For unto every one that hath shall be given and he shall have abundance: but from him that hath not shall be taken away even that which he hath.

Gospel According to St. Matthew*

Besides the problems and barriers due to scarcity of literature, information management tools and equipment, inadequate human resources and those arising out of users' communication habits, there are certain other issues and factors which the library and information policy makers of India must take into consideration.

6.1. Matthew Effect

Matthew Effect is a term coined by Robert K. Merton, an eminent American social scientist. According to this term those who possess the resources in abundance and enjoy good position will gain more while others who do not have much will lose even what they have. Since information communication is international in character India must not ignore the implications of the 'Matthew Effect', while formulating its policies and programmes.

6.1.1. Library Holdings

India's position regarding library holdings is much better than that of several countries. "The total holdings of Pakistan's 110 scientific and technical libraries number 805,771"¹ Number of total holdings of Indian scientific and technical libraries is much higher than this. However, the number of India's total library holdings is not high in comparison to those of some developed countries.


**TABLE 6.1**

Number of Current Serial Titles Received by Indian Scientific and Technical Libraries from Various Countries of the World.

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Country of Origin</th>
<th>Number of Serials</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>USA</td>
<td>3816</td>
<td>28.47</td>
</tr>
<tr>
<td>2.</td>
<td>UK</td>
<td>2071</td>
<td>15.45</td>
</tr>
<tr>
<td>3.</td>
<td>India</td>
<td>1892</td>
<td>14.12</td>
</tr>
<tr>
<td>4.</td>
<td>Germany (East &amp; West)</td>
<td>693</td>
<td>5.17</td>
</tr>
<tr>
<td>5.</td>
<td>USSR</td>
<td>621</td>
<td>4.63</td>
</tr>
<tr>
<td>6.</td>
<td>Japan</td>
<td>539</td>
<td>4.02</td>
</tr>
<tr>
<td>7.</td>
<td>Netherlands</td>
<td>438</td>
<td>3.27</td>
</tr>
<tr>
<td>8.</td>
<td>France</td>
<td>405</td>
<td>3.02</td>
</tr>
<tr>
<td>9.</td>
<td>Australia</td>
<td>291</td>
<td>2.17</td>
</tr>
<tr>
<td>10.</td>
<td>Switzerland</td>
<td>255</td>
<td>1.90</td>
</tr>
<tr>
<td>11.</td>
<td>Canada</td>
<td>253</td>
<td>1.89</td>
</tr>
<tr>
<td>12.</td>
<td>Italy</td>
<td>163</td>
<td>1.22</td>
</tr>
<tr>
<td>13.</td>
<td>Poland</td>
<td>142</td>
<td>1.06</td>
</tr>
<tr>
<td>14.</td>
<td>Czechoslovakia</td>
<td>129</td>
<td>0.96</td>
</tr>
<tr>
<td>15.</td>
<td>International Organisations</td>
<td>125</td>
<td>0.93</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>1570</td>
<td>11.72</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>13403</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

"While the USA can boast of 407 million volumes with an annual addition of 25 million volumes of publications, India has only 11 million volumes with an annual increase of 0.7 million. India's total book stock does not even reach the 50 percent mark of annual addition of U.S. book stock". The combined book collection of the Soviet Union exceeds 4 billion volumes.  

6.1.2. Import of Publications

Table 6.1 indicates that Indian libraries receive about eighty-five percent of scientific and technical serials from abroad.

---


3Figures displayed at the Soviet Book Centre during the National Book Fair Organised by NBT in February, 1983 at Leisure Valley, Chandigarh.

A majority of the surrogate journals, scientific and technical textbooks and reference works are also procured from some developed countries especially the UK and the USA. A large number of scientific and technical publications are published in developed countries by a few commercial publishers. Whenever the need for starting a scientific journal in any new discipline is felt, such publishers do not lose any time in seizing the opportunity. They associate eminent scientists, sometimes even Nobel Laureates, with their editorial or advisory boards, do extensive publicity and thus attract high-quality material for their new journals. They usually fix high subscription rates. Scientists prefer to use such journals because most of the high quality material is published in them. Libraries subscribe to such journals to satisfy the information needs of their users. In 1972 in an analysis, Garfield listed 152 most cited journals in science, and 152 journals with the highest impact. "About half of these are published by profit-making organizations. These include Academic, Elsevier, Karger, Macmillan, Pergamon, Springer, Wiley, William and Wilkins, among others. A good number of the remaining journals in the list are owned by non-profit making organizations but published for them by profit-making publishers."^4

A majority of the International surrogate services are published in the United States, e.g. Chemical Abstracts, Biological Abstracts, Psychological Abstracts, Index Medicus, Index Chemicus and Current Abstracts of Chemistry, Dissertation Abstracts International, Engineering Index, Science Citation Index etc. Physics Abstracts is published in the U.K. Such publications have achieved both comprehensive-ness and timeliness and serve the international community well through their worldwide circulation. International surrogate services are based on and sustained by the publications from all over the world. "At Chemical Abstract Service, some 73 percent of the information...originate outside the United States". Some of the abstracting journals are now asking for charges for including abstracts of journal articles. Reputed indexing and abstracting services enjoy a great power and they can

affect the economy of a scientific journal to a great extent. The inclusion of abstracts of papers of a scientific journal in a standard abstracting service may increase the circulation of the journal. Therefore, journal publishers largely co-operate with the surrogate publishers and even supply the material to them after its translation in the language of the surrogate service.

Most of the developing countries have adopted the western pattern of university education. The faculty members going to some developed countries bring with them new ideas for curricula design and revision of the existing syllabi. Consequently, the text-books produced in the developed countries also become suitable for the developing countries. Advanced text-books are mostly published in the USA, the UK and West Germany. Even within these countries the book publishing and distribution business is controlled by a few firms. "At present six of the largest British publishing groups account for about thirty percent of the sales. These are International Publishing Corporation, Collins, Penguin Books, Associated Book Publishers, Hutchinsons, and Routledge and Kegan Paul\(^6\). Similar is the position in the book selling trade. "It has been estimated that eighty percent of the UK bookselling trade goes to ten percent of the booksellers..."\(^7\) Writing text-books and similar secondary publications does not require laboratory facilities and sophisticated equipment. What one requires is access to all relevant scientific literature. In India, there is no dearth of scientific manpower. However, the number of authors in this country who earn their living by writing text-books and bringing out other secondary publications, can be counted on one's finger tips. There are no incentives and encouragement for publishing this kind of material with the result that we import a large number of pedagogic publications from abroad. The developed countries are earning a lot through the sale of such publications.

The Encyclopaedia Britannica, the Encyclopaedia Americana, the Colliers Encyclopedia, the World Book Encyclopedia, the McGraw Hill Encyclopedia of Science and Technology, the Van


\(^7\)Ibid., p.113.
Nostrand's Scientific Encyclopaedia, the Columbia Lippincott Gazetteer of the world, the Oxford English Dictionary, the International Who's Who and a number of other reference tools are published by a few giant publishers in the West. Such publications of World-wide scope and coverage, besides generating employment in their countries, fetch a lot of finances to these publishing nations. Recently Great Britain has published the world's most comprehensive Union Catalogue as the world's biggest book 125 ft in length, two and a half tonnes in weight the cost of a copy being £16,352. This astonishing work entitled, National Union Catalogue, took 15 years to compile. It now has a publishing company all to itself i.e. the National Union Catalogue Company. So far, 1358 sets of the National Union Catalogue have been sold in 51 countries around the world from Nigeria to the Soviet Union. The sales of this catalogue have so far brought £16.5 million to this company.8 The well-established and properly managed reference book publishers receive all the needed data without much cost and effort. Many interested individuals/institutions voluntarily communicate the data to reference book publishers because of their own interests e.g. data supplied to directories, biographical dictionaries, etc. Therefore, the publishers are able to update their data bases without much difficulty. However, they sell the packaged products all over the world at very high prices.

6.1.2.1. Cost of Imported Publications. At what cost are scientific and technical publications received in India from other countries? To calculate this, a detailed analysis of the resources of two libraries, namely, PGIMER Chandigarh and CSIO, Chandigarh, was undertaken. Table 6.2 shows that these libraries are procuring a majority of scientific and technical publications from other countries. Secondly, the cost of foreign publications is much higher than that of Indian Publications. Table 6.3 gives the price of foreign and Indian journals subscribed by some libraries during 1981-82. Among the foreign journals, the prices of foreign indexing and abstracting journals in particular are much higher than those of Indian ones as is evident from Table 6.4

### TABLE 6.2
Total Number and Cost of Foreign and Indian Publications Procured by Two Indian Libraries as on Jan.83

<table>
<thead>
<tr>
<th>Name of the Library</th>
<th>Number of Publications</th>
<th>Cost of Publications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Foreign</td>
</tr>
<tr>
<td>PGIMER Library</td>
<td>52436</td>
<td>48071</td>
</tr>
<tr>
<td>CSIO Library</td>
<td>23055</td>
<td>14190</td>
</tr>
</tbody>
</table>

Source: Accession Registers of these two libraries (The price of each document is taken as paid at the time of purchase).

