CHAPTER- 1

INTRODUCTION

Libraries survey as an interface between the consumer of information and the world’s recorded knowledge. Given this role, libraries goal is to maximize the accessibility of published material to its users. The problem of meeting this challenge has been further aggravated by the fast expanding boundaries of knowledge and proliferation in publishing which has made it difficult for the libraries to meet the information needs of its specialist users. This problem is more acute in science-technology (Sci-Tech) libraries where emergence of new researchers and new investigations and their application is enriching the knowledge at a very fast rate.

Scientists have always needed and demanded information relevant to their research, such as: the methods used to study the problems under investigation, research results, what other researchers in the related field have recently completed or are presently doing, and what is being done in a broader and narrower areas of their interest as well. This information keeps scientists updated in their field of interest and provides a broad base to give meaning to their work. This type of information usually includes all documents that present new ideas and research findings. This can take the form of scientific periodical, patents, technical reports, conference proceeding, theses etc.

Current periodicals are the sources of new information, which are not generally available in other sources. These are the basic sources of publication of new inventions, theories, tends and view points, which otherwise would take years to appear in the sources like books. This can even lead to super cession of inventions and discoveries by advanced research. Periodicals have thus become the life blood of scientists despite their high costs and the problems involved in their acquisition, handling, storage and retrieval of information.

Periodicals have played a vital role in the communication of scientific and technical information and have correspondingly constituted an important section of the collection in science and technological libraries. Every type of library is facing the growing need for library space and the problems of working within ever shrinking space.
allotments. In addition, there are serious budgetary restraint, acceleration in journal subscription prices and many other difficulties. As a result of these, the library collection has to be fragmented, the journal subscriptions to some less needed titles have to be cancelled, new acquisitions have to be limited, and many other deflationary actions taken. These affect the library users both directly and indirectly. In short, the detailed uses are needed of the study to enable the libraries to build up balanced and optimally used collection with limited financial resources.

An interest in the information needs of users have prompted this study. A survey of the use pattern of Physical Science (Physics, Chemistry and Mathematics) Periodicals literature of the West Bengal University libraries such as Burdwan University library, Calcutta University Library, Jadavpur University Library, Kalyani University Library and Visva-Bharati Library. The use has been studied with the help of five indicators viz. In-Library use, Photocopy use; Inter-library loan use and Assessed use.

The study is confined to five University Libraries in West Bengal such as Burdwan University library, Calcutta University Library, Jadavpur University Library, Kalyani University Library and Visva-Bharati Library on the basis of parameters like document collection specialization, size of the collection, no. of the scientific periodicals acquired, library membership, library budget and the year of establishment of the library.

Need for the study

The libraries in general, and their periodicals section in particular are facing problems like literature explosion and consequent information explosion i.e. increase in number of periodical publication as well as articles published in them, rising price, continuous shift in thrust areas of research and interdisciplinary research. In a country like India the situation has become more acute with the inflation (devaluation of Indian rupee) and fluctuation in exchange/ conversion rate static or disproportionate library periodical budget and increasing number of user scientists.

The need, therefore, for optimum utilization of periodicals and maintenance of manageable yet relevant collection becomes more acute than ever before. In order to have the optimum use of limited resources and communicate the available published knowledge, there is a need to relate the acquisition of periodicals to their use and a use survey is that the most effective means of evaluating as well as developing the library
periodicals collection of a library. This need is most obvious in countries like India and the present study is an attempt in this direction.

The importance of such survey has been pointed out by many Matarazzo (1) who studied corporate library closure found that lack of evaluation of library collection and services was as an important factor responsible for the closure of library. Cover (2) stress on the determination of the users’ need and Bare (3) states, “periodically, it is necessary to canvass the user population of a special library to determine whether the objectives of library are being met”.

A large number of use studies have been conducted to find out the relative use of different channels in response to questions like ‘where would you search for information’ or ‘how did you find the references’. At the Washington Conference a number of papers on such studies were presented.

A survey of the past library literature reveals that a few studies have been carried out which are relevant to the present study. In this context, it is worth mentioning the work of Ching-Chih Chen (4) ‘the use patterns of Physics journal in a large Academic research Library’.

