, typically by a document, but which may also be conveyed verbally, visually, etc.

Liaison/advisory service. See Extension Service.

Library. An organization which collects, stores and makes available for use books, periodicals and similar materials.

National information system. A system in which the various national documentation and information and referral services and resources of a country are linked and coordinated so as to maximize their value and availability to users.

Primary publication or document. The original publication or document in which new information or new interpretations of existing information is published in full.

Referral centre. A centre or unit providing hard data or other factual information on specific subjects rather than abstracts or other bibliographic information, or indicating sources (persons, institutions, publications, etc.) where such information can be obtained.

Repackaging. The rearrangement of bibliographic material (usually titles plus abstracts) that has already been published as a main output by a secondary information service into new, generally narrow, subject profiles or arrangements to meet the needs of special user groups.

Secondary publications. Publications in which secondary information, typically in the form of titles plus abstracts, derived from primary documents are published in order to inform users about the existence and contents of the documents; they may also include similarly derived catalogues, reviews, surveys, etc.

SDI (Selective Dissemination of Information). Type of regularly issued, repackaged secondary output consisting of regularly updated sets of references (usually documents titles, with or without abstracts) on a specific, narrow subject profile.

Retrospective retrieval. Type of one-off repackaged secondary output consisting of a single set of references (usually document titles with or without abstracts) on a specific, narrow subject profile and derived from literature published over a greater or lesser time span.

Thesaurus. A keyword list or index in which only controlled keywords are used. Such a list may specify which are permitted keywords and which are non-permitted keyword synonyms or related terms, with cross-references from non-permitted to permitted keywords. The keywords may also be arranged in a logical structure of main and subordinate or broader and narrower terms.

VISUAL COMMUNICATION

D J Plumb

Introduction

Graphic communication has been used for centuries under a variety of names, using a visual language as a means of practical communication rather than as a means of personal expression as found in other areas of graphic art.

The earliest cave paintings could be viewed as being not only decorative additions to the environment of the man of those times but also as a practical statement of fact regarding information necessary to the well-being of the community as a whole.

The advantage of a graphic/visual means of communication is in the maximum effective spread of information that can be made at any one time - irrespective of the language, culture, educational status or age of the recipient. It is however important that the choice of graphic image and its use in conjunction with other images is suitable, not only for its intended purpose, but also that it is capable of being understood in its purposeful role.

It could be assumed that if one group is attempting to communicate with another, using common visual images, success should be achieved. In practical terms this is proved not to be the case. Research conducted by Bernard Shaw of the African Medical and Research Foundation in the form of a visual symbol survey among Kenyans, shows up this misconception. Although all the drawings and symbols used in this survey were graphically accurate and common to all participants, some misunderstandings occurred due to the manner in which the illustration was viewed. A tortoise, for example, was identified as being (a) an elephant, because of its feet, (b) a crocodile, because of the pattern on its shell and (c) a snake, because of its head. These responses were due to the fact that not everyone sees the complete image but rather a series of details, and on any one of these details bases the answer. In a similar manner a goat was described as being a cow by 53% of a certain group of participants due to their seeing a head, horns, legs and a turned down tail. The fact that all details shown on the drawing were of a goat was missed by these participants who based their answer on the single fact that all local goats have tails that turn up so it must be a cow. The theoretical capability of visual communication can be near to achievement if the various methods of perception employed by the social or ethnic groups taking part in the communication process are investigated before work is started.

Any person whose work demands explanation, must attempt to see their own specialist activity through the eyes of those whose understanding of it is limited or non-existent.

One of the first objectives in any communication process is finding a common denominator. If there is no such thing readily available in the natural context of the communication then one has to be contribed in order that the difficult path to complete understanding is navigated. An unknown subject is similar to finding oneself in a foreign city with no knowledge of the language or street plan, no money and surrounded by a people displaying strange and threatening attitudes. If you move, it would be easy to lose yourself and get further from your destination of say, your national embassy or consulate. You are wary of trusting the local taxi service or guide and long for a familiar face to appear around the corner. If one did, you would be quite happy to place your trust in him irrespective of the devious route taken in reaching your destination.

As communicators, it is our duty to provide this familiar, identifiable figure as a means by which we can lead people through unfamiliar, unidentifiable surroundings.

Figuratively speaking

Whilst text speaks with words, the graphic figure speaks with form, and just as words are the flexible units, or vocabulary, of spoken or written language, so the point, line, shape, value and texture are the equally flexible units of vocabulary of form. The use of this vocabulary is essential in the preparation of a visual, graphic language.

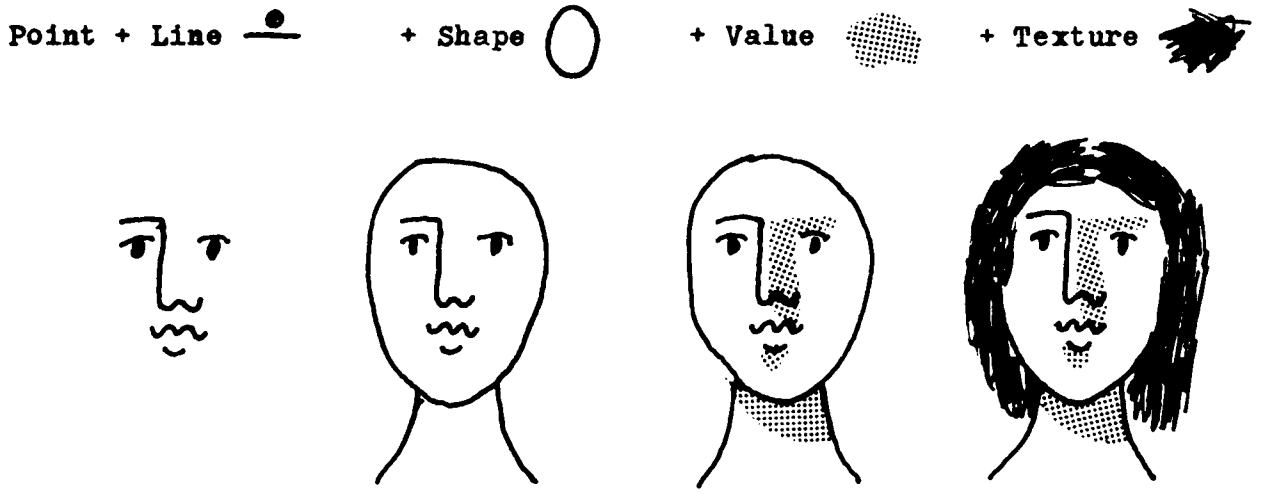
The Point Theoretically non-dimensional showing location, position or focus. In practice, a point can vary with respect to its size, shape and value, and can also act as a symbol representing a specific subject or idea.

The Line One-dimensional in character and shows direction, extension or movement. Linear form can vary in weight, length, structure, character, value and course. A major quality of the line is in its directional capability. In this role it can also indicate motion. Lines can be complete or broken, and, varying in width, can also indicate changes in magnitude.

Shape Two-dimensional in form, it shows contour, area, outline, enclosure or edge. Shape quality derives from the structure of its edge, and varies with respect to size, distribution of weight, position, regularity (or irregularity) of its edge. Shape can be constructed in solid or outline form.

Value A quality of colour which refers to the degree of darkness or light and in practical use could reflect the quantitative aspect, distance etc. Made up of a concentration of dots which at a distance appear to blend with the intervening white spaces, graduations of tone are dependent upon the relative size and density of the dots.

Texture The quality of surface structure or pattern. In practical terms, the use of texture as an aid to differentiation of individual aspects is invaluable and should be considered in conjunction with other form elements, especially colour value.



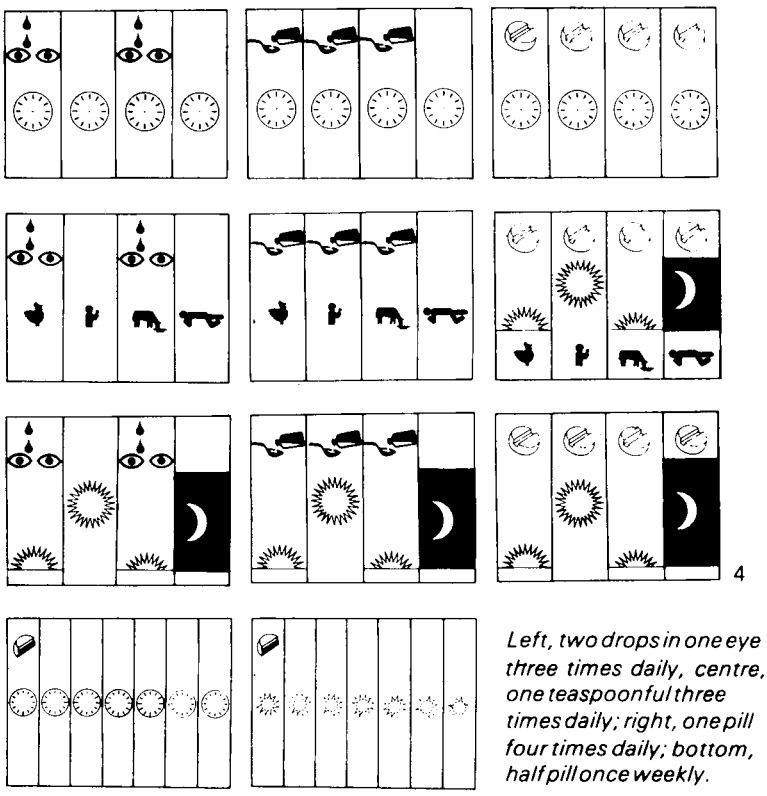
The Graphic statement

Visual language is not an end in itself, but simply a means by which to visualise ideas and have those ideas understood. The visualization of ideas begins with the definition of purpose.

Relevant subject matter is applied to this purpose and translated into logical visual concepts.

In everyday life the meaning of a thing can vary in relation to the way in which it is seen and understood. The farmer for instance sees the wheel of his wagon as a physical object, the engineer who designed it sees it as a mechanical problem and the merchant who sold it sees it as a financial profit or loss. Thus while the farmer's view is objective, the engineer's is symbolized into a plan and the merchant's into an abstract of monetary terms. Similarly, the subject of the graphic figure can be seen and represented in different ways, depending upon its communicative aim-subjective, symbolic or abstract.

Pictorial Diagram



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Left, two drops in one eye three times daily, centre, one teaspoonful three times daily; right, one pill four times daily; bottom, half pill once weekly.

Objective translation shows the idea in terms of visual reality. The photograph is possibly the purest example of objectivity, although often requiring visual modification in order to simplify or exaggerate the character of the object.

Symbolic translation removes the idea from the context of natural reality, retaining only the visual features which are essential to its identity.

Abstract translation presents the idea in terms of pure visual logic, independent of any associations with specific objects in the real world. It also lends itself to problems in which the technical content, or its interpretation, is itself abstract. Abstract form can also act as an organizing device without special meaning.

Designing the statement

The visual communication of information takes three distinct forms, Statistical, Explanatory, Locational (maps), and is represented graphically in the form of diagrams.

Statistical information can be shown visually in various ways. One of the most common is the use of the graph, whether it be in the form of line, divided line (which shows the value of the total and its constituent parts on the same frame), bar graph (which shows quantitative values more clearly than line), block diagram, divided rectangles, circular graphs, divided circles and pictorial graphs.

Explanatory diagrams explain stages in a manufacturing process, the structure of an organization or events related to each other in time. They do not usually make quantitative statements although adaptations could make this possible. The main design problem in explanatory diagrams is in reducing information to the essential without distortion. This can be done in many ways from the objective to the abstract or near abstract viewing.

Locational diagrams and maps also make full use of form vocabulary as well as the objective, symbolic and abstract method of presentation. Certain characteristics found in graphs are also to be found in the presentation of maps, especially when statistics regarding geographic areas are required to be shown.

The important difference between the statistical diagram and the locational diagram is that the map provides the framework on which information can be shown. In giving statistics in diagrammatic form there may be several ways open to the designer or communicator to use or modify shape to suit the requirements of the information. The one main problem in map design is that of getting inflexible information into inflexible shapes, a problem increased when labelling of the information is required. To superimpose population pyramids for various countries on a map of Africa may be easy for Zaire, Nigeria and the Sudan but impossible for Togo, Lesotho or Sierra Leone on a map of the same scale and if the map lines and superimposed information are to be kept readable. Maps can be in the form of explanatory, route, statistical, non-quantitative (political, physical, racial etc.)

Various factors will have a bearing upon the method of presentation used: type of information, type of audience, sources of reference, the type of media used (slide, overhead projector etc.) and the skill of the presenter.

Production of visual aid material is a highly specialized field, but the communicator should be in a position to discuss effectively with the designer as to what and how to express information graphically. In other words, the communicator must have sufficient background knowledge of graphic design to be able to assess the communication requirements and to issue a comprehensive brief regarding the visual aspects of these aids in order that he can fully exploit the potential of the information being presented. The communicator should therefore have some knowledge of the physical requirements of organizing and presenting information in a graphic form.

Organization

The same type of questions must be asked when preparing visual material as when organizing a meeting. (1) What is the purpose of the meeting? (2) What type of information is to be presented? (3) Who is the audience? (4) How many expected in the audience? (5) Where is the meeting to be held? (6) What facilities does the venue offer? (7) What is to be the method of presentation? and (8) What costs are likely to be involved? All of these questions must be answered in the early planning stages in order to get the best results from the time, effort and expenses involved.

In establishing the purpose of the meeting, it is necessary to consider the type and size of audience, subject of presentation and finance available for the production of visual material. For example, if the meeting is aimed at a specialist audience then the visual presentation and its spoken commentary can be more technical than if the audience is for the non-specialist, even on the same subject. By establishing the expected composition of the audience at an early stage, the depth of detail and explanation of the subject matter to be presented, including the degree of complexity of the graphics, can be decided upon. The size of the audience will have a bearing on the type of visual equipment to be used. The amount of effort to be expended on the preparation of graphic material will not only be determined by finance available, but will be influenced by the type of equipment to be used and whether or not a permanent record is required for future presentation.

Audio-visual systems

There are several aids suitable for the presentation of visual material:

Slides

In 5cm x 5cm mounts
Colour or Black and White
Picture size: 36mm x 24mm

Advantages include:
Easy to use
Readily available
Easy to make

Advantages include: (contd)
Can be presented in any sequence
Storage and transportation easy
Can be combined with sound
Automatic and remote control is easily arranged

Disadvantages include:
The need for electric power
The need for blacked-out room
Once projector is switched-off the image has disappeared and no longer available for study

Filmstrips — 35mm single frame (18mm x 24mm picture)
35mm double frame (24mm x 36mm picture)

Advantages include:
Correctly threaded into the projector the pictures will be presented correctly and in sequence
Very transportable
Easy to use
Copies are cheap

Disadvantages include:
The need for electric power
Projection Equipment is required
A blacked-out or dimmed room
Inflexible in so far as the sequence of presentation is fixed and it is impractical to insert local or alternative material
Material disappears when equipment is switched-off

Overhead Projectors — $9\frac{3}{4}$ x $7\frac{3}{4}$" (25cm x 20cm)
$9\frac{3}{4}$ x $9\frac{1}{4}$" (25cm x 25cm) Standard sizes

Advantages include:
Easy to use after a few minutes basic Instruction
Flexible in that transparencies can be varied in sequence, added or omitted
Can be used in normal lighting
Colour can be easily introduced
Presenter faces audiences (Good eye contact)

Disadvantages include:
Need for electric power
Large size of transparencies compared to 35mm slides

Episcope — An instrument for projecting flat copy (book pages etc. straight onto a screen without having to make transparencies)

Advantages include:
Cheapness. Because the image is projected from the original there is no expenditure of time

and money in making slides i.e. there is an instant projection

Disadvantages include:
Need for power
The machines are not easily available
Light output is very poor and use dictates a completely blacked-out room

Cinefilm — 8mm, 16mm or 35mm with or without sound
Colour or Black and White

Advantages include:
Movement
Sound
Great impact

Disadvantages include:
Need for power
Need for equipment
Need for specialist operator
Films may have to be booked well in advance
Expensive

Flannel Board (Felt Board) — Usually a piece of dark felt cloth stretched over a board such as hardboard or an existing blackboard
Size can vary, but 3' x 4' will be suitable for most purposes
The images can be produced on coloured flock paper, which can be used piece by piece at whatever speed the presenter considers best

Advantages include:
Materials easy to obtain and make-up
Easily transported

Disadvantages include:
Need to be kept clean and dust free to maintain smart appearance
The presenter cannot introduce new facts or ideas on the spot as he could with a blackboard

Flip Charts — Loose sheets (clipped, pinned or taped up)
Sheets mounted on hardboard with easels
3' x 4' approx.

Advantages include:
Can be economical (hand lettered or drawn on cheap newsprint)
Can be produced very quickly
Can be tailormade and topical
Needs no power
Full daylight use

Disadvantages include:
Needs special display arrangements e.g. board, easel, pins etc.
In some cases, charts may have to be large and unwieldy, numerous, heavy to handle and transport

Blackboard Whiteboard, chalkboard with chalks or liquid markers
Immediate production of images in the presence of an audience

Advantages include:
Cheap
Familiar to majority of audiences
Colour easily introduced
Visuals created the moment they are required

Disadvantages include:
Temptation to include too much information
Is liable to be badly used and present illegible information
Cleaning does not necessarily remove the last set of information and 'ghosting' can occur
The use of chalk and the cleaning covers the presenters hands and clothes with dust

The following information will assist in arranging the positions of audience members and projectors in relation to the screen

Slide projection

With a lens of 5cm focal length:

Screen distance of	10'	will give a picture size of 7'6" x 5'0"
	13'	9'6" x 6'4"
	16'	12'0" x 8'0"
	20'	14'4" x 9'6"

With a lens of 8cm focal length:

Screen distance of	10'	will give a picture size of 4'6" x 3'0"
	13'	6'0" x 4'0"
	16'	7'6" x 5'0"
	20'	9'0" x 6'0"

Overhead projection (10" x 10" transparencies)

Lens to screen distance	5'6"	Picture size 39" x 39"
	6'0"	46" x 46"
	10'0"	78" x 78"
	20'0"	156" x 156"

Audience numbers in relation to screen size and seating

Screen width	Seating Area	Practical Seating
5'0"	20' x 17' (340 sq ft)	50
5'10"	24' x 20' (482 sq ft)	75
7'0"	30' x 22' (654 sq ft)	100

General guide for seating positioning in relation to screen

No person to be nearer than twice the screen width.
No person further from screen than six times its width.
No person on either side more than 30° from axis of projection.
General guidelines as to the size of image in relation to projection distance for maximum legibility could be taken as being a symbol (either drawing or lettering) of 1" high for each 30' of projected distance (from the lens to the screen).
This would mean that at a distance of 60' the eight of a projected symbol or letter would have to be 2".
This size could be reduced to $\frac{7}{8}$" if the image is clear and well defined.

When preparing transparencies in the form of lines of lettering, the distance between the lines should be equal to 1/36 of the overall height of the transparency.

Sequential steps in the preparation of material

1. Determine the main and subsidiary purposes of the presentation
2. Prepare rough ideas of the visual aspect in association with the spoken commentary
3. Prepare visual images
4. Arrange sequence - decide on changes
5. Rehearsal for both time and continuity with the script
6. Modify, if necessary, to conform to the time limit or parts of the commentary that are found to require greater emphasis.

Important facts in presentation

1. All visual material should be of the same, good quality
2. Spoken commentary should be clear and concise
3. Visual and spoken commentary should be in synchronization
4. The overall presentation should be professional, to the point, and have a beginning, a middle and an end
5. Time should be allowed for questions. The speaker must decide beforehand whether questions can be asked during as well as the end of the presentation. Questions interposed in the course of a delivery requiring sequential presentation of ideas in building up a reasoned case could be distracting. On the other hand, the speaker may wish to have active audience participation, and comments and questions would then be encouraged. The audience should be aware of the speaker's wish before the oral delivery is started.

Remember that pictures or visual images are static. An approximate guide as to the length of time a single image is in view should be no longer than 15 seconds, unless it is the subject of prolonged discussion.

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