* 2/3 of the Indian publications were standards.

### TABLE 6.3
Total Number and Price of Foreign and Indian Journals Subscribed by Some Libraries

<table>
<thead>
<tr>
<th>Name of the Library</th>
<th>Number of Journals Subscribed</th>
<th>Subscription for Journals paid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Foreign</td>
</tr>
<tr>
<td>PGIMER Chandigarh</td>
<td>670</td>
<td>600</td>
</tr>
<tr>
<td>CSIO Chandigarh</td>
<td>170</td>
<td>140</td>
</tr>
<tr>
<td>NDRI Karnal RRL Jammu</td>
<td>625</td>
<td>455</td>
</tr>
<tr>
<td>Total</td>
<td>1725</td>
<td>1348</td>
</tr>
</tbody>
</table>

### TABLE 6.4
Subscription Rates of Some Foreign and Indian Indexing and Abstracting Services (1983)

<table>
<thead>
<tr>
<th>Foreign Publications</th>
<th>Annual Subscription</th>
<th>Indian Publications</th>
<th>Annual Subscription</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Abstracts</td>
<td>62,000</td>
<td>Indian Science Abstracts</td>
<td>100</td>
</tr>
<tr>
<td>Biological Abstracts</td>
<td>19,350</td>
<td>Indian Science Index</td>
<td>150</td>
</tr>
<tr>
<td>Physics Abstracts</td>
<td>12,400</td>
<td>Medicinal &amp; Aromatic Plants Abstracts</td>
<td>43</td>
</tr>
<tr>
<td>Engineering Index</td>
<td>11,650</td>
<td>CRI Abstracts</td>
<td>40</td>
</tr>
<tr>
<td>Science Citation Index</td>
<td>45,000</td>
<td>Irrigation &amp; Power Abstracts</td>
<td>500</td>
</tr>
<tr>
<td>Index Chemicals</td>
<td>95,000</td>
<td>Indian Dissertation Abstract</td>
<td>15</td>
</tr>
</tbody>
</table>

Note: $ is taken at the exchange rate of Rs.10
6.1.3. Indian Contribution to Literature and Information Systems

India's major output of science enters the world stream of scientific literature in the form of scientific papers (Table 6.5). Out of a sample of 9,779 papers published by Indian scientists, 3,467 were published abroad. A study of publications of a random sample of scientists from different institutions indicates that institutions having sound financial base and those which are reputed for high quality research work publish more papers in foreign journals than others (Table 6.6). The well established international scientific journals therefore, get the bulk of high quality material and are able to sustain their high standard. Such journals, in spite of their very high subscription rates, are widely circulated as they are invariably recommended by scientists for subscription. The Ulrich International Periodical Directory (1979-80) records the circulation of Science as 160,000 and that of Science Digest as 1,50,000. Now several reputed journals have introduced page charges for the publication of papers. The Physical Review Letters charges $135 per page and charge for an abstract is $20. The Journal of American Chemical Society charges $65 per page, and $15 per paper for abstracting. The American Journal for Clinical Nutrition charges $30 per page.

With the intention of helping the developing Countries to derive benefits of information technologies and to facilitate worldwide collection and dissemination of information through mutual co-operation, the United Nations has established a number of international information systems e.g. INIS, AGRIS, UNBIS, POPINS, ASFIS, ISDS, etc. National inputting centres have been established in various countries to supply relevant information to such international information systems. India is participating in several international information systems. (Heading 3.5) Information is supplied in a processed form which otherwise would have involved a huge cost, if collected through the efforts of the international centre. Processing of information in India, Pakistan, S.Korea or Cuba is much cheaper than in the United States, France or Britain. Developed nations, where this world-wide data is more in use, in fact derive a greater benefit
### TABLE 6.5

<table>
<thead>
<tr>
<th>Institutions</th>
<th>Total</th>
<th>No. of Scientists</th>
<th>Papers in JILs</th>
<th>Books</th>
<th>Reports</th>
<th>Conferences</th>
<th>Patents</th>
<th>Diet. &amp; Other Publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td>721</td>
<td>9779</td>
<td>3467</td>
<td>6312</td>
<td>75</td>
<td>68</td>
<td>4</td>
<td>184</td>
</tr>
<tr>
<td>CSIR</td>
<td>155</td>
<td>1 *1878</td>
<td>801</td>
<td>1077</td>
<td>9</td>
<td>2</td>
<td>7</td>
<td>65</td>
</tr>
<tr>
<td>ICAR</td>
<td>113</td>
<td>1667</td>
<td>422</td>
<td>1245</td>
<td>18</td>
<td>0</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>ICAR</td>
<td>132</td>
<td>1504</td>
<td>650</td>
<td>133</td>
<td>16</td>
<td>2</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>ICMR</td>
<td>144</td>
<td>2285</td>
<td>443</td>
<td>1842</td>
<td>18</td>
<td>1</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>AGU</td>
<td>30</td>
<td>421</td>
<td>183</td>
<td>238</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>IITs</td>
<td>23</td>
<td>362</td>
<td>189</td>
<td>238</td>
<td>0</td>
<td>0</td>
<td>35</td>
<td>0</td>
</tr>
<tr>
<td>SRC</td>
<td>25</td>
<td>309</td>
<td>227</td>
<td>173</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>99</td>
<td>1533</td>
<td>552</td>
<td>801</td>
<td>10</td>
<td>2</td>
<td>8</td>
<td>54</td>
</tr>
</tbody>
</table>

**Notes:**
- JILs = Journals
- TOTAL = Total
- CSIR = Council of Scientific & Industrial Research
- ICAR = Indian Council of Agricultural Research
- ICMR = Indian Council of Medical Research
- AGU = Advanced Grants Unit
- IITs = Indian Institutes of Technology
- SRC = Science and Research Council
- TOTAL = Total
### TABLE 6.6
Foreign and Indian Papers Published by the Scientists Surveyed at Some Institutions

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Institutions</th>
<th>No. of Scientists Surveyed</th>
<th>Combined Research Experience in years</th>
<th>Papers Published</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td>Abroad</td>
<td>India</td>
</tr>
<tr>
<td>1</td>
<td>BARC 25</td>
<td>369</td>
<td></td>
<td>309</td>
<td>227</td>
<td>82</td>
</tr>
<tr>
<td>2</td>
<td>SRC 23</td>
<td>214</td>
<td></td>
<td>362</td>
<td>199</td>
<td>163</td>
</tr>
<tr>
<td>3</td>
<td>TIFR, Bombay 3</td>
<td>59</td>
<td></td>
<td>54</td>
<td>33</td>
<td>21</td>
</tr>
<tr>
<td>4</td>
<td>BOSEIL, Calcutta 3</td>
<td>46</td>
<td></td>
<td>77</td>
<td>67</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>PRL, Ahmedabad 5</td>
<td>44</td>
<td></td>
<td>71</td>
<td>57</td>
<td>14</td>
</tr>
<tr>
<td>6</td>
<td>IISC, Bangalore 13</td>
<td>39</td>
<td></td>
<td>30</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>7</td>
<td>IIP, Dehradun 25</td>
<td>279</td>
<td></td>
<td>250</td>
<td>109</td>
<td>141</td>
</tr>
<tr>
<td>8</td>
<td>NEERI, Nagpur 12</td>
<td>112</td>
<td></td>
<td>92</td>
<td>22</td>
<td>70</td>
</tr>
<tr>
<td>9</td>
<td>CSIR-MC, Madras 9</td>
<td>158</td>
<td></td>
<td>212</td>
<td>87</td>
<td>125</td>
</tr>
<tr>
<td>10</td>
<td>PGI MIR, Chandigarh 39</td>
<td>264</td>
<td></td>
<td>362</td>
<td>180</td>
<td>182</td>
</tr>
<tr>
<td>11</td>
<td>NIV, Pune 7</td>
<td>128</td>
<td></td>
<td>212</td>
<td>41</td>
<td>70</td>
</tr>
<tr>
<td>12</td>
<td>NINL, Hyderabad 11</td>
<td>166</td>
<td></td>
<td>232</td>
<td>109</td>
<td>123</td>
</tr>
<tr>
<td>13</td>
<td>NDRI, Karnal 20</td>
<td>170</td>
<td></td>
<td>251</td>
<td>46</td>
<td>205</td>
</tr>
<tr>
<td>14</td>
<td>JARI, Calcutta 5</td>
<td>67</td>
<td></td>
<td>103</td>
<td>19</td>
<td>84</td>
</tr>
<tr>
<td>15</td>
<td>CIFRI, Calcutta 9</td>
<td>131</td>
<td></td>
<td>105</td>
<td>18</td>
<td>87</td>
</tr>
<tr>
<td>16</td>
<td>UAS, Bangalore 33</td>
<td>319</td>
<td></td>
<td>493</td>
<td>72</td>
<td>421</td>
</tr>
<tr>
<td>17</td>
<td>UAS, Hyderabad 16</td>
<td>114</td>
<td></td>
<td>146</td>
<td>35</td>
<td>111</td>
</tr>
<tr>
<td>18</td>
<td>UAS, Kalyani 15</td>
<td>43</td>
<td></td>
<td>46</td>
<td>7</td>
<td>39</td>
</tr>
<tr>
<td>19</td>
<td>IIT, Madras 8</td>
<td>53</td>
<td></td>
<td>61</td>
<td>29</td>
<td>32</td>
</tr>
</tbody>
</table>

from international information systems than the developing ones. Secondly, they are the first users of the information fed by other nations because they have the technology to utilize it fully and speedily.

6.1.4 Developments in Information and Communication Technologies

Developments in information and communication technologies help the affluent countries to keep up their dominating status in the world. Such countries are integrating their libraries with the application of sophisticated technologies. Data bases are also being created for specific library functions. OCLC is the most comprehensive and one of the oldest data bases of its kind in the USA. It maintains an on-line Union Catalogue for the participating libraries. During the last decade,
a large number of libraries in the United States started an on-line bibliographic processing to perform various functions more efficiently and speedily. Certain libraries are even selling the products of their data bases. The library of Congress is selling MARC tapes to some 3000 libraries all over the world.9

The developing countries have to pay a high cost for using the comprehensive data bases and for importing technologies available in some advanced countries. "At present 85 percent of the World supply of computers.... is in the hands of 10 western companies and IBM provides almost half of it"10. The western countries are making rapid strides in communication technologies. Electronic journals have made their appearance. Writing a scientific paper on Computer and its simultaneous editing is no more a science fiction. Developments in communication technologies are so fast that the futurists are predicting a paperless society in the United States by the end of this century. F.W. Lancaster leads this group. A number of Commercial data bases have also been established which are accessible for on-line use e.g. Lockheed data base, California; ISI data base, Philadelphia. "A consortium of scientific and technical publishers has proposed .... a technology-based document delivery system. At present the consortium includes publishers like Blackwell, Elsevier, Pergamon Press, Springer and Academic Press. The system they envision is called Article Delivery Over Network Information Service (ADONIS). ADONIS members would provide journal articles in the machine readable form for storage on videodiscs. When an article is requested a computer will locate it on the appropriate disc. The system will transfer the article via satellite to a laser printer at the user's end"11. Seeing the high profitability of information industry, many private concerns are attracted to it.

The services of big private information industries will not be free from monopolistic approach, besides the profit motives, e.g. ISI,

Philadelphia imposes the following terms and conditions for on-line use. "On-line searching will be available only to those institutions that subscribe to the printed indexes at rates that will encourage on-line use."12 The time may soon come when such multi-national information corporation may not sell their products in paper form.

Several nations are now pooling together their resources to develop and maintain comprehensive data bases and information networks. "At Franscati, near Rome, the European Space Agency (ESA) provides the ESRIN/RECON On-line Interactive Retrieval Service. The terminals are located in France, the Netherlands, the U.K., FRG, Spain, Sweden, Denmark and some other countries. The network covers some 10000 Kms and has some 26 terminal nodes."13

The United States is foremost among all the countries in the development and application of sophisticated information technologies for information storage, retrieval and transfer. "The[US] data bases account for 80 percent of the worldwide transmission and processing of information."14 Even some other countries are using the US data bases for information storage and processing. Such a trend has serious socio-economic implications for some countries. "At an OECD conference in Paris [1980]... a Canadian representative said that by 1985 his nation could lose upto 1,00,000 jobs as a result of information channelized to the US for processing."15

Most of the countries are now aware of the incredibly rapid developments in the field of information processing, storage and communication. To save the outflow of their currency, many of them are developing their own data bases. Seeing the data base developments

in the USA, the UK and W.Germany, the French President (1974-81) Giscard d'Estaing took a personal interest in creating a new data bank for providing French scientists with appropriate bibliographic information produced by the world's major documentation services. The centre was built in a record time of six months. "The official reason for the creation of the new centre...[was] economic. French scientists have been making about 60,000 inquiries to the US data banks each year at a cost of 15 million FF."^16

There is a stiff competition among the developed nations to attain supremacy in information and communication technologies. The United States and other advanced countries are liberally investing for the development of most advanced communication technologies. The 'Prestel' and 'Telidon' systems, developed in the UK and Canada respectively are likely to bring about a real revolution as with their extensive application even homes will be linked with data bases to ensure a prompt supply of the required information. The sale of such sophisticated technologies is likely to bring affluence to the countries responsible for their development.

The major benefits of the efforts of the developing countries to adopt the latest communication technologies will go to the advanced countries because of 'Matthew Effect.' In this situation, the developing countries will have to formulate their common science information policy. India as a leading Third World Country, with its high level of scientific and technological activities, should take the initiative in this matter and strongly advocate that science communication should not wholly depend on the financial capacities of nations, institutions or individuals, but should keep in view certain accepted international norms, and consider all scientists as one community and all world scientific information as one source.

6.2 Chaos of Information Services and Tools

In India, various scientific institutions are compiling and


A sample of such communication systems sales is given in International Herald Tribune, Communication Technology-Special Supplement, September 1982, p.9.
issuing a number of information services (Fig. 6.1) Table 6.7 records the information services brought out by the scientific and technical libraries surveyed by the investigator. A study of such information services and tools indicates that many of them are not comprehensive, properly planned, co-ordinated and geared to meet the national needs. Several scientific laboratories bring out documentation lists with the assistance of journals received in their libraries. Some of the institutions even use the bibliographic entries from some secondary information services, in order to compile their documentation lists. Such multitudinous and multifarious local-level efforts are not effective in offering satisfactory science information services in the country. Due to lack of proper regulation and control of such publications, their growth takes place in a haphazard manner. Several libraries have started information services without taking into consideration what services are already being issued by other institutions, what are their difficulties and effectiveness, and whether they should support the already existing services and help in their improvement or start fresh ones. Feasibility of joint efforts to bring out comprehensive and regular publications is generally not studied.

6.2.1 Diverse Origin

Science information services in India emanate from a wide variety of sources. Various laboratories under CSIR, ICMR and ICAR bring out their own publications. Besides these, a number of information services are issued by the universities, IITs, Space Research Centres BARC, Government Departments, Boards, research institutions associated with the Central and State Governments, learned societies and associations and commercial publishers. The Defence Laboratories have their own independent systems of organizing information services. All the Defence laboratories taken together issue some 48 current awareness services, scanning about 4000 journals and annually record some 20,000-25,000 bibliographic references. The Current awareness services of the Defence Laboratories are issued in the form of current contents, indexing and abstracting bulletins, and patent information bulletins, etc. A sample of information tools listed in Table 6.8 indicates that

*Personal interview with S.N. Mehta, Deputy Director DESIDOC, December 14, 1983.
<table>
<thead>
<tr>
<th>Library</th>
<th>Information Services and Tools Brought Out by Scientific and Technical Libraries</th>
</tr>
</thead>
</table>
| CSIO, Chandigarh | 1. Documentation List(Q)  
2. Instrumentation Index(Q)  
3. CSIO Communications(Q)  
4. Directory of Scientific Instruments(Q) |
| CHRS, Dhanbad    | 1. Library Bulletin(Q) |
| CSIR, Delhi      | 1. List of Additions(M)  
2. Current Serials  
3. Catalogue of Serials(Q)  
5. Industrial Toxicology Bulletin(Q) |
| ITRC, Lucknow    | 1. List of Additions(M)  
2. Current Serials  
3. Catalogue of Serials(Q)  
5. Industrial Toxicology Bulletin(Q) |
| IIP, Dhanbad     | 1. Library Bulletin(Q)  
2. Subject Bibliographies (O)  
3. Catalogue of Serials (O) |
| NIO, Goa         | 1. New Arrivals (M)  
2. Acquititles (F)  
3. Documentation Services Series(O)  
4. Misc. Publications Series(O) |
| CEERI, Pilani    | 1. Documentation List(Q)  
2. Current Additions (M)  
3. List of Additions (M)  
4. Library Additions Bulletin(M)  
5. Project Oriented SDI Services.  
6. Information Brief Service |
| CSMCRI, Bhavnagar| 1. Library Additions Bulletin(M)  
2. Project Oriented SDI Services.  
3. Information Brief Service |
| CDRI, Lucknow    | 1. Library Additions Bulletin(M)  
2. Project Oriented SDI Services.  
3. Information Brief Service  
4. Drugs and Industry Highlights - Pharmaceuticals.  
6. Drugs and Industry Highlights - Current Highlights.  
7. Drugs and Industry Highlights - Current Indian Titles.  
8. This week in CDRI (W) |
| SERC, Roorkee    | 1. Current Additions(M)  
2. New Serials Added to the Library(M)  
3. List of Additions (M)  
4. Library Additions Bulletin(M)  
5. Project Oriented SDI Services.  
6. Information Brief Service |
| CRRI, Delhi      | 1. Highway Documentation(K)  
2. CRRI Road Abstracts(SA)  
3. Bibliographies (Irr.)  
4. IAC Products (Irr.) |
| CFTRI, Mysore    | 1. Library Bulletin(Q)  
2. Bibliographies(S)  
3. Food Technology Abstracts(M)  
4. Food Digest(Q)  
5. Food Patents(Q)  
6. Bibliographies(O)  
7. State of Art Reports (Irr).  
9. seen in the literature (M) |
| NCL, Pune        | 1. NCL List of Additions (M)  
2. Agro Chemicals and Pesticides Bulletin (M)  
3. Indian Patent Bulletin (M)  
4. Current Chemical Reactions (B)  
5. Current Solar Energy(M)  
6. Current Biomass Energy(B)  
7. current Nitrogen Fixation (M)  
8. Catalogue of Theses (O)  
9. Catalogue of Serials (O) |
| PGIMER, Chandigarh| 1. List of Additions (Bi-M)  
| BBDF- AIMS, Delhi| 1. Catalogue of Theses (O)  
2. Catalogue of Serials (O) |
| NINL, Hyderabad  | 1. List of Additions (M)  
2. List of NIN Publications (O)  
3. Current Awareness List (Reprints)  
<table>
<thead>
<tr>
<th>No.</th>
<th>Journal/Service</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>28.</td>
<td>NIHFW</td>
<td>New Delhi</td>
</tr>
<tr>
<td>29.</td>
<td>NIHFW</td>
<td>New Delhi</td>
</tr>
<tr>
<td>30.</td>
<td>NIV</td>
<td>Pune</td>
</tr>
<tr>
<td>31.</td>
<td>IPMER</td>
<td>Calcutta</td>
</tr>
<tr>
<td>32.</td>
<td>NML</td>
<td>Delhi</td>
</tr>
<tr>
<td>33.</td>
<td>IDL</td>
<td>Hyderabad</td>
</tr>
<tr>
<td>34.</td>
<td>NRRI</td>
<td>Karnal</td>
</tr>
<tr>
<td>35.</td>
<td>GSRRI</td>
<td>Karnal</td>
</tr>
<tr>
<td>36.</td>
<td>CPRI</td>
<td>Simla</td>
</tr>
<tr>
<td>37.</td>
<td>CSFRI</td>
<td>Coimbatore</td>
</tr>
<tr>
<td>38.</td>
<td>CBERI</td>
<td>Pune</td>
</tr>
<tr>
<td>39.</td>
<td>CTRI</td>
<td>Calcutta</td>
</tr>
<tr>
<td>40.</td>
<td>SUGCBI</td>
<td>Coimbatore</td>
</tr>
</tbody>
</table>

**Selected contents**
- New Documents Received in NDC (other than purchased)
- Press clippings
- Special publications
- Bibliographies
- Annual Report (A)
- New Additions to the Library (W)
- Reprints Bibliography (W)
- Periodical Abstracts Bulletin (Q)
- Summaries of NTI Publications
- NTI Newsletter (B1-M)
- List of Periodicals Received During the Week (W)
- List of Monthly Additions (M)
- Bioenergy Information
- Bibliography of Scientific Contributions of CRRI (0)
- Selected Bibliography of Rice Soils, Plant Nutrition and Fertilizers use for Rice (0)
- Annual Report (A)
- Accession List (M)
- Have you Read - Selected contents of current journals.
- New Documents Received in HCD (other than purchased).
- Bibliographies.
- List of Additions (M)
- Annotated Bibliography of Coconuts (1976)
- Annotated Bibliography of Cashew (1979)
- Annotated Bibliography of Cardamom (1980)
- Annotated Bibliography of Areca (1981)
- Bibliography of Scientific Contributions of CRRI (0)
- Selected Bibliography of Rice Soils, Plant Nutrition and Fertilizers use for Rice (0)
- Annual Report (A)
- Accession List (M)
- Have you Read - Selected contents of current journals.
- New Documents Received in HCD (other than purchased).
- Bibliographies.
- List of Additions (M)
- Annotated Bibliography of Coconuts (1976)
- Annotated Bibliography of Cashew (1979)
- Annotated Bibliography of Cardamom (1980)
- Annotated Bibliography of Areca (1981)
- Bibliography of Scientific Contributions of CRRI (0)
- Selected Bibliography of Rice Soils, Plant Nutrition and Fertilizers use for Rice (0)
- Annual Report (A)
<table>
<thead>
<tr>
<th>Institution</th>
<th>City</th>
<th>Services</th>
</tr>
</thead>
</table>
| IASRI      | New Delhi | 1. Current Contents Mirror (Presently discontinued)  
               2. Bulletin of New Additions(M) |
               3. Cumulative Index of Soil Sciences.  
               4. Union Catalogue of Periodicals of A.P.A.U. Library (M)  
               5. Dissertation Index of A.P.A.U.(O)  
               6. Recent Additions to A.P.A.U. Library (M) |
| CAZRI      | Jodhpur | 1. CAZRI Publications Bibliography (O).  
               2. Catalogue of Periodicals in CAZRI Library (O)  
               3. List of Books - Local use (Suspened) |
| IIHR       | Bangalore | 1. Book List for Local use.  
               2. Catalogue of Serials - Local use.  
| NBSSLPN    | Nagpur | 1. Soil Science Information Service: CAS Bulletin (M)  
               2. Soil Survey Newsletter (Hy)  
               3. Recent Addition of Technical Literature (Q)  
               4. Serial Holdings in the Library.  
               5. Bureau's Report Publications(A) |
| PAU        | Ludhiana | 1. Monthly Book Sampler (M)  
               2. Received This Week (W)  
               3. Contents of the Month (Suspended) |
| GPBPUAT    | Pantnagar | 1. Monthly Information Bulletin (M)  
               2. Weekly periodicals Bulletin(W)  
               3. Annual Report (A)  
               4. Indian Agricultural Index (Q)  
               5. Bibliographies (Irr) |
| WING       | Dehradun | 1. List of Additions(M)  
               2. CAS Bulletin (M)  
               3. Himalayan Geology Contents List(M) |
               2. Recent Additions  
               3. Documentation Lists.  
               4. Textile Information Surveys(O) |
| SAC        | Ahmedabad | 1. Current Awareness Service (M)  
               2. Acquisation - Technical Reports Lists (M)  
               3. Newspaper Clippings (M)  
               4. Specialised Bibliographies (Irr)  
               5. Catalogue of periodicals(O) |
| NIDRC      | Ahmedabad | 1. Design Resources Bulletin (M)  
               2. Introduction to Resource Centre(O)  
               3. SDRI Bulletin  
               4. SDI Current Titles  
               5. List of Additions.  
               6. Bibliographies (Irr)  
               7. State of Art Reports (Irr)  
               8. Metal Select  
               9. Recent Additions (Bi-M)  
               10. Forthcoming Seminars/Symposia  
               12. Metal Select |
| ISIK       | Dhanbad | 1. Current Contents-Geology(M)  
               2. Current Contents-Mining(M)  
               3. Current Contents-Geophysics(M)  
               4. Current Contents-Petrology(M)  
               5. Current Contents-Engineering(M)  
               6. SCOLMIN Guide to Reference Sources  
               8. SCOLMIN Guide on Mining Engineering  
               9. SCOLMIN Guide to Additions List |
| IIMINES    | Nagpur | 1. Documentation Notes-Mines and Minerals (Bi-M)  
               2. Publications Added to Central and Regional Libraries(O)  
               3. Adhoc Bibliographies. |
| APAU       | Hyderabad | 1. Union Catalogue of Periodicals of A.P.A.U. Library (O)  
               2. Dissertation Index of A.P.A.U.(O)  
               3. Recent Additions to A.P.A.U. Library (M) |
| CAU        | Navaer | 1. List of New-Books (M) |
| HAU        | Hisar | 1. Monthly Book Sampler (M)  
               2. Received This Week (W)  
               3. A few Bibliographies (Irr). |
| JACS       | Calcutta | 1. List of Books (Q)  
               2. List of Journals Received Daily. |
| BOSEIL     | Calcutta | 1. Transactions of Bose Institute  
| SINP       | Calcutta | 1. Bibliographies (Irr)  
               2. Earth Science Abstracts (Q)  
               3. Indian Geoscience Abstracts(A) |
| ZSI        | Calcutta | 1. Periodicals Accession List (W)  
               2. Book Alert Service (Q)  
               3. Adhoc Bibliographies (Irr)  
               4. SMIC Newsletter (Three Times a Year)  
               5. Bibliographies and Bulletins (Irr) |
| GSI        | Calcutta | 1. Monnly lists of Publications Received in NIH Library (M)  
               2. List of Additions (M)  
               3. Souvenir (A) |
| GSI-RC     | Lucknow | 1. Monthly Book Sampler (M)  
               2. Received This Week (W)  
               3. A few Bibliographies (Irr) |
| IISTI      | New Delhi | 1. New Additions (Bi-H) |
| DEEL       | Hyderabad | 1. SDI Bulletin  
               2. Information Bulletin.  
               4. TELCO Journal |
| DMERL      | Hyderabad | 1. List of Additions (M)  
               2. Additions to Library  
| TELCO      | Jamshedpur | 1. Information Bulletin.  
| APERL      | Hyderabad | 1. Library Bulletin.  
               2. Power Engineering Patents.  
               3. Reports in Microfiche.  
               4. Index to Translations.  
               5. Rapidaware (In 22 fascicules) |
<table>
<thead>
<tr>
<th>No.</th>
<th>Institute</th>
<th>Type</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>MDNL</td>
<td>Acquisition List</td>
<td>Hyderabad</td>
</tr>
<tr>
<td>86</td>
<td>SAIL</td>
<td>Steel Abstracts</td>
<td>Ranchi</td>
</tr>
<tr>
<td>87</td>
<td>IITROHET</td>
<td>Contribution from I.I.T.M.</td>
<td>Pune</td>
</tr>
<tr>
<td>88</td>
<td>ISI</td>
<td>Standards World Over</td>
<td>New Delhi</td>
</tr>
<tr>
<td>89</td>
<td>CMTI</td>
<td>Metal Working Abstracts</td>
<td>Bangalore</td>
</tr>
<tr>
<td>90</td>
<td>HRSL</td>
<td>Current Awareness Service</td>
<td>Madras</td>
</tr>
<tr>
<td>91</td>
<td>SASMIRA</td>
<td>List of Dissertations</td>
<td>Bombay</td>
</tr>
<tr>
<td>92</td>
<td>IIT</td>
<td>Library Information Bulletin</td>
<td>Madras</td>
</tr>
<tr>
<td>93</td>
<td>BHEL</td>
<td>New Additions</td>
<td>Bangalore</td>
</tr>
<tr>
<td>94</td>
<td>SRIIR</td>
<td>SRI Documentation</td>
<td>Delhi</td>
</tr>
<tr>
<td>95</td>
<td>IIT Madras</td>
<td>Machine and Tool Engineer</td>
<td></td>
</tr>
<tr>
<td>96</td>
<td>CPowerri</td>
<td>Technical Information Service</td>
<td>Bangalore</td>
</tr>
</tbody>
</table>

**Abbreviations:**
- W = Weekly
- Q = Quarterly
- F = Fortnightly
- HY = Halfyearly
- M = Monthly
- A = Annual
- Bi-M = Bimonthly
- Bi-A = Bi Annual
- Irr = Irregular
- O = Occasional
Fig. 6.1 Documentation Lists, Indexing and Abstracting Bulletins issued by Some Institutions in India.
information services in India have diverse origin.

### TABLE 6.8

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Institution</th>
<th>Tools</th>
</tr>
</thead>
</table>
| 1.    | Central Water Commission | 1. Irrigation Statistics of India  
         |               | 2. Water Yearbook |
         |               | 2. Handbook of Indigenous Manufacturers of Chemical and Miscellaneous Stores |
| 3.    | Central Bureau of Health Intelligence | 1. Health Statistics of India |
| 4.    | Coffee Board | 1. Indian Coffee Statistics |
| 5.    | Tea Board | 1. Tea Statistics |
| 8.    | Publication and Information Directorate, CSIR, New Delhi | 1. Minerals Wealth of India |
         |               | 2. Mineral statistics of India  

One department may not be aware what another is doing. So there is overlapping of information services and hence duplication of effort. For example, Health Statistics of India is published by the Central Bureau of Health Intelligence, whereas such a data is also maintained by the Documentation Centre of NIHFW, New Delhi.

### 6.2.2 Scope and Coverage

A majority of science information services are not comprehensive in coverage. Many of the documentation lists compiled by certain libraries comprise just a few pages, covering a few bibliographic entries, abstracts or other information items serving the needs of local scientists only. Table 6.9 lists the total number of entries included in some information services during 1982.

Even the national-level service like Indian Science Abstracts (ISA) published by INSDOC is not comprehensive in its coverage.
TABLE 6.9
Total Number of Bibliographic items Published by
Some Information Services (1982)

<table>
<thead>
<tr>
<th>Title of the Information Service</th>
<th>Number of Entries</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBRI Abstracts (Q)</td>
<td>36</td>
</tr>
<tr>
<td>CRI Abstracts (Q)</td>
<td>322</td>
</tr>
<tr>
<td>Drugs and Pharmaceuticals; Current Highlights</td>
<td>342</td>
</tr>
<tr>
<td>Applied Botany Abstracts (Q)</td>
<td>412</td>
</tr>
<tr>
<td>Indian Energy Abstracts (Q)</td>
<td>455</td>
</tr>
<tr>
<td>Medicinal and Aromatic Plants Abstracts (Bi-M)</td>
<td>3294</td>
</tr>
<tr>
<td>Documentation List on Glass and Ceramics (M)</td>
<td>4199</td>
</tr>
<tr>
<td>Indian Science Abstracts (M)</td>
<td>14,711</td>
</tr>
</tbody>
</table>

Certain science information services claim to cover the World literature e.g. Medicinal & Aromatic Plant Abstracts, PID(CSIR), but on investigation, one finds that they are not truly international in scope and coverage. The title of a publication may indicate something about the scope and coverage, while the actual contents may indicate something else. For example, Indian Chemical Abstracts published from Bombay is supposed to abstract Indian chemical literature, as is evident from its title. But its various issues include technical articles on chemistry and also a survey of foreign literature on chemistry, advertisements, news items, interviews, biographies etc. Only 50-100 abstracts are included from 6-7 chemistry journals.

6.2.3 Timeliness, Literature Age etc.

Due to paucity of financial resources and other reasons, some information services sometimes lag behind their publication schedules. The utility and usefulness of such services is lost on account of delays in their publication.

Even some of the best services report very old literature, e.g. some bibliographical tools compiled by NEERI, Nagpur. "Indian Literature in Environmental Engineering" was compiled by its library staff and provided the bibliographical details of 1092 papers culled out from 179 Indian and 29 foreign periodicals and 51 conference
proceedings. This is a serial publication, the sixth in the series covering the contributions made in 1977."\textsuperscript{17} This tool reports about five year old literature. Further time may be involved in the procurement of this publication from NEERI, and processing and making it available to the scientists of an organisation through its library. In a growing field like environmental science, after such a gap of time, some of the literature located by the scientists through this bibliographic tool may already be obsolete and useless.

6. 2.4. Co-operation and Co-ordination

Even the World's best and biggest publishers of information services and tools are collaborating with each other. They are also taking the help of other institutions and agencies to improve their services. For example, IFLA helped World of Learning, 1974, to include the data regarding institutions which willingly exchange their publications; ALA maintains a committee on Wilson Indexes; Columbia Lippincott Gazetteer of the World is published with the co-operation of the American Geographical Society. Encyclopaedia Britannica is published with the help of the University of Chicago faculty members. Various publishing agencies are pooling their resources to bring out the most comprehensive and timely tools of high quality, which may have a deep impact on the users for currency, comprehensiveness and authenticity of information."AIP is the federation of leading American societies in physics and astronomy. In addition to serving as the management headquarters of these societies, arranging meetings and providing educational services to the physics community, AIP is the largest single publisher of physics journals issued in the U.S. This primary publication programme, supplemented with the Institute's translated journals, accounts for 35% of the world's physics journals literature\textsuperscript{18}.

In India, co-ordination among various institutions for bringing out some information services is missing. Instead of collaborating with each other, various institutions want to maintain their separate identity.

\textsuperscript{17} "Indian Literature in Environmental Engineering". CSIR News 32(4) July 30, 1982, p.11.

However, infrastructure is already existing. It is quite possible to improve science information services. For example, PID(CSIR), which is already publishing tools like the Wealth of India and Medicinal and Aromatic Plants Abstracts can compile more such tools in collaboration with scientific laboratories, universities, IITs and even private publishers. The services of Information Centres like the NIC Delhi should also be utilized. National Information Systems such as NISSAT should undertake the assessment of the availability of information tools and draft a plan as to how improvement can be brought about through increased co-ordination and co-operation.

6.2.5. Divided Efforts and Duplication

Efforts have been made by various institutions to compile a number of information access tools. Such attempts are variegated. Not infrequently, one may not be knowing which organization is bringing out what kind of publications. Though sparse and patchy, some programmes for bibliographic control of different kinds of publications have been started. But such programmes seldom achieve their objective.

The attempts made for the bibliographic control of Indian dissertations, have been haphazard. If properly planned, the same efforts could be made more effective. In the present situation, in spite of such attempts, users are not able to locate dissertations. In India, the Association of Indian Universities publishes Indian Dissertation Abstracts, the ICSSR brings out Social Science Dissertation Abstracts and the INSDOC issues the Indian Science Abstracts which also includes dissertations submitted in various areas of science. The HAU, Hissar is publishing the Agricultural Dissertation Abstracts and is claiming to cover Master's and Ph.D. dissertations from all agricultural universities except three. The APAU, Hyderabad publishes a Dissertation Index. The IARI has published a bibliography of its dissertations. Some of the agricultural universities too have issued bibliographies of their own dissertations. The ICRISAT library, Hyderabad compiled 'Bibliography of Indian Theses on ICRISAT Specialities, upto 1975' and another
publication i.e. Indian Theses on Groundnut (1948-1977). The CFTRI, Mysore has brought out a Bibliography of Dissertations on Food. The Association of Indian Universities, New Delhi has brought out bibliographies of doctoral dissertations in physical and biological sciences. Some of the universities and IITs have also compiled the bibliographies of their own dissertations. Some of them are even memographed and not much circulated, e.g. Doctoral Dissertations Submitted to P.U. Chandigarh. The IIT, Madras has published Abstracts of Ph.D. Theses in two volumes. Besides these attempts, for bibliographic control of dissertations, some periodical publications giving information regarding dissertations are also being issued by some institution e.g. Ravishanker University Abstracts. (Fig.6.2). The University News, published by the Association of Indian Universities, also lists some dissertations accepted by Indian Universities, as well as titles of dissertations in progress.

Efforts for the publication of Union Lists too are uncoordinated and duplicating Chinnapaat INREREP, Bombay showed to the investigator the Union List of Periodicals in Medical Libraries. Chaudhry at CMERI, Durgapur, talked about the Union List of Conference Proceedings and also that of serials covering the Durgapur region. Deendyalu at IIT, Madras provided to this researcher a list of IIT library publications which includes Union Catalogue of Periodical Holdings Available in the Libraries of IITs at Madras, Kharagpur, Kanpur, Delhi, Bombay and the Indian Institute of Science, Bangalore. Iswara Reddy, APAU, Hyderabad, showed to the investigator the Union Catalogue of APAU Libraries. Surinder Mehta, DESIDOC, Delhi gave an introduction regarding the Union Catalogue of Defence Laboratories’ Libraries (Fig.6.3) The IARI, Delhi is bringing out Union Catalogue of Dissertation Holdings in Agricultural Libraries. There are many more attempts, especially in respect of the Union Catalogues of Scientific Serials, although INSDOC is bringing out a series of Union Catalogue of Scientific Serials in India.

The INSDOC, New Delhi, published the Directory of Current Scientific Research Projects in Indian Universities, 1974 (Fig.6.4). It is also publishing a Directory of Current Research Projects in the CSIR Laboratories. Besides this, some laboratories have brought out directories concerning their own disciplines, e.g. CFTRI, Mysore has published Directory of Current Food Science and Technology.
Fig. 6.4 Overlapping of Directories Pertaining to Forthcoming Conferences.

Fig. 6.5 Overlapping of Tools Pertaining to Forthcoming Conferences.

Fig. 6.3 Overlapping of Union-Catalogues.

Fig. 6.2 Overlapping of Information Tools regarding Dissertations.

Fig. 6.1 Overlapping of Directories Pertaining to Current Scientific Research Projects in India.
Research Projects; and NIO, Goa has published the Indian National Directory of Marine Research Projects. The DST, New Delhi, publishes Directory of Forthcoming Conferences/Symposia/Meetings/Workshops on Science and Technology in India: The ITRI, Lucknow is also bringing out such a publication, but only in the field of toxicology Newsletters and Bulletins of some bodies too include information regarding forthcoming Conferences, e.g. ICMR Bulletin (Fig.6.5).

Unfortunately, some of such publications are not known nationally. Wherever, lack of some information tools was noticed, a number of institutions endeavoured to compile these without caring to find out what other institutions had done or were doing. To know who is doing what is a problem. The work of private publishers too is not organized and most of their publications are not regular. A private concern from Gurgaon, namely Indian Documentation Service, started Indian Science Index, but stopped it after bringing out a few volumes. If one looks at the Ulrich International Periodical Directory, 1982, one finds that a similar title i.e. Indian Science Index is also published from Calcutta. By and large, information services and tools in India are not very effective in rendering the required services. Information services and tools are not issued after proper assessment of the existing ones. They are in a state of near chaos because their national-level co-ordination and control is missing.

6.2.6 Scientists' Opinion

Opinions of scientists regarding various information services and tools compiled by libraries and information centres were sought. A majority of scientists appreciated the attempts of libraries to bring out such publications. It was observed that some scientists even appreciated those bibliographic tools which recorded 4-5 years old literature. Another characteristic of scientists' use of tools was that they consulted only one or two of such tools on a specific subject. Therefore, instead of wasting resources and efforts to bring out too many information services and tools on the same subject
India should attempt to publish a few but most comprehensive and regular information services and tools.

Another serious problem is that a considerable number of scientists are not aware of such publications. Even some scientists were ignorant of national-level tools like Indian Science Abstracts. A scientist working in food technology in RRL Jammu was not aware of the existence of Directory of Current Research Projects in Food Science and Technology published by CFTRI, Mysore in spite of the fact that it was available in the RRL Library, Jammu.

6.2.7 Marketing of Information Services and Tools.

The circulation of many of the information services and tools issued by various libraries is very poor. A large number of their copies remain unsold. This is because business interests are ignored and proper attempts are not made for their proper marketing.

6.3 Bibliographic standardization

Bibliographic standardization for writing footnotes, appending references and preparing bibliographies is very important to facilitate the processing of information and streamlining its transfer. To achieve this objective co-operation and participation of several agencies, education of individuals, drafting of standards and their implementation are necessary. A few familiar and standardized practices would decrease the work load of information processing. It would lead to economy of time, as the work of surrogate publishers will not be hampered. Though ISO standards are available and standardization is carried out at national level by ISI and also through certain international programmes like ISBD, still a number of editors, publishers and authors provide bibliographic references according to their own patterns and policies. This creates avoidable confusion.

The problems of neglecting bibliographic standards may not be fully realized by individual publishers and editors of primary Publications, but they certainly create problems for surrogate publishers and other information processing organisations. A number
of scientific journal publishers consider such problems as very minor. They continue with their own traditions in their quest for identity. The publishers of secondary information services wonder why the publishers of such scientific journals are not ready to introduce slight change to make things easier for them. "It is remarkable example of human resistance to change that many publishers will not give even half an inch to make their content pages more legible in Current Contents".  

The journal 'Science Digest' does not provide references to its articles and news items. Garfield says,"It irks me and the librarians that the editorial page in 'Science' is never numbered. If one photocopies the editorial, it is not possible later to complete a citation to it." Science is one of the most cited scientific journals. Its citations are not providing complete bibliographic description. This journal does not include the title of the article for which a citation is provided. Users usually determine the type of material included in an article by having a glance at the title.

"Some journals such as the British Journal of the Chemical Society' (JCS) and Tetrahedron Letters, do not have volume numbers. A citation in JCS to an earlier article in the journal may read as follows:  


which is the year and which is the page number? According to ANSI, 1971 should be the page[number]. But in JCS 1971 is the year." The issues regarding standardization of bibliographic description have already been widely discussed at length at national level and are still being discussed frequently at international level. But, adequate efforts are not made for the implementation of various decisions taken at such discussions. Non-standardization of bibliographic references not only increases the frustrations of surrogate publishers, but also taxes the time of bibliographers, reference librarians and other concerned with this kind of work.

---

6.4 Title Services

Generally, in bibliographic searches, the title of an article is given great consideration. Certain information services are purely based on titles e.g. Current Contents. In spite of the fact that there is a growing reliance on titles and title services for identification of documents, still a lot of journalistic slang is found in the titles. e.g. titles like Black Diamonds, Yellow Revolution, Liquid: Gold and so on. A heading in the Indian Express (Chandigarh edition) dated 9.3.1984 i.e. US Cobras for Pak may be misleading. A layman may think that snakes are being sent to Pakistan, but actually this title concerns the supply of Cobra helicopters to Pakistan. Such titles create problems in the quick subject analysis of documents in the matter of their classification. In certain cases, if subject determination is taken casually, the document may be wrongly classified in bibliographic services and the collection of a library. This leads to waste of time of the library users and also that of some librarians who, on having access to such documents, find a different subject-matter. An item entitled 'Journals and the Literature Explosion' published in the prestigious journal Nature, is included under the subject heading literature explosion in a bibliography. On reading the actual article, one finds that this item deals with the publishing policies of 'Nature' rather than with 'literature explosion'. Mistakes once made in literature are repeated in several other tools. "An entry of a journal i.e. Indian Journal of Experimental Botany was detected in the Indian National Bibliography, 1963. All the details, as given in the entry, were noted. When verification of the tile was undertaken, this title could not be traced. Even the sponsoring body, as was given in INB, could not tell anything about the periodical. In all probability, this entry was made by mistake for the periodical 'Indian Journal of Experimental Biology".


Thomas, J Waldhart and Enid, S Waldhart; "Communication Research in Library and Information Science: A bibliography on Communication in the Sciences, Social Sciences, and Technology (Littleton: Libraries Unlimited, 1975),p.66,Ent.No. 0539

Sometimes, the journal title does not convey the exact subject scope of the journal. This may lead to its wrong classification in periodical directories. The Journal of Science published in the USA mainly covers the literature on Geology. Sometimes it is very difficult to identify two different publications by their titles and even the title may not convey the scope of the journal in terms of the subject coverage. "For example, how is one to know the difference between Nuclear Physics A & Nuclear Physics B? You cannot even tell by looking at the covers. Each part is described as a journal devoted to the experimental and theoretical study of the fundamental constituents of matter and their interactions". A number of journal titles are distinguished only through the sub-titles. However, a scientist while recording the bibliographic details of an article may omit the sub-title of the journal.

It is sometimes difficult to decide from the title whether a publication is an encyclopaedia, a handbook, a treatise, a textbook or a bibliography. "[For example] J.N. Friend's Text book of Inorganic Chemistry (Griffin, 1914-37) ... is a treatise rather than a text-book ....[and] R.G. White's Handbook of Ultraviolet Methods (New York, Plenum, 1965) is not a handbook... but a bibliography.".

With the automation of information services, greater emphasis is being laid on titles. Searches are made merely using keywords/descriptors or through their permutations and combinations. In such a situation, authors and editors should encourage the tradition of providing simple straightforward, clear unambiguous titles rather than ornate or sketchy titles. The publishers too should attempt to make the titles of their journals and other types of publications very clear and self-explanatory.

6.5 Language Barrier

Most of the Indian scientific and technical literature is published in English, while a negligible quantity is brought out in


various Indian languages. At this stage of development, publication of Indian Scientific investigations in Indian languages is extremely difficult. Development of suitable terminologies in various Indian languages requires enormous cost, time and effort. Moreover, Indian science will not be properly disseminated abroad, because being largely a middle level science, no foreign scientists will take the trouble of getting translations of documents published in Indian languages into their own languages.

A major part of scientific and technical literature acquired by Indian libraries is in English. Scientists usually do not derive benefit from relevant literature in other foreign languages, since a majority of them do not know those languages. The solution lies in getting such a material in translated form. But the cost of translation is very high; and secondly, there arises the problem of delay in supply.

The translation problem can be solved to some extent if English summaries of foreign language papers are made available. In an experiment, the British Library Lending Division found that the supply of English summaries satisfied about half of a sample of requests made for full translations.²⁵

6.6 Terminology Problem

According to the canon of currency, the latest terminology should be adopted and incorporated in the classification schemes. With the rapid growth of knowledge, generation of new terminology is inevitable. To distinguish a new phenomenon from the previous ones, to rename devices because of their changing functions, for the sake of establishing sheer identity etc., scientists add a considerable number of new terms to scientific vocabulary. Besides the communication problems which arise due to the generation of new terms, certain other issues (e.g. the same term used in more than one discipline) also arise, e.g. use of the term 'entropy'. Continuous generation of new terms creates additional workload for lexicographers. The problem also confronts information processors who have to undertake information processing to facilitate its easy and timely retrieval. The library and information personnel need to keep in

continuous touch with terminological developments. Lack of such a notice may lead to the neglect of a number of well-recognised terms, for their inclusion in classification codes, subject headings lists, thesauri, etc. For example, the term bio-bibliography has been extensively used during the last few decades, but it was included in the schedules of the Dewey Decimal Classification only when its 19th edition was published still, several terms have not yet been included, e.g. 'scientometrics'. To notice new terms is not a problem these days. It is now possible to roughly estimate the evolution of new terms in science during a particular period through the analysis of comprehensive science data bases. During 1977, about 300,000 different terms were used in titles of articles.... Index[ed at ISI] . Of these .... it was estimate[d] that about 500 were used for the first time. It is also possible to know the significance of terms through the frequencies of their occurrence. However, it requires a very careful study because the same term may be used in more than one field. "For example, 'charm' increased from 6 occurrences in 1973 to 106 in 1976. This indicates an increasing interest in 'Charm' a property of sub-atomic particles.....'Charm could have been used not only in Physics titles but also in titles dealing with physical attractiveness, good luck, amulets, music, or enchantment."27

How various terms originate is an important area of terminological studies. "Physicists and earth scientists... have been producing well ever a third of the new terms of assigning new meaning to old words. They have formed another third of their words by joining elements, already existing in English and they have borrowed between a fifth and a fourth of their new terms from foreign languages.... Thus, the processes of semantic change, composition and borrowing were responsible for the entry, into the vocabulary of science, of over 95% of the words studied."28


27 Ibid.

Library schools are already teaching topics like 'evolution and pattern of knowledge' mode of formation of subjects', etc. Terminology studies should also be introduced in library and information science curricula, as they are helpful in designing some information tools, e.g. thesaurus building. Keeping in view the role of terminology in the communication of science, UNISIST, too under its programme, established INFOTERM in Vienna to study terminological problems. Another organization undertaking terminological studies is IINTE in Poland.

6.7 Geographical Distance

Geographical distance is a delaying factor in the procurement of the required literature. It is, of course, a less serious problem for countries which produce more literature, have good transportation facilities, and have created electronic communication networks using sophisticated communication technologies.

In India, we procure a major part of the literature from countries like the USA and the UK. Most of the journals and other documents are received through sea mail. A number of scientists demand air-lifting of journals. For example, eighty-six out of 721 scientists in the present study suggested air-lifting of journals as one of the means to improve science communication services in India. Co-operation amongst a number of departments and agencies, e.g. postal, transportation, etc, is essential to facilitate the timely availability of publications. According to Garfield, "Many Indian editors would like to send their journals to the US and elsewhere by air, but the Indian Government seems little interested. Perhaps my visits to India will help effect a solution. Since most transcontinental flights are half empty these days, why does not Air India carry a sackful of Indian journals? The Indian Government might subsidize this scheme to help to improve the image of Indian Science. Alternatively, the government could subsidize the postage required for air mail delivery".

6.8 Lack of Culture of Discussion

The present-day R&D activities do not allow confinement of

ideas in one's mind for a long period. If some new ideas are not timely disclosed by one scientist or a team of scientists, they may be made known by another scientist or a team. Early communication of new ideas also helps to establish priority in discovery or innovation. Therefore, it is imperative that new ideas are divulged as early as possible through all possible channels, such as reporting at conferences, writing to colleagues, and participating in group discussions.

In India, we generally lack the culture of discussion among scientists, especially among scientists of local institutions, working in similar scientific disciplines. Even in the same institution such an exchange is rare because of groupism, personality cult and jealously which not only hinder discussions among senior scientists, but also among the junior ones working under them. Interaction among junior and senior scientists is also poor. Under Indian religious and cultural traditions a dominant place is provided to the Guru, but a similar status has not been given to the majority of outstanding technological gatekeepers in the scientific and technical research institutions. In the advanced countries which produce a major part of the scientific literature, isolation among scientists is much less. "Current scientific problems are discussed among scientists with keen interest. There is an intellectual ferment. The arrival of a journal like the Physical Review Letters or the Astrophysical Journal is an event. On that day, the work reported in these journals is discussed in coffee rooms, cafeterias and beer parlours. This type of excitement in scientific work and interest in journals is singularly lacking in our laboratories, research institutions and universities."  

In India, besides encouraging discussion among the scientists associated with an institution, we should create an environment which may facilitate more inter-institutional exchanges, because scientists mostly discuss issues with much deeper interest with strangers in their disciplines rather than with their own friends and colleagues working in their area of specialization.

---

30 S. Ramaseshan, "Some Thoughts on Scientific Journals in India". Current Science 51(1) January 5, 1982, p.11.
6.9 Cross-Disciplinary Communication

As discussed in chapter one, the Avery's paper published in *Journal of Experimental Medicine* 79(1944) could not be properly abstracted in the chemical Abstracts and the *Biological Abstracts* because the abstract excluded the genetic part. Many geneticists could not have direct access to the journal because it was a journal usually subscribed to by medical libraries at that time, while many geneticists worked in science departments. "In 1944, there were thirty-six copies of the journal in libraries in Britain and out of these ...probably more than twenty-six were in medical or veterinary libraries".  

Communication among pure and applied scientists is poor. To facilitate the application of the latest biomedical knowledge in medical practice, PGIMER, Chandigarh have established a big hospital as well as large biomedical research blocks. However, it is learnt that interpersonal communication among its scientists and doctors is rare because of professional conflicts. Doctors are provided with better treatment as compared to basic medical scientists. A kind of hiatus and hatred, developed between these communities, is one of the reasons for lack of interpersonal communication among them.

Communication among even basic scientists belonging to different but related fields is also poor. At one of the seminars organized by Research Forum of PGIMER, Chandigarh, three medical scientists presented a paper*. In the experimental part of the paper, the age of monkeys was reported to be determined on the basis of their weight. If these medical scientists had consulted an Anthropologist, he would have guided them to determine the age of monkeys through a more accurate method.**

---


**Personal Interview with Ranjeet Singh, Deptt. of Pharmacology, PGIMER, Chandigarh August 12, 1983.
6.10 Authority and Influence

If we study the history of science, we find, that there were always some authoritative scientists whose words carried weight. Through their established reputation and status they influenced the communication of science information and sometimes even delayed the development of science. They had such a high recognition during their times that views contrary to theirs were not easily accepted and scientists challenging their ideas had to suffer in one way or the other. Lord Kelvin did not accept any theory claiming that the earth could be older than about 100 million years. "He ignored the mounting evidence of paleontologists and geologists which was increasingly in conflict with his calculations and refused to the end to accept the advice of Rutherford that the work of the Curies on radioactivity rendered his deductions invalid. Because of his dominant position in the scientific establishment, opposition to Kelvin could cost you your reputation and even your job."32

Srinivasa Ramanujan's manuscript was returned by two British Professors without giving any reason before the manuscript was declared as a work of a great genius by Prof. G.H. Hardy. It is just possible that the earlier professors might have returned his manuscript because Ramanujan was not associated with an advanced school of Mathematics in India and did not possess a printed letter head with degrees, honours and membership of academies. He was just a petty clerk in Madras Port Trust.

Sir Richard Owen was a reputed natural scientist during Darwin's period. "[During his Career]... Owen accumulated honours and rose in professional and social esteem. He became intimately acquainted with Prince Albert and the Royal family, with leaders of political clubs and with more distinguished prelates of the Anglican Church [and]... won for himself the superintendency of the Natural History Department of the British Museum. "33 He strongly opposed the views of Darwin and Huxley regarding evolution. Due to Owen's

32 Spreading the Scientific Gospel South African Journal of Science, 72, May, 1976, p.130

influence and his links with men in power the recognition of Darwin's *Origin of Species* and Huxley's *Man's Place in Nature* was delayed for a few decades.

Newton had great influence among the scientific community during his time. "[His]... enormous authority probably retarded the introduction of the wave theory of light, which was not accepted until about 1820". According to Ziman, "[Robert Hooke's] .... microscopic discovery of cells in plants is matched by such novel ideas as the design of a universal joint, and a scheme for regular weather reports. As a result of quarrels with Newton, his historical reputation was not very amiable, but in fact he was one of the cleverest and most sociable men of his days."  

The ideas of senior scientists who have gained some recognition are usually not contradicted by junior scientists, even if they are not acceptable to them. This is because such great authority is vested with some of such senior scientists that just with a stroke of pen they may adversely affect the career of a scientist. "By their advice ...they can either delay or accelerate the growth of the new line of research. By the award of prizes and other distinctions, they can invest a promising pioneer almost overnight with a position of authority and independence."  

Even Communist countries like the Soviet-Union are not free from the harm done to their science by authority and influence. During 1930's, Lysenko forwarded his theory of Heredity which was contrary to the chromosome theory. "Lysenko was in political favour, and in the late 1930's was made editor of the major journal in which articles that were critical of classical genetics and breeding were published. By controlling this journal, Lysenko was able to eliminate most of the communication of scientific information critical of his theory." with the favour of the


then Soviet political leaders, Lysenko was able to achieve the prestigious position of the President of Lenin-All Union Academy of Agricultural Sciences. With political patronage and his own authority as President, Lysenko had a near grip over major communication media and thus was able to eliminate any criticism of his theory. "By maintaining his personal control until 1960's, Soviet genetics was set back by a quarter of a century - the first book (in Russian) on human genetics was not published until 1964."38

Authority and influence have hit the Indian scientists worst and also the communication behaviour of scientists. In the context of scientific communication, authority and influence play significant role in finalizing the subscription lists of journals, exchange of reprints, publication of scientific papers and letters, gaining positions among editorial and advisory boards of journals, getting authorship for works mainly done by others, planning programmes and even keeping the library documents for long periods. A scientist at Bangalore reported that most of the important conferences were attended by the Director and his blue-eyed men. Another scientist in Hyderabad said that scientists in authority usually transferred a specific item of information or a publication to their favourite scientists instead of giving to the most deserving scientists who required it the most.

6.10 Bureaucracy

A scientist of TIFR, Bombay wrote only one word i.e. 'bureaucracy' in the column seventeen of the questionnaire (Appendix.III). A number of other scientists also highlighted how bureaucracy is detrimental to the communication of science vis-a-vis development of science. Requests for photocopies may be delayed and suggestions for improvement in the matter of exchange of information may be turned down. Applications for grant of funds for attending conferences move through labyrinthine routes of bureaucracy and are recommended only if every effort at obstruction by raising objections fails. Requests for purchase of books, reprints and backsets of journals are subjected to bureaucratic procedures. Undue delay in procurement of material and economic loss due to bureaucracy is evident from the following case study.

38Ibid, p.29.
Some scientists made a request to the library of their scientific laboratory on 4.11.1981 for the procurement of a publication entitled *Power Diffraction File Sets (Inorganic)*, in book form (Vol.1-22). The Book Supply Bureau, South Extension Delhi promised to supply this publication. Order was placed with this firm on 21.11.1981, but no response came. Since scientists were in urgent need of this document, the librarian had, by then also sent inquiries at a number of other places. Ultimately the publisher i.e. the International Centre for Diffraction Data, Swarthmore, Pennsylvania, was directly contacted on 12.3.1982 and asked to send the proforma invoice, which was received on 5.4.1982. Immediately the State Bank of India, was contacted and request was also sent to the Accounts Department of the Laboratory to make arrangements for payment. While the State Bank of India started making a number of inquiries to the library regarding import licence etc., the Accounts Department of the Laboratory refused to make payment in advance, as the document to be procured was a book not a journal. Moreover, this Department claimed that there was no surety of supply of the document if payment was made. Keeping in view these problems, the librarian placed the order on 21.5.82 with Oxford Books and Stationery Co., Sciendia House, Delhi. This firm refused to supply the document as they did not have direct dealing with the publisher. Ultimately order was placed with Allied Publishers, New Delhi on 21.2.1983. This firm replied on 3.3.1983 that arrangements were being made for the procurement of the document supplied by the library. Allied publishers sent a Communication to the library on 1.7.1983 that they were ready to procure the document, but its price had increased as reported by its publisher. The librarian had to make efforts again to get orders for payment according to the enhanced price. The orders for payment were passed. As per the situation on 23.3.1984, the library had not received the publication. From this case study one can draw the following conclusions.

1. The publication required by the scientists in 1981 was likely to be supplied in 1984.
2. At the time of request the price of publication was Rs.10716.00 and now it is being procured at a price of Rs.13,776.00 because of increase of its price during the process of acquisition.

3. The Director of the laboratory has the power to sanction advance payments in such cases, but this power was not exercised by him.

4. Unnecessary inquiries by the State Bank of India, when it was clearly mentioned in item 31 of Appendix 10 of Import and Export Policy of the Government of India (1982-83) that scientific books could be imported Under Open General License (OGL).

6.12 Lack of Urgency

How current is the Current Contents for an Indian library? In a reputed library, an issue of Current Contents (Life Sciences) (Fig.6.6) was received on 27.3.1978 (as the entry in the register indicated). Neither the library staff transferred it to the Biophysics Department of the institution, where it was supposed to be displayed, nor did anybody from that Department come to collect it till 3.4.1982; the day the investigator got it issued for taking a photograph. It is an example of lack of sense of urgency amongst library personnel and scientists in the matter of science information Communication. Even if such journals are transferred well in time they usually reach the junior scientists needing them almost six month late as they remain with the scientist administrators for some period without being really used.

6.13 Lack of Leadership

The type of leadership acts as a catalyst for the anabolic or Ketabolic activities of a profession. The anabolic role can be illustrated by the leadership of Ranganathan with whose dedicated efforts library science and services considerably improved in India. Presently the main problem is that most of the institutions are functioning without dedicated and enlightened leadership. Only half of the agricultural University libraries have full-fledged university librarians. INSDOC's first and the last director was appointed in 1962. The National Library of India, Calcutta remained without a librarian for a long time. Obviously everything is not going on well with our manpower development programmes.
Fig. 6.6 One of the Dumped issues of Current Contents in a Reputed Library.
Besides leadership, a government's initiative and interest in improving scientific information facilities is also important. Both in Israel and Japan, the departments of scientific information are under the respective Prime Minister's. The United States hold conferences at White House to discuss various aspects of library and information science. The librarian of Japan National Diet Library is provided with a status which a minister of state enjoys. In our country, the review committee recommended the status of National Librarian as equivalent to the Vice-Chancellor of a University, but it appears that this recommendation has not been properly implemented.