It is also worth mentioning the work of Roger Flynn (5) on ‘the use of Journal of the Pittsburgh University study’. Flynn studies the six Science and Engineering Libraries to determine the use of Journals.

In this context, it is also worth mentioning the work of Barbara A Rice, On “Science Periodical use study”.

Several Compilations of use studies exist the most inclusive bibliography is that compiled by Atkin (7) in 1971.

A recent analysis by Ford (8) examines over 100 studies conducted in academic libraries. W. Wood (9) presents a useful analysis and summary of the major studies of library use in the period of 1930-1964.

D. N. Wood (10) lists use studies conducted during 1966-1970.

It is also worth mentioning the work of Golam Ambia (11) on ‘use of periodicals in physics in Delhi university science library, IIT Library and NPL Library: A comparative study’ which was submitted for the award of M.Phil degree in the Dept of Library and
information science, University of Delhi, and it was published in the journal Libri, International Library Review. V 41, No 2; 1991.

**Growth of Periodicals:** - The proliferation of periodicals can be traced when the growth of periodical is calculated from the data available in Ulrich’s International Periodical Directory from the time period of 2003-2008. A study of five different years can be presented in the following table.

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Titles of periodicals listed</th>
<th>Growth of periodicals during the period</th>
<th>% growth in mentioned years</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002-2003</td>
<td>180270</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003-2004</td>
<td>184430</td>
<td>4160</td>
<td>2.30</td>
</tr>
<tr>
<td>2004-2005</td>
<td>187975</td>
<td>3545</td>
<td>1.92</td>
</tr>
<tr>
<td>2005-2006</td>
<td>193750</td>
<td>5775</td>
<td>3.07</td>
</tr>
<tr>
<td>2006-2007</td>
<td>196790</td>
<td>3040</td>
<td>1.56</td>
</tr>
<tr>
<td>2007-2008</td>
<td>201330</td>
<td>4540</td>
<td>2.30</td>
</tr>
</tbody>
</table>

Table-A reveals that the growth of periodicals is increasing from 2003-2008. It is also seen that 4160; 3545; 5775; 3040; and 4540 new periodical titles have been added annually during the periods of 2003-04, 2004-05, 2005-06, 2006-07 and 2007-08 respectively. In the year 2005-2006 the percentage of growth achieved highest i.e. 3.07% and it is also seen that during the study period the average percentage of growth can be calculated as 2.07. Bonn (12) has estimated that about 95% of all the cited literature of basic science is published in periodicals having a doubling period of 10-15 years. Scientific and Technical (13) books and serials in print, lists 185,000 books and 45,000 serials in 1998 and which lists is increase in 2,48,000 books and 88,400 serials in 2008.
Therefore, it is obvious that both books and serials are being increasingly published as well as doubling within 10 years.

**Increase in Subscription Rates:** Periodicals are becoming increasingly costlier. Publication cost is steadily going up and so are the subscription prices. The annual survey of periodicals prices reported in Library Journal (14) from the Faxon on-line title subscription for US Libraries indicates that the subscription rate of Periodicals are increasing at the rate of 10% to 15% per annum.

### Table - B:
Increase in Average Subscription Rate during 2005-08

<table>
<thead>
<tr>
<th>Subject</th>
<th>Avg price 2005 In $</th>
<th>Avg price 2006 In $</th>
<th>Avg price 2007 In $</th>
<th>Avg price 2008 In $</th>
<th>% inc 2005-06</th>
<th>% inc 2006-07</th>
<th>% inc 2007-08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics</td>
<td>114.84</td>
<td>132.16</td>
<td>150.25</td>
<td>168.33</td>
<td>15.08%</td>
<td>13.69%</td>
<td>12.03%</td>
</tr>
<tr>
<td>Chemistry</td>
<td>945.12</td>
<td>1095.72</td>
<td>1218.66</td>
<td>1385.55</td>
<td>15.93%</td>
<td>11.22%</td>
<td>13.69%</td>
</tr>
<tr>
<td>Maths</td>
<td>110.66</td>
<td>122.72</td>
<td>140.82</td>
<td>162.26</td>
<td>10.90%</td>
<td>14.75%</td>
<td>15.23%</td>
</tr>
</tbody>
</table>

It is clear from the Table- B that among all subject subscription cost of the periodicals in science is the highest were as among Science Periodicals, Chemistry Periodicals are costliest i.e. the average subscription price per title was $ 1385.55 in the year 2008 followed by Physics i.e. $ 168.33 and mathematics $ 162.26. The subscription rate of science periodicals according to on line Faxon’s price survey have increase 10%-15% or more during the last three decades or so.

**BOOK BUDGET:**

In India the library book budgets are either static or the increase in the book budget is not proportionate to the increase in subscription rates. It is felt that libraries are unable to cope up with the price rise and are spending 85% to 95% of their book budget on acquisition of periodicals. The National Union Catalogue of Current Scientific Serials in India (NUCSI)15 brought out by INSDOC (2007) shows that in India all science
technology libraries taken together receive only 36,000 periodicals as against 201,330 periodicals published all over the world.

**INFLATIONARY EFFECTS:**

In developing countries like India, the inflationary spiral has been most obvious, and has effected acquisition of periodical publications year after year in a competent manner. Despite, increase in the number of periodicals, a strenuous efforts has to be made by libraries in avoiding subscription to new periodicals. Even of there is no change in the number of periodicals subscribed, the percentage of budget spent on periodicals, continues to rise.

It is clear from the Table-C that Conversion rates of US $ has increase from Rs. 48.20 in the year 2005 and decrease to Rs.47.30 in the year 2006 and British pound Sterling increase GBP 91.00 in the year 2006 and decrease GBP 85.50 in the year 2008. The change of percentage -5.51, +8.33, -5.16 and -0.92 respectively.

<table>
<thead>
<tr>
<th>Year</th>
<th>Rs. US $</th>
<th>% of change</th>
<th>Rs. British Pound Sterling</th>
<th>% of change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec 2004</td>
<td>47.60</td>
<td></td>
<td>88.90</td>
<td></td>
</tr>
<tr>
<td>Dec 2005</td>
<td>48.20</td>
<td>+1.26</td>
<td>84.00</td>
<td>-5.51</td>
</tr>
<tr>
<td>Dec 2006</td>
<td>47.30</td>
<td>-1.86</td>
<td>91.00</td>
<td>+8.33</td>
</tr>
<tr>
<td>Dec 2007</td>
<td>41.80</td>
<td>-11.62</td>
<td>86.30</td>
<td>-5.16</td>
</tr>
<tr>
<td>Apr 2008</td>
<td>42.60</td>
<td>+1.91</td>
<td>85.50</td>
<td>-0.92</td>
</tr>
</tbody>
</table>

Source: GOC, Federation of Publishers’ and Booksellers’ association of India, New Delhi

**SCIENTIFIC TECHNICAL MAN POWER**

The strength of scientific and Technical manpower of a country as an indicator of country’s can well be taken to generate literature and gauge their information needs. World wide estimation in 2006 indicates that India has third largest scientific and technical manpower in the world statistical year book 2007 (UNESCO)\(^{(17)}\) lists 68,328;
74,875; 81,598; 88,036; 95,309 personnel engaged in R&D (Scientists and Engineers) in 2004, 2005, 2006, and 2007 respectively. The status report of science and technology in India (2004) has indicated that the total stock of science and technology manpower was around four million in 2004. The annual outturn of science and technology personnel as per University Grants Commission (U.G.C) is around two lakhs in the recent years. The above data reveals the need for the provision of more scientific information.

**Nature of Research**

The nature of research in science is becoming more and more interdisciplinary; Biochemistry, Microbiology, Environmental Science are the examples and therefore, there is a continuous shift in thrust areas in research.

**Advances in Information Technology**

The advances in Information Technology could be of help in solving the problem of effectiveness and efficiency in the library services but their acquisition and use in a library calls for more funds.

**Scope of the study**

The present study is on ‘Use of Physical science periodicals in selected University Libraries of West Bengal: A comparative study’. The study is confined to five University libraries i.e. Calcutta University, Burdwan University, Jadavpur University, Kalyani University and Visva-Bharati of Physics, Chemistry and Mathematics periodicals. The scope of study needs to be defined in relation to different terms and concept used i.e. large size of University libraries, Scientists, Periodicals, Use and different disciplines Chemistry, Physics and Mathematics.

The study is being undertaken to find out the use of periodical by Research scholars, Postgraduate students and teachers in the field of Physics, Chemistry & Mathematics in the various Institution such as Department of Physics, Chemistry & Mathematics of the University of Calcutta, University of Burdwan, University of...
Jadavpur, University of Kalyani and the Visva Bharati for their opinion of use of periodicals of the different subjects.

In a large library such as Science Library, University of Calcutta, Visva Bharati, University of Burdwan, University of Jadavpur & University of Kalyani Library, it would be almost impossible to develop a systematic recording either every title or a random number of titles used by the library users without investing a great deal of library staff time. Since the present study is the Ph.D. Thesis, which is done with minimum assistance from the Library staff of B.U., C.U., J.U., K.U., V.B., it is necessary to limit the study to journals of one subject category in order to save time and to facilitate the recording of statistics.

The findings suggest that a study of the use patterns of Physics journals in a large research library would be most interesting, particularly if one could correlate the findings with those of previous studies. Therefore, the scope of this study is limited to periodicals in the field of Physics, Chemistry and Mathematics of the University of Calcutta, Visva Bharati, University of Jadavpur, University of Kalyani and the University of Burdwan.

However, due to the many inter-disciplinary research interests of the various academic departments served by the library, it is safe to presume that although the Physics, Chemistry and Mathematics Department and the Research scholars use these periodicals most heavily & persons from related departments are also frequent users.

Scientists

The word 'Scientists' is used for a person who professes knowledge of natural Physical science and is actively engaged in scientific research. Dictionaries define scientists as: 'A person with expect knowledge of science; a person using scientific methods' and one learned in science especially in natural science, a scientific investigator. According to McGraw Hill Dictionary of Scientific and Technical terms "Scientist is a person having training ability and desire to seek new knowledge and new principles and new material in some field of science" whereas, Collier's dictionary defines, scientist as 'one who is highly skilled or knowledgeable in science, especially in the area of natural sciences, and is engaged in it as a profession'. The Department of science and
technology in its ‘Handbook of Research and development statistics, includes degree holders in science and degree holders in Engineering, Medicine and Agricultural sciences as Scientific and Technical manpower’. Identifying the difference between the ‘Scientists’ and a ‘Technologist’ Subramanayam21 says:

‘Scientists’ and Technologists’ are quite different social groups comprising the people who create new knowledge theoretical and applied. For browsing and reviewing new developments scientists make greater use of professional literature such as periodical articles and those mostly used by technologists and engineers are corporate reports and trade literature. Scientists are likely to see themselves as member of larger groups of fellow scientists who share their research interests and attitudes, regardless of organizational and geographical limitation. Whereas, technologists or Engineer tend to identify themselves as members of small team within their immediate working environment.

A scientist demonstrates a great alliance to the large social system of science transcending Institutional or even national boundaries but technologist and Engineers engaged in similar pursuits in different corporations see each other as competitors. Scientist seems to have more freedom in selection of projects; whereas for technologist and Engineers projects are suggested by sponsoring agencies. Scientist consider the wide dissemination of his findings a necessary part of his commitment to science. In sharp contrast to this approach, a technologist is not quite free to communicate the result of his R & D efforts.

The reward for the technologist comes mainly from the employer and is likely to be more tangible in nature than the award from pure approbation from his peers.

Landendrof22 also says “both scientists and technologists work in fiercely competitive worlds, but in ‘science’ the competition is among individuals for prestige and in ‘technology’ it is among corporation for profit”.

Here for the purpose of this study the ‘scientists’ include:-

- Faculty members in science Departments in the Institutions of higher education under study:
- Research scholars and fellows involved in scientific research in selected institutes in the three disciplines under study, or working in scientific projects.
- Scientists working in scientific organizations under study at National levels and/or dealing with production, editing, etc. scientific publications.

**DEFINITIONS AND SCOPE OF THE TERMS USED**

**USE:** ‘What is use’? Unfortunately in Information Science, less efforts have been made upon the formulation of accepted definition of concept of 'use', Lines 23 definition of use is a satisfied demand or it may be the result of browsing the material and ‘use is what an individual uses’ reflects the library users’ point of view. Norman Robert put forth the librarians view point of use. According to him browsing the material or taking a book off the shelf does constitute use from individual stand point but from librarian’s point of view it is use because the provision of material which is browsable and browsable is one of the services offered, by the library and borrowing a book should be treated as ‘use’ of the services as well as of the library. According to this definition what is an individual does with the borrowed material is not the concern of librarian.

These overlapping meanings and ambiguities associated with ‘use’ make vigorous definitions and limitation essential in the research situation. Chen 23 while discussing ‘use’ points out that despite the value of every use study, one should have in mind that it has an inherent limitation; it can give only quantitative evaluation rather than qualitative. A used periodical may be of such more importance than indicated quantitatively by a use study. Wenger and Childress (24) stress on the ‘variable use value’and ‘use density value’. According to them each ‘use’ has its own use value and quality of use should be weighted accordingly.
In present study 'use' has been taken as:

- An act of taking a periodical off the shelf and not re-shelved by the user after its use by him.
- A frequent made for photocopy of articles published in periodicals.
- Getting a periodical on inter library loan.
- Having been cited in published work of or in research work of a scientists; and
- Perceiving by the scientist as useful or most useful for his scientific and research work.

Use studies: A review

Surveys which are conducted to find out the use of any communication medium such as a primary periodical or a secondary periodical etc. are called the use studies. This use includes reading room use, home use and photocopying use.

A large number of use studies have been conducted to find out the relative use of different channels in response to questions like 'where would you search for information'? Or 'how did you find out the reference'? etc. The possible channels that could be named in response to such questions are — by chance, personal recommendations, from indexing and absenting services, as cited references, through regular perusal of periodicals etc. At the Washington conference a number of papers on such studies were presented since then many more such surveys have been made and their findings are available.

Periodical:

Publication of which each volume is made up of distinct and independent contributions, not forming a continuous exposition, normally by two or more personal authors and normally the specific subjects and the authors of the contributions in successive volume also being, in general, different, but all the subjects falling within one and the same region of knowledge, contemplated to be brought within its purview. It is not usually released complete as a volume but only in fascicles or numbers as they are called. It essentially expands knowledge and not repeats the same kind of information,
usually in the same pattern, in each of its volume\(^27\). The term periodical is also used to denote any single volume of a periodical as defined above.

Examples: 1. Annals of library science  
2. Proceeding, Royal Society of London.

**Serial:**  
Periodical publication of which each volume or each periodical group of volumes embodies more or less the same kind of information, usually in the same pattern, mainly relating to its year (or other period) of coverage. It is usually released complete as a volume. It is not made of diverse contributions each forming a continuous exposition of knowledge. The term serial is also used to denote any single volume of a serial as defined above \(^27\).


**Journal:** This term is used as a synonymous term to periodical publication.

**Half life:** The time during which one half of all currently active literature was published.

**Inter library loan:** A book lent between libraries of the same or different systems for a particular reader.

**Point of obsolescence:** The point of obsolescence as a point after which less than 15 Percent of all use occurs.

**The problem:**

Use studies of Physical Science (Physics, Chemistry and Mathematics) Periodicals may be understood as the use of Periodicals by Physical scientists covering reading room use, home use and photocopying use for their study purposes. Physical Scientists for the study have been defined having at least a master’s degree in Physics, Chemistry and Mathematics.
Objectives of the study:

1. To identify the core Physical science (Physics, Chemistry and Mathematics) periodicals;
2. To estimate the total expenditure on the core Physical science (Physics, Chemistry and Mathematics) periodicals;
3. To identify the most heavily used Physical science (Physics, Chemistry and Mathematics) periodicals;
4. To identify the least used physical science (Physics, Chemistry and Mathematics) periodicals;
5. To identify Physical science (Physics, Chemistry and Mathematics) periodicals which should be made readily accessible? And which could be considered for remote storage?
6. To determine the age of the Physical science (Physics, Chemistry and Mathematics) periodicals that are used;
7. To identify how do readers find out about the relevant Physical science (Physics, Chemistry and Mathematics) periodical articles that they are read? That is, whether they are directed by references from secondary periodicals or from some other sources?
8. To determine how often Photostat request is made?
9. To determine how often interlibrary loan request is made?
10. To determine whether or not they are using periodicals other than English language? That is, listing of periodicals on the basis of language, and
11. To suggest regarding use of Physical science (Physics, Chemistry and Mathematics) periodicals which could lead their effective use?
Hypothesis:

Keeping the purpose of the study in mind the following hypothesis is given below for the use study of Physics, Chemistry and Mathematics periodicals.

1. Nature and New scientists are the most used periodicals other than their area of research.
2. Most of the Physical Scientists use the Photocopying facilities when the article is most important and the time is insufficient to read in the library.
3. The use pattern of periodicals in University Libraries of West Bengal in Physics, Chemistry and Mathematics is identical.
4. Periodicals of Foreign origin are preferred over the periodicals of Indian origin.
5. Current issues of periodicals are more used than the retrospective over.

Origin and Growth of Scientific Periodicals

Origins:

In the development and establishment of the formal process of scientific communication, periodicals have played an absolutely vital role. Although it is common practice for the results of a research project to be first disseminated informally at seminars and meetings, it is assumed by the scientific community at large that the work with later be published as a paper in a periodical, where it is accessible to every body. Primary periodicals responsible for the dissemination of new research result have in fact been described as the heart of the publication system, while monographs, reviews, abstract and indexes and more recently the computerized databases exist as additional aids.

Scientific periodicals are now well over three hundred years old. The first two scientific periodicals were both founded in 1655, The Journals des Scavans in France and the Philosophical Transactions in England.

The Philosophical Transaction was started by the Secretary of the Royal Society, Henry Oldenburg, initially as a private venture. It was intended as a medium for the
publication of new observations and original research in science, which had been carried out by fellow of the Royal Society.

The *Journal des Scavans* was in fact the first scientific periodical to be issued, preceding publication of three months.

**Development:**

The development of scientific periodicals over the preceding three centuries has been closely interlinked with the establishment and growth of learned societies and professional institutions. These organizations of which the Royal Society was one of the earliest originated as institutions at which the members would give verbal accounts of their scientific research to which the other members would listen.

By the 1700s about thirty scientific periodicals had been established. Many of these were associated in some way with a learned society, though the links were not always direct. The *Philosophical Transactions*, for instance was not adopted as the official publication of the Royal Society until 1753, nearly a century after its foundation.

Throughout the 18th century the number of periodicals published increased considerably, the majority of these being fairly general in nature, attempting to cover the whole field of science.

**Growth rate:** Because of the difficulties involved in accurately calculating the number of periodicals in circulation at any one time, any estimate of their rate of growth can only be an approximation. In 1961 De Solla Price estimated that the growth rate of scientific periodicals over the previous three hundred years had remained at a fairly constant level of 5 percent per annum. This rate was based on the total number of periodicals founded, without any allowances for the members which later ceased publication. It would appear from other investigations that, up to the end of the 1960s, the growth rate for current serials was approximately 4 percent a year.

These figures accord well with those determined by King, who calculated an annual average growth rate of 2.7 per cent for scientific and technical periodicals between 1960 and 1977, and a growth rate of 1.2 percent for other scientific and technical periodicals. A further study made at the BLLD has indicate that around 1 percent of titles cease publication each year.
**Importance of periodical:** The need for rapid and accurate transmission of technical data has actually led to a demand for a means of presentation of such information which is more efficient than the traditional method. One of the chief reasons for the importance of periodicals in the fields of knowledge has been that new knowledge achieves faster dissemination than it would if it was produced in book form. There is considerable evidence, however, that even the periodical with its relatively swift publication of new material is failing to satisfy the demands of its principal users in those branches which develop vary rapidly. It may be that we are on the verge of a revolution which, even if it does not provide a substitute for the technical periodical, will bring forth a serious competition for the traditional periodical press.

Information contained in periodicals is almost invariably more up-to-date than that appears in book form. Information on new processes and techniques can appear within weeks of formulation if published in periodical articles; whereas it might be several years before it published in book form.

**Periodicals:** The term 'periodicals' was first used to designate the publication of scholarly memoirs and the news of learned world Kirchner distinguished the following characteristics which the 'periodical' had acquired by the end of the 18th century. (1) Periodicity (2) Duration - the intention of continuing it indefinitely (3) Collectivity - the heterogeneity and diversity of offerings. (4) Availability - should be available to all those who wish to pay for it and (5) Continuity - consistency in its format and its editorial policy. To distinguish the 'periodical' from 'newspaper' Kirchner gives two negative criteria also. There are (1) Timeliness (2) Universality periodicals is not strictly time bound like the events of a day or events of a week and it is less universal in terms of audience / readers, than that of newspaper.

In Germany, the class of publication was designated by a large variety of descriptive names including 'biblioteck', 'magazine' etc. An in France, a similar pair of terms were used to describe two classes of publication the term 'gazette' for the 'newspaper' and 'Journal' was applied to the publication of learned news and information.

During the 19th century, beyond the problem of defining the periodicals, the problems of different formats of periodicals cropped in and as a result the periodicals were defined with a view to develop a working classification of the formats and the
organization in the country. In 1904 C.A. cutter and in 1908 the committee of library associations and the ALA defined periodicals in detail. The term ‘serial’ came in vogue from Northern America during the era only and experts made deliberate attempts to define ‘periodical’ and ‘serial’ both and drew distinctions between them, if any. In 1937 Gable stressed on the appearance of periodicals at regular intervals and ALA catalogue and university library statistical report (1935) defined periodicals as ‘A publication appearing at regular intervals of less than a year’.

ALA glossary defining ‘periodical’ stressed on its appearance in an unbounded state and containing articles by several contributors. In the conference of UNESCO held at Paris in 1964 was agreed that a publication is a periodical if it constitutes one issue in a continuous series under the same title, published at regular or irregular intervals over an indefinite period, individual issues in the series being number consecutively or each issue being dated.

In India, Indian standard Institution (Now Bureau of Indian Standards) defined periodical on the lines laid down by S. R. Ranganathan in his ‘classified catalogue code’. According to ISI to be a periodical a document should have following attributes: (a) Periodicity (b) Distinguishing number (c) Continuity. Further, a publication in which each volume is made up of distinct and independent contributions, not forming a continuous exposition, normally by (two or more) different authors, and normally on the specific subjects and the authors of the contribution in successive volumes are being different; but all the subjects following in and are on the same region of knowledge, contemplated to be brought with in its purview. It is not usually released complete as a volume but only in fascicule. It is essentially expands knowledge and not repeat the same kind of information usually in the same pattern, in each of its volume just bringing the information up to date from volume to volume.

Looking back over the last three hundred years of the history of periodicals are found that the definitions have some common ground, some differ in slide details may be because of different terms used but they do differ and this difference is sufficient to cause confusion. Terms often confused with periodicals are, Magazines, Journals, Serials. It is better to clarify these terms are:
**Periodical vs. Magazine**

Oxford English Dictionary\(^{43}\) defines ‘magazine’ as a publication containing articles by various writers, intended to general reader rather than learned professional, consisting of miscellany of critical and descriptive articles, essays, work of fiction etc. ALA glossary\(^{44}\) compares ‘magazine’ with ‘Journal’ and Harrold in Librarians glossary\(^{45}\) defines it as a periodical publication distinct from newspapers, independently paginated and identified by date rather than by serial number.

Authorities on periodicals like Osborn\(^{46}\) and Davinson\(^{47}\) do not take the term ‘Magazine’ seriously. Maglup draws a clear distinction between ‘Magazine’ and ‘Journal’ by saying that Magazine are chiefly for a general reader, whereas ‘Journal’ are for readers specialized in a particular discipline and interested intellectually sophisticated treatment of a variety of a subject.

Moreover, Magazines are read for recreation and periodicals are read to become more knowledgeable with recent developments in the specified fields. In this study magazines meant for recreational purpose and general reading have not been included in periodicals.

**Periodicals vs. Journal vs. Serial**

‘Journal’ ‘Serial’ and ‘periodical’ are the terms which are used more or less synonymously. In fact, these terms have been used in different countries to represent more or less some category of documents i.e. Journal in France (Journal des savants), ‘Serial’ in United States to be more specific in North America (Union list of Serials in United States and Canada, New Serial titles etc.) and ‘Periodicals’ in Europe and particularly in U.K. (Ulrich’s International Periodical Directory).

ALA glossary\(^{48}\) defines ‘Journal’ as “a periodical, especially one centering scholarly articles and/or disseminating current information on research and development in a particular subject field. Houghton\(^{49}\) feels ‘Journal’ is a common term which can be used for periodicals as a whole. Lambert\(^{50}\) in his ‘Science and Technology Journal’ used ‘Journal’ as synonymous to periodical. He does not go to the details of definition. For him a short definition could be ‘a publication issued in separate parts and intend to be continued indefinitely’.
Serials as defined by ALA glossary\textsuperscript{51} is a publication on any medium issued in successive parts bearing numerical or chronological designations and intended to be continued indefinitely. Serials include periodicals; newspapers, annuals (reports and yearbooks etc.); the journals, the memoirs, proceedings transactions of societies and the numbered monographic series". Osborn\textsuperscript{52} prefers to more term ‘Serial’ because that is more common in North America, quoting evidences from bibliographical sources; he regards ‘Serial’ as being of higher order than the ‘Periodical’; but sometimes feels that both are synonymous.

As defined by ALA glossary “Periodicals” are published more frequently than annually and normally contains separate articles, stories or other writings Newspapers and Proceeding etc. are not included in this term. Grenfell prefers to use term ‘Periodical’. In his words ‘the term serial’, although it has a wide connotation, finds comparatively little mention in professional literature, whilst in everyday usage the term ‘Periodical’ is used more.

The distinction usually stated in between a ‘Periodical’ and a ‘Serial’ is that the periodicals are publication issued at regular intervals (less that a year), regularly i.e. appearing at regular period of intervals, loosely longer than a day whereas serials can be issued at regular and or irregular intervals and this interval can be a year and more than a year as well. Further, serials are mainly related to its year of coverage and usually published as a complete volume such as yearbooks, annual reports. Such is not a case with periodicals.

Fortunately, the choice of the term ‘Serial’ or a ‘Periodical’ is among the least consequent from the point of view of scientists. The scientists and scholars do not make as fine distinction between the various forms of periodicals as do those responsible for organizing analyzes research collection. Osborn rightly points out that it seems wiser to adopt working definition than to confuse both theory and practice with endless exceptions and borderline cases.
Types of Periodical:

Periodicals have been categorized by different characteristics.

Kronick\textsuperscript{53} classified them by using subject approach e.g. Science Periodicals, Social Science Periodicals, Humanities etc. and Grenfell\textsuperscript{54} uses the frequency as characteristic and classifies them as dailies, weeklies, monthlies and quarterlies. Comparatively broadly accepted types of periodicals are primary periodicals and secondary periodicals.

**Primary periodical** are the vehicles of the publication of new and original research and are known as archival periodicals also. Their function, defined over three centuries of development lie in four different areas i.e. to make public the result of original research, to provide permanent records i.e., the archives of research, to assign priority to scientists and to ensure guaranteed standard of quality through referencing system.

**Secondary periodical** has been defined by Grogan as ‘discussing, connecting and interpreting the research which has been published in primary periodicals. These include indexing, Abstracting, Review Periodicals etc.

Many changes have come in recent past in the periodicals and today a periodical can be both a vehicle. For rapid ‘communication and publication of preliminary results of research an entirely new breed of periodicals known as ‘communication periodicals’ and ‘letter periodicals’ have come into existence. Tetrahedron letters, Physical review letters, Chemical communications are the examples. The review periodicals provide critical evaluation of research papers and fewer provide summary of progress which has been made in a particular field, generally by experts in the area under investigation like progress in etc. All these in printed form have been an important source of information and have retained their importance for the scientists largely for transferring scientific information from non formal to the format domain and for gaining visibility. Consequently, periodical abstract a large number of articles stands as most important source of information for scientists.
**Periodicals covered in the present study**

The 'periodical' in the present study means all those publications which are issued at regular intervals; consecutively numbered, intended to be continued indefinitely; made up of independent contributions by many authors; and on different aspects of subjects falling within one and the same region of knowledge; and the author and the contributors in it successive volumes are normally different.

All periodicals having the regular frequency of less than a year and are of use to scientists (as defined earlier); and are of research nature in specified disciplines of Chemistry, Physics and Mathematics; communication periodical or a research report periodical, a review periodical or a periodical etc. have been covered in this study. Further present study covers the periodical published on printed form and E. Journal only. This study includes periodