

81

RAMAN RESEARCH INSTITUTE

BANGALORE-560 080, INDIA

Dictated
into VR

PROF. S. RAMASESHAN

11 FEBRUARY 1986

~~_____~~
20/11/86

Dear Shri Rajan:

As per the decision taken at the meeting of the Expert Committee on INSDOC on 19th January 1986, I have submitted one copy of the report to INSDOC. I have requested the Scientist-in-Charge, INSDOC to make copies of this and to send you a copy of the report. May I thank you for the active help and co-operation I received from you in the preparation of this report.

With my regards,

Yours sincerely,

g

Ramesh

Shri Y.S. Rajan
Scientific Secretary
Indian Space Research
Organisation
Cauvery Bhavan
BANGALORE

3/3/86

RES: 7/10 Palace Cross Road, Bangalore 560 020
(PH: Off - 360122, 360455; Res - 363594)

SS: 676
3/3/86
PHONE: 30122

TELEX: 845-671

GRAMS: RAMANINST

REPORT ON INSDOC - ITS ROLE & TASKS FOR THE COMING YEARS

Submitted

by

The Expert Committee

to

DG, CSIR

REPORT ON INSDOC - ITS ROLE & TASKS FOR THE COMING YEAR

Submitted
by
The Expert Committee
to
DG, CSIR

CONTENTS

1. Letter to DG, CSIR
 2. Members of the Committee
 3. Terms of Reference
 4. Executive Summary
 5. Report of the Committee
 6. Background
 7. Minutes of the Final Meeting
- } Appendices

RAMAN RESEARCH INSTITUTE

BANGALORE-560 080, INDIA

PROF. S. RAMASESHAN

5 FEBRUARY 1986

The Director General
Council of Scientific and
Industrial Research
Rafi Marg
NEW DELHI 110 001

Dear Director General:

As Chairman of the Expert Committee to advise on the modernisation programme of Indian National Scientific Documentation Centre (INSDOC) which was constituted in pursuance of a recommendation of the Advisory Council of INSDOC, I have great pleasure in forwarding the report of this Committee for the consideration of CSIR.

The Committee has recommended suitable modifications in the objectives of INSDOC in today's context, keeping in view the future. The Committee has outlined the role of INSDOC as a part of the National System taking into account the various information related activities/programmes in the country. The report carries specific suggestions on Indian Science Abstracts, National Science Library, Translation Services, Printing, Compacting, Coordination/System role, Training, Computerisation, Research, International Relations, setting up of a National Council of Science Information and a few others.

While the Committee has set goals and objectives and given guidelines, it has particularly not gone into specific details of hardware, software and managerial mechanisms as it is necessary for INSDOC to have flexibility to be able to adopt itself to dynamic changing situations.

It is also felt that a financial outlay of Rs.8 crores in a five year period would be necessary to implement the recommendations of the Committee, in addition to the investment being made on the present activities of INSDOC.

An important aspect to be noted is that the present staff of INSDOC would require retraining/redeployment in the context of modernisation programme recommended by the Committee. Augmentation of some staff would seem to be necessary, particularly for computerisation and research activities.

.....2/-

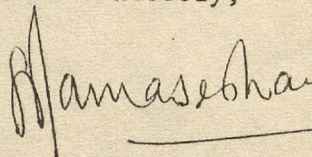
I am happy to have received active help and cooperation from all the members of the Expert Committee, though all the members could not attend the meetings of the Committee.

I am confident that, by taking up the implementation of the recommendations of the Committee, INSDOC will be able to enter into a new phase of development and modernise its operations and services.

I am happy to have associated myself with the work of this Committee.

With best regards,

Yours sincerely,

A handwritten signature in cursive script, appearing to read 'S. Ramaseshan', written in dark ink. The signature is fluid and somewhat stylized, with a horizontal line underneath the name.

(S. RAMASESHAN)

RES: 7/10 Palace Cross Road, Bangalore 560 020
(PH: Off - 360122, 360455; RES - 363594)

MEMBERS OF THE COMMITTEE

Prof. S. Ramaseshan Raman Research Institute Bangalore	Chairman
Prof. R. Narasimha National Aeronautical Laboratory Bangalore	Member
Prof. H.N. Mahabala Indian Institute of Technology Madras	Member
Dr. P.J. Lavakare Department of Science and Technology New Delhi	Member
Shri Y.S. Rajan Indian Space Research Organisation Bangalore	Member
Dr. Ashok Jain National Institute of Science, Technology and Development Studies New Delhi	Member
Dr. G. Bhattacharyya Documentation Research and Training Centre Bangalore	Member
Dr. A. Lahiri Department of Science and Technology New Delhi	Member
Shri T.S. Rajagopalan Indian National Scientific Documentation Centre New Delhi	Convener

TERMS OF REFERENCE

- a) To indicate future lines of development in regard to programme of modernisation of INSDOC.
- b) To suggest a programme for the introduction of modern information technology into INSDOC.
- c) To recommend areas of computerisation and the hardware and software requirements.
- d) To work out manpower requirements and ways and means for implementing (a) to (c) above.

EXECUTIVE SUMMARY

INSDOC has played a very useful role over the past three decades in servicing the Indian Scientific Community with information on science and technology matters. Considering the various information networks that have been established and are being planned in the country and also considering the international context, it is recommended that the objectives of INSDOC are suitably modified; specific suggestions are given in the Committee report. The paragraphs below give the brief summary of the recommendations of the Committee report.

1. Objectives

Essential change in the objectives is to stress the system role of INSDOC and also the linkages with various institutions and networks in the country that deal with information science, technology and services. Research, training and international relations are also included.

2. Indian Science Abstracts (ISA)

The need for having ISA in an internationally compatible form has been recommended since many scientists in the world today largely depend upon computer based retrieval systems. Such compatible formats will facilitate access to the Indian literature thus helping Indian Science through information exchange.

3. National Science Library System

The National Science Library System has been recommended not as a single monolith but as a system in which the various institutions in the country will be utilised. The total system will ensure availability of most of the journals, proceedings and books in the country. INSDOC's key role would be, besides acquiring books that are not available elsewhere in the country, to develop an Information System to help the users in the country to know which document is available - where. This will require evolution of linkages and also recognition of many of the cooperating institutions as associate centres of INSDOC.

4. Translation Services

In view of the enormous amount of work involved in Translation Services it is recommended that a separate Technical Translation Services Bureau be established and INSDOC should not be burdened with this service.

5. Printing

It has been recommended that INSDOC should concentrate on advanced scientific printing and the printing units of INSDOC should be made a separate cost centre.

6. Compacting

Compacting of information has been stressed with a specific suggestion as to the directions which INSDOC can take. It is

also recommended that the newly acquired journals etc, should henceforth be increasingly in compacted forms so that in the next few years, computer based access and retrieval system could be operationalised fully in the country. There are also some specific suggestions regarding micro-filming etc.

7. Coordination/System Role

It has been stressed that INSDOC should play a system and coordinating role which should be through associative cooperation and not through controls. This role can evolve well if the network concepts are worked out and INSDOC plays certain import roles in cooperation with other institutions for standardisation of abstracts, compacting etc; some specific suggestions are given in the report.

8. Training/Computerisation

The importance of training of personnel in information science, technology and services, and in specific, the retaining of INSDOC personnel are stressed. Specific reference is made to computerisation and some broad indications are given about the type of computerisation to be implemented by INSDOC.

9. Research

Research as an important element of the activities of INSDOC is stressed.

10. International Relationship

It is a vital item in which INSDOC should play a key role not only with developed countries but also with the developing countries.

11. Miscellaneous

There are some suggestions regarding utilisation of part-time services to enhance the overall productivity of INSDOC without necessarily adding many full time additional personnel to INSDOC system. Some suggestion regarding "preprint or semi-published literature network" is also given.

12. National Council for Science Information

In view of the complex networks which are to be developed in the country, it is also suggested that a National Council for Science Information be set up.

13. Reorientation

In view of the newer tasks for INSDOC, the reorientation required to be done by INSDOC by enhancing certain activities and shedding some, is pointed out.

The Committee, particularly, has not gone into specific details of hardware, software or managerial mechanism to be adopted by INSDOC to implement the above, since it is necessary for INSDOC to have reasonable flexibility to be able to adopt to the dynamically changing situations. However, it is necessary for INSDOC to project the profile of activity

14. Budget

It is estimated that over and above the ongoing expenses of INSDOC, about Rs.8 crores will be required for the Plan period to effect the modernisation programmes suggested. An augmentation of staff to the extent of 3% to 4% per year for the next five years may be necessary.

INSDOC - ITS ROLE AND TASKS FOR THE COMING YEARS

1.0 PREAMBLE

1.1 INSDOC established in 1952, has been for many years, one of the very few information centres in the country, operating at a national level. The dependence upon INSDOC by the S & T community for the provision of information services was greater in the past. In the recent times, many more information centres and systems have been established.

For example:

CSIR groups of institutions (including INSDOC) subscribes to 10,053 journals;

BARC	:	1,800 with whole of DAE: 2,496
ICAR	:	5,000
DRDO	:	2,300
DOS	:	2,278
ICMR	:	2,820
IARI	:	6,000
IISc, IITs & Univer- sities	:	6,000

While these developments have not in any way diminished the importance of INSDOC, it is to be noted that there are now greater facilities in the country for complementing the services of INSDOC.

1.2 There are many developments in the international scene in information technology. Also the country has set itself a goal to proceed rapidly towards modernisation in order that scientific and technological backwardness can be removed very soon. In this context, it is necessary to reassess the role of INSDOC so that it can raise to higher tasks which are ahead in the field of information and documentation. The ultimate goal of INSDOC is to participate effectively, as complement and supplement to the Indian National Information Service System pertaining to different disciplines and systems in the promotion of utilisation of existing information for national development ensuring timeliness, appropriateness, economy and efficiency.

2.0 OBJECTIVES OF INSDOC

2.1 The objectives of INSDOC may be restated as under:

1. to develop collections of relevant sources of information in the field of science and technology to complement and supplement the total national system
2. to render all appropriate and feasible information service in the field of science and technology
3. to develop appropriate linkages with the information network and services carried out in India

4. to establish a national repository for reports of scientific work of the nation (both published and semi-published) and be a channel through which this information is made available within and outside the country
5. to contribute to advancements in information science and technology including documentation and library science through research and other activities
6. to develop trained manpower for undertaking advanced level tasks in the field of information science and services
7. to adopt and to promote appropriate technologies and management, practices to enhance capabilities and productivity of information networks and services in the country
8. to participate effectively in international information exchange of scientific matters

2.2 With the above objectives in mind, the Committee considered some important immediate tasks of INSDOC. The objectives take into account various information networks which have developed or planned in the country; the prime role of INSDOC is envisaged as not only to offer certain services but also to enable development of integrated network in the country, by itself being an effective part of the total network. Towards this INSDOC would have to develop not only systems but also have to develop linkages with the various information sources in the country whether these are libraries, information networks, or specialised laboratories

which render certain services and so on. Since the growth has to be dynamic and capable of adapting rapidly to changed situations, it is essential for INSDOC to define specific time targetted activities to achieve these objectives. Some specific recommendations for action are given below.

3.0 INDIAN SCIENCE ABSTRACTS

- 3.1 So far INSDOC has been doing a commendable job in terms of Indian Science Abstracts (ISA). While ISA has played a very important and historical role, it should be noted that the international development in the field of scientific abstracting has advanced tremendously and many scientists in the international arena now use computer based systems for access/retrieval. This would mean that it is essential to make the Indian Science Abstracts in formats compatible to international systems so that Indian work can be used by others. It need not be reiterated that the utility and the growth of science depends upon how much other scientists use a particular scientific literature. If the Indian Science Abstracts (ISA) continues in the present form, it may not be possible for it to be of continued utility and thus it is essential to convert it to internationally compatible forms.

4.0 NATIONAL SCIENCE LIBRARY SYSTEM

4.1 In most of the industrialised countries comprehensive documentation centres for science and technology have been set up based on related technology which allow compacting of information. There has been an exponential growth in the number of research publications and 90 percent of these papers originate from industrialised countries. Specialised journals which publish these papers are acquired by libraries/documentation centres attached to specialised institutions in India. However, accessibility to these journals by the widespread scientific community is a problem. A referral system on the availability of journals at different centres would be a better alternative than attempting a centralised collection of all science and technology journals.

4.2 It is in this context INSDOC could serve an important need of the country by providing a referral system. In addition being a part of the CSIR family of the laboratories, it could provide a contact point for documents available in the CSIR system. While the inflow of S & T literature from abroad is being taken care of by the various centres and its accessibility to it can be improved as explained above, there is no focal point at the national level through which information on S & T literature emanating from India can be obtained. In view of the above observations, INSDOC could aim at providing

a referral system for international literature on science and technology and a national centre to receive, retain and disseminate information on science and technology literature originating from India.

4.3 The role of National Science Library (NSL) System can be as under:

4.4 International Scientific literature

- 4.4.1 According to the plan proposal of NSL project, the stated objective is to build a central collection of documents, by way of supplementing the collections already available in various science libraries in the country. NSL will, as far as possible, avoid duplication of material held in other libraries. It will endeavour to fill up gaps in the national collection. The aim is that all the science libraries in the country put together and NSL taking the role of filling up gaps, should ensure that all worthwhile documents (journals, books etc) in science and technology published world-wide, are available within the country, no matter where in the country they are held, for use by Indian scientists at all times to come.
- 4.4.2 Considering the fact that it is costly and perhaps not desirable in a large country like ours, to build up a central collection of all documents in science and technology

and that it is desirable to place the active collection in places of actual use in R & D establishments, the concept of NSL to supplement only the national collection is sound. NSL may continue its developments in this framework.

4.4.3 The complementary and supplementary role of NSL is itself substantial. If the acquisition programme is implemented in full scale, we could have within the country a fairly comprehensive, world-wide collection of scientific literature resources for supporting R & D activities.

4.4.4 Periodicals constitute nearly 75 percent of scientific literature. For that matter, emphasis is usually placed on acquisition of periodical literature. According to our estimate, in the country as a whole (800 science libraries), only about 12,000 foreign periodicals are at present being received. Whereas, a modest estimate of worthwhile scientific periodicals being published now it is placed around 50,000 titles. This means that we have a gap of about 38,000 titles in our national holdings. NSL could definitely step in to fill up the gaps. Since there would be some resources constraints the priority should be for core journals/periodicals.

4.4.5 Likewise, the national collections in conference proceedings, research and technical reports, foreign language publications, dissertations and difficult to procure and

costly publications are weak. NSL could play a vital role to acquire such materials by way of supplementing the national collections. In identifying and filling up gaps, NSL should first explore the possibility of their acquisition by appropriate institutions; failing which only it may acquire the publications to fill up the gaps.

4.5 National Scientific Literature

4.5.1 NSL has also another function of maintaining a repository of Indian scientific and technical publications. This is also one of the main functions of INSDOC. The acquisition programme of NSL has hitherto been on a modest scale due to lack of building and other constraints. It is noted that the acquisition programme is proposed to be stepped up. Efforts should be made now onwards to acquire comprehensively all Indian scientific and technical publications. NSL should be able to acquire, on its own, all worthwhile Indian scientific and technical publications that are being published. Older material may be also acquired by NSL to the extent possible, but the priority should be given to the newer materials in S & T to effectively contribute to the country's goal of rapid modernisation.

4.6 Thus INSDOC's role is system role along with a service role. More important than collecting books which are not procured else where is to have information as to what book, journal or

report is where. This type of central information should be available at INSDOC so that through this National Science Library System (NSLS) interested scientists could be given right access to information speedily.

4.7 Access to information can take the form, as for example, bibliographical services, preparation and production of information referral tools, etc - all these to be backed up by a document supply system.

5.0 TRANSLATION SERVICES

5.1 As regards Translation Services, it is one very vital component in the information systems and services to be done by INSDOC being envisaged is so enormous and important and also considering that there are considerable journals or books available in the international market which give translation of important foreign journals and books, INSDOC should primarily concentrate upon getting these translated journals and books into the National Science Library System. The technical translation services per se are sufficiently huge task and it is worth having complete Technical Translation Service Bureau in the country established separately and it will be better not to burden INSDOC with such a role. If such a technical translation service system gets established INSDOC could acquire information from this translation system for the National Science Library System.

6.0 PRINTING

6.1 INSDOC is doing a very useful activity through printing and it is one of the important work which is appreciated by the scientific community. However, the role should not be seen as a tied inhouse facility but this should become in the first instance an independent cost centre within INSDOC catering to CSIR and also other important scientific institutions. While it is not necessary for INSDOC to do research in printing technology, it should be on the look out for acquiring the up-to-date printing systems used in scientific and technical information services and try to acquire them in Delhi as well as other regional centres, so that the best available S&T printing services can be given by INSDOC to the scientific community. It should also endeavour to off-load regular and routine printing to the industries which have been established in the country over the past few years and which do really good work in terms of printing. This independent cost centre may eventually require a separate management system.

7.0 COMPACTING OF INFORMATION

7.1 Compacting of information can take a variety of forms. This can be in terms of microfilming for document storage; having information on tapes; for access and retrieval and also in future perhaps in optical discs. While INSDOC may not do

basic research work in this area, it is necessary for INSDOC to experiment with various possible compacting media which are available in the world. INSDOC should endeavour to put the often accessed and vital new information in tape form. Probably to a certain extent it will be possible for INSDOC to skip the microfilm phase stage (except for storage of certain essential archives) and jump directly to magnetic tape phase since it is a vital link to computerisation and computer networking. While doing this, it is essential to have a fair amount of compatibility with the international systems since S&T information thrives only on use and exchange. This is an aspect in which INSDOC should concentrate immediately. The various networks like NISSAT etc., also have a considerable role to play in this matter. INSDOC while developing such a compatible compacting systems should work closely with the other Indian networks and also involve information networks in the country which have certain access (even on an experimental basis) with international system (e.g. NAL's Aerospace Information Retrieval System with the European Space Agency).

- 7.2 The question will naturally arise as to what to do with the enormous amount of information (available as documents) which are presently collected at INSDOC. Probably it will be wise not to put them into compacted form at this stage; it will be

better to start the compacting activity in a phased manner for some well selected, much used newer literature beginning say a year from now so that gradually all the newly acquired information will be in a compacted form; these can be accessed through computer systems and also it will be possible to develop networks compatible with international systems. Subsequently the utility of putting the already existing information in such compacted forms can be examined.

- 7.3 There may be instances where hand copies alone are available. The question of compacting these should be attended on a case to case basis. However, information on these should be available in computer compatible networks.

8.0 COORDINATION/SYSTEM ROLE

- 8.1 Coordination with other agencies is conceived as an associative role and not as a specific regulatory nor advisory modes; it should be the coordination which arise through actual co-operative work in terms of developing systems for information. The National Science Library System as conceived above is an excellent example. Thus a full network of National Science Library System should be energised by INSDOC and its regional centres through actual work and playing catalytic role. Efforts in this direction will be facilitated by introducing a system of associateship involving INSDOC and other information centres in the country.

8.2 Similarly the Indian Science abstracts has to be made compatible with international standards. It is necessary for INSDOC to request all the journals to put their abstracted information in particular formats so that ISA can be in an international compatible form. In the beginning stages of such a cooperation there may be some teething troubles but with continued work, it will be possible for INSDOC to effect such a national standardisation especially when the science abstracts get utilised in the international scientific circles through compatible standards. The same would apply to the information networks which get developed in the country, for which INSDOC can play an important role in terms of developing standards for information systems. Similarly the experiments done by INSDOC on compacting can be shared with other information centres in the country and also their experiences can be integrated while adopting future national compacting systems.

8.3 INSDOC can help in design and development of common communication formats and of software packages for adoption by other information centres uniformly. INSDOC can assume responsibility for certain centralised functions, not falling to the sphere of other centres, towards supplementing and complementing the national facilities.

9.0 TRAINING/COMPUTERISATION

9.1 Training to cater to all the services mentioned above whether it is ISA, NSL system or standardisation of information, networking with other agencies, responding to the users in the timely manner, compacting, systems management etc., would require a fair amount of retaining of existing INSDOC personnel including many aspects of computerisation. Also it is essential to further develop trained manpower for various information services in the country. It is essential that the computers are introduced in the INSDOC main Centre and the regional centres immediately.

10 RESEARCH

10.1 Since the advances in the field of Information Science and Technology including the services are very rapid, it is essential that INSDOC does certain amount of research and development activities in this area, to keep itself abreast of some important developments and also to be in a position to effect changes, when necessary. Since the research areas are numerous the Committee does not propose to give any specific suggestions. However, broad areas that could be pointed out are in the areas of compacting of information; information processing in a few selected areas which could also be on an experimental mode; statistical surveys pertaining to information needs and so on. Specific topics

should be identified by INSDOC through appropriate executive mechanisms.

11 MISCELLANEOUS

11.1 It has been noted that a few information "preprint" or "semi-published literature" networks exist in a very few areas in the country. These would be very useful since most recent information are available in preprint or semi-published form. INSDOC could be in touch with some of these groups to encourage formation of such preprint networks for other selected specific discipline/areas.

11.2 For various services mentioned above, it is not necessary that INSDOC should always have full time personnel. It is found that a large number of scientifically qualified personnel are available in the country who could be better tapped if part time services are used as a matter of course by INSDOC for itself as well as for the total system of information services in the country. Appropriate administration mechanism for availing such part time services/personnel should be built into INSDOC.

12. NATIONAL COUNCIL FOR SCIENCE INFORMATION

12.1 As described above, the various activities concerning Information Science, Technology and Services in the country

have become very complex and it is only through a systems approach, the country will be able to utilise the infrastructure already built in and also to enhance them rapidly to meet the requirements of the coming decades. While the linkages to be developed by INSDOC would be very useful to develop such systematic approach, it is also considered useful to have a formal mechanism in which the national system can be discussed. It is therefore recommended that representatives from important institutions and scientists who deal with information science, technology and service should meet in a formal forum called National Council for Science Information. The exact modalities of servicing this Council as well as its membership could be decided once these concepts are basically accepted.

13. PERSONNEL

- 13.1 An important aspect is that the present staff of INSDOC would require retraining and redeployment in the context of the modernisation programme. Augmentation of the staff is also necessary particularly for the computerisation, compaction and research activities. A suggested increase of 3% to 4% of the existing staff per year would seem adequate.

14. BUDGET

While there can be many desirable activities under the modernisation programme keeping in view the ongoing budget

of INSDOC and general resource constraints it is recommended that about Rs. 8.3 crores may be provided to INSDOC over and above the ongoing expenditure to effect some minimum essential modernisation activities. A rough break-up of the projects is given in Table-1 (attached). While the expenditure on the continuing projects is shown as projected by INSDOC during actual annual budget reviews, saving, if any, resulting from the reorientation of INSDOC may be utilised for modernisation activities.

Table : Budget for INSDOC for Seventh Plan period

I.	<u>Continuing Projects*</u>	1985-90 (Rs. in lakhs)
1.	Information Services	274.90
2.	Information dissemination	66.00
3.	Information retrieval	110.00
4.	Information access tools	50.50
5.	Information Resources Development	304.40
6.	Manpower Development	22.50
7.	Information use Promotion	8.60
8.	Regional Centres	175.00
9.	Infrastructure	275.00
	Sub-Total Ongoing - (A)	1,284.90
II.	<u>Modernisation Programme (Indicative)</u>	
1.	ISA related	75.00
2.	National Science Library	100.00
3.	Printing	75.00
4.	Compacting	200.00
5.	Coordination role/System	25.00
6.	Training/Retraining	25.00
7.	Research	50.00
8.	Computer(s)	200.00
9.	Network Costs	30.00
10.	Some infrastructure augmentation for the above	50.00
	Sub-Total for modernisation - (B) (including additional manpower costs also as required)	830.00

TOTAL : (A) + (B) = 1,285.00 + 830.00 = Rs. 2,115.00 lakhs

NOTE: Yearwise phasing may be done by INSDOC

*taken from the financial projections of the Seventh Plan

APPENDICESBACKGROUND

The Advisory Council of INSDOC at its 9th meeting held on 13 May 1985, while reviewing the work programme of INSDOC, had recommended the constitution of an Expert Committee to suggest measures for modernisation of INSDOC's operations and services. The Executive Committee of INSDOC, at its 24th meeting held on 15 July 1985, while endorsing this recommendation, authorised Prof. S. Ramaseshan, Chairman of the Advisory Council to draw the panel of names of the Expert Committee and the terms of reference. The composition of the Expert Committee and the terms of reference drawn by Prof. Ramaseshan are as follows:

Composition of the Expert Committee

Prof. S. Ramaseshan Raman Research Institute Bangalore	Chairman
Prof. R. Narasimha National Aeronautical Laboratory Bangalore	Member
Prof. H.N. Mahabala Indian Institute of Technology Madras	Member
Dr. P.J. Lavakare Department of Science and Technology New Delhi	Member
Shri Y.S. Rajan Indian Space Research Organisation Bangalore	Member
Dr. Ashok Jain National Institute of Science, Technology and Development Studies New Delhi	Member

Dr. G. Bhattacharyya Documentation Research and Training Centre Bangalore	Member
Dr. A. Lahiri Department of Science and Technology New Delhi	Member
Shri T.S. Rajagopalan Indian National Scientific Documentation Centre New Delhi	Convener

Terms of Reference

- a) To indicate future lines of development in regard to programme of modernisation of INSDOC.
- b) To suggest a programme for the introduction of modern information technology into INSDOC.
- c) To recommend areas of computerisation and the hardware and software requirements.
- d) To work out manpower requirements and ways and means for implementing a to c above.

The Director General, Scientific & Industrial Research, approved the constitution of the Expert Committee and the terms of reference on 20 August 1985.

The first meeting of the Expert Committee was held on 18 December 1985 at INSDOC under the Chairmanship of Prof. S. Ramaseshan. INSDOC had prepared for the meeting background papers and also made available a few related documents. The Chairman focussed attention on major issues relating to modernisation which require collective thinking, examination and

judgement of the Committee. There were detailed discussions on all the issues on which the members expressed their considered opinion. The members were also requested to send written statements to be considered at a subsequent meeting. A Drafting Sub-Committee was constituted at this meeting, comprising Prof. S. Ramaseshan, Shri Y.S. Rajan, Dr. Ashok Jain and Shri T.S. Rajagopalan to prepare a draft report of the Expert Committee for further consideration at the final meeting on 18 January 1986. The Drafting Sub-Committee met in Bangalore during 11 - 12 January 1986. It had before it a note prepared by the Chairman, identifying the main issues on which the report of the Expert Committee should carry recommendations, the written statements of Shri Y.S. Rajan, Dr. G. Bhattacharyya, Dr. A. Lahiri, Dr. Ashok Jain, Dr. P.J. Lavakare and Shri T.S. Rajagopalan and a preliminary draft prepared by Shri Y.S. Rajan on the basis of discussions that took place in the meeting of the Expert Committee held on 18 December 1985 and the written statements of members. After the Drafting Sub-Committee agreed upon the substance of various recommendations, Shri Y.S. Rajan, in collaboration with the Chairman, had prepared the final draft report.

At the meeting of the Expert Committee held on 18 January 1986 the final draft report was discussed at length and approved. The Chairman was authorised to forward the report of the Expert Committee to the Director-General, Scientific & Industrial Research, with a covering letter indicating the financial and manpower requirements for implementing the various recommendations.

R16
1912

भारत सरकार
अन्तरिक्ष विभाग
इसरो मुख्यालय

कावेरी भवन केम्पेगोडा मार्ग
बैंगलूर 560 009 भारत

तार : इसरो टेलिग्राम : 0845 - 499 : 0845 - 326
दूरभाष : 27371



सत्यमेव जयते

GOVERNMENT OF INDIA
DEPARTMENT OF SPACE

ISRO HEADQUARTERS

CAUVERY BHAVAN KEMPEGOWDA ROAD
BANGALORE-560 009 INDIA

TELEGRAM : ISRO TELEX : 0845-499, 0845-326
TELEPHONE : 27371

Y S Rajan

→ YSR / Archives
Dichahar
into VG
on 20/11/18

Ref: ISRO:SS: 88/7

September 10, 1985

My dear Sid,

These are some of thoughts on the article on Scientific Creationism and rationality by Mr. Michael A Cavanaugh, which appeared in Nature, volume 315, dated May 16, 1985. I have discussed some of it with you; still I thought in view of its importance that I should write down some ideas that came to my mind-more in terms of action rather than merely theory building. I should hasten to add that I am not against theory-building at all, and in fact the entire basis of scientific method rests with theory itself. In fact it is the history ~~and the whole~~ of theories that is science, as has been brought out in the article. I am quoting below a few parts to stress certain aspects in the article which I want to address here.

2. Scientific method is defined as under:

a) Quote: First knowledge is acquired through conjectures and refutations in a research process. Research is institutionalized in the various scientific professions, which select and certify practioners.

b) Another aspect stressed is:

Unquote

Quote: Second, whence the coherence of science? it cannot be founded upon tenets, which change. Any single tenet may be false; most (the set of all scientific theories minus our present ones) are false. Science acquires coherence, rather, through its procedural commitment to the integrity, reliability and professional governance of scientific theory-testing (and teaching) over the long haul. In other words, modern science rests (like modern law) upon long-term "orthopraxy" (the integrity of method, instituionalized in professions) rather than any short-term orthodoxy of individually trustworthy tenets. Accordingly, the unit of knowledge acquisition is the theoretical community rather than the individual scientist: thus "science" develops as the distributed property of individual genius-much less, of what everyman observes in an untutored way. (On this view, theory is not the luxurious icing on the scientific cake,

...../

but the very cake itself. Science is nothing other than the history of its theories, since a method independent science is impossible, and the subjects of this history are the scientific collectivities that produce and change theories .

Unquote

c) The very organisation of Science itself described as:

Quote:

Science is now conducted typically by career scientists within large complex organisations (rather than as the loosely organized hobby of gentleman amateurs). Increased size refines divisions of labour; consequently, "science" becomes even less the concentrated property of individuals. Each may differ greatly in understanding, talent and skill, yet all may contribute, talent (provided their labour is divided cleverly enough) to the hints of their diverse gifts).

Unquote

3. Consequent to the above three, arises another important aspect which gives some clue to the complex relationship of control between Science and Society.

Quote:

The organizational factor makes for a complex relationship of control between science and society. On the one hand, though the typical scientist is not Einstein, he will enjoy some expert divergence from commonsense not shared by every citizen. On the other hand, science and commonsense are not totally antithetical, for in a knowledge-based society, commonsense is increasingly tutored by "packed-down science".

Unquote

4. If you look at the above, it is very clear that Science is not "democratic" in the common sense parlance, that is being equal to every untutored person. One has to be initiated into science; one has to adopt certain methodologies. The very process itself is a complex relationship of works of different individuals related however in a particularly structured form. Institutionlised integrity is very important. The individuals who contribute to science should have procedural commitment to integrity, and professional acceptance of theory testing in a long run. Also, it is very clear that science is not the private property of an individual genius; it is part of a total/collective effort; a part of history. But it does not occur ⁱⁿ a laissez faire manner but in an organised structured fashion.

5. After you read the above carefully, we should probably ask a few questions which the author of the article has not asked probably due to his unfamiliarity or due to predominantly 'Western bias' of the article. While

.../.

the author has addressed Islam to a limited extent and more elaborately the Protestant theology, he has not addressed some of the oriental philosophies. If you take Taoism, Confucianism, Buddhism or the Hindu Advaitic traditions elaborated by Shankara, Ramakrishna, Ramana etc., there is a great difference in their approaches. What is expounded in the oriental philosophies/religions/theology? These philosophies (or religious teachers) have used enquiry as method for search of reality. In fact, they have recommended a process of enquiry (mark it). They also state that there are many ways to Realisation of Truth and in the process variety of "bhashyams" are written. If so, are these scientific methods of arriving at Truth? I think it is necessary to address this question carefully because movements similar to "the scientific creationism" can emanate in the Eastern Societies. If scientific creationism is a parasite on "Western science based society" as the author has brought out in the end, what type of movements would be the parasites "in the Eastern societies". First of all are they parasites or are they competitive movements? This is an aspect to be examined carefully. When I state this it is not that I have no belief or faith in the scientific method but this aspect has to be addressed rather carefully because the issues are more complex.

6. While the author towards the end, pleads for the climate of scientific method and also deflating the protective belts of creationism and similar parasitic movements through packed-down science etc., he also asks a question whether concentrated attention now is not small price to pay in order to avoid future generations, who having passed through higher education agree with 25% of Ohio students, who believe that evolution is just bunk "even the scientists say so". This has a very great significance; it points out the challenges scientific method may have to face in the coming years. Please note that it will not only be from the Protestant theology and related movements, but also from other religious/beliefs and cultures because Science is being practised by many now. Given the faster communication between different regions of the world and also noting the number of science fictions/stories/movies etc., which mix on one side projection of high science and technology and on the other side various beliefs of different cultures, I distinctly foresee this possibility. You see 'Star trek'; see 'Rambo'; see 'Return of the Jedi'; see 'The first blood' and a number of 'scientific' films from USA. What I say will be self-evident. Many ancient beliefs are being modernised with colourful imaginations and Western penchant for show. What type of belief structures these will create, one must ponder; I am sure it is not the 19th century approach to Science. Another factor to be noted is that whatever may be the elegance of scientific method is itself and whatever may be excitement scientists may derive out of the whole process, by and large common persons (so called public including many great statesmen), have looked upon science as a saviour of the world from poverty, and the giver of techniques for enriching the world in material benefit. Partly due to this belief and the public support, what has come through Science and Technology is a large amount of commendable progress; at the same time its dialectical antipode viz war, destruction, terror, loss of privacy, loss of

freedomn alienation etc have also resulted. When we look at the modern societies, one will be amazed to see the amount of alienation, the amount of psychic stress, feeling of pointlessness etc., Rationalising these may not be possible.

In the eyes of public science and scientific method will be seen as death, terror, repression etc.,

I am not imagining a situation. Please note that the statistics quoted by the author is from the so called advanced society; it is found that 10% believed in creationism 76% were fence sitters. I consider it more dangerous for science, the mere fact that 76% chose to be fence sitters. This balance will probably tilt if a few nuclear bombs exploded in some places in the world inadvertently or if some other deadly weapons are exploded or if there is some "limited" (sic) nuclear war etc., The movement against science could take place any time if modern technology is used for mass distruction in a way resulting a great public shock.

7. In many cases, Islamic fundamentalism that has arisen in a few places in the globe is not just because of backwardness but because of imperialism of technology; please note that modern technology is a child of scientific method ; a child of science. Every man is not going to see the fine subtlety between science and technology. Technology with all its results and actions will be seen as science; how does one face such situation which is much more tougher than what the author has described towards the end of the article. I do firmly believe that along with the scientific method, its anti-podes and a few parasites such as scientific creationism etc., will also exist/emerge. These parasites may become bigger if science itself and its products cannot solve the problems of humanity. This is where one should note that the question is not just that of sociology of science; it is the sociology and history of human being. It is important to recognise it. What role can mass of religious beliefs can play to ensure that the bulk of the humanity can atleast utilize the positive features of science? How can the packeddown science can mix with beliefs of many cultures and integrate with it mainly to protect the "golden goose" of science I do not know the answer. I have posed these questions not because I lost faith in science. Science is very important for humanity; I believe in it. At the same time I find that it is a fragile child in the hands of humanity. There was a time in human history it was thought to be the Panacea. Many mouth it even now. But those days are gone. It is a child of humanity; it will continue to be the child because of the very nature of science and its division of labour and the fact that it does not belong to any individual and cannot be possessed by any individual. It will be part of the whole humanity in some structured form; it is a part of human history; it is history of scientific processes. In this form and in this sense, for a common person, it acquires a

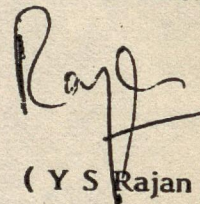
mataphysical position and therefore it cannot be contained or symbolised in a simple way for "every man" to perceive; therein lies the danger for Science.

8. As I discussed with you once, Science in a general sense for epistemology, and History for dialectical materialism, appear similar to "Brahman" in Advaita. It is not my conclusion, but only a general passing remark while studying this too complex a matter. I will keep thinking about it. But I am convinced now (after seeing the human history and the role of science so far), that one cannot keep the eyes and mind closed just after defining what scientific method is and then leave it at that. The so-called "Scientific temper" does not logically follow either from Science or packed down Science. "Scientific temper" seems to be an elusive attribute which Hindus have given to the perfect Yogi. Note what is happening today we have lots of science, many powerful scientists, powerful managers, administrators, technical wizards and so on and philosophy has zero position in the modern world. Therein lies the danger for science itself. To a certain extent "packed down Science" generalised is natural philosophy. Now Science would require some humanist philosophers to protect it and to reach it to the people and to create the so called packeddown science, and distribute it.
9. In the Indian context, besides the aspects of impact of the Indian thoughts which I have addressed earlier, one should address their relevance similarity etc., (if any) or dissimilarity between Indian belief/ thought systems with scientific methods. Besides studying these carefully, one should also think of how packeddown science can be distributed in India. Firstly it has to absorb a lot of Indian culture or say clothed with Indian thinking. Also it cannot be spread by English writings not even by Hindi writings. It has to be in various languages. It has to be written in many local forms. Otherwise, if US produced 10% of scientific of those who believe in scientific creationism and 25% in Ohio University who consider the evolution as junk, in India we may have 99% including many so called practitioners of Science. How does one address these popular beliefs. I have no solution. Please think of it, that's all what I can say.
10. Also it may be good to remind persons like Cavanaugh that the danger to scientific method may not just come from protestant theology alone. Scientific methods now in some sense belong to the whole world; therefore the danger can come from various cultures and sub-cultures. The Western world looks at a world centred around itself. The solutions of protecting scientific methods centred only in West are not going to be that easy. Science in the Western system itself is so vulnerable as can be seen from the article.

11. Lastly it so happened that I came across a book X-rays to Quarks-Modern Physicist and their discoveries by Emilio Segre, University of California, Berkley (1980). It gives not just the scientific aspects but also how the scientists did their discoveries in their period giving personal touches etc., etc., and how some doubted certain things during the certain period and so on. It is a good thing to see especially in the context of the definition of the scientific method "which is a history of all the theories". If you get a chance you read it.

Regards,

Yours sincerely



(Y S Rajan)

Dr V Siddhartha
Council for Scientific &
Industrial Research
C/o. Shri M C Kapila
Under Secretary
Department of Space
New Delhi - 110 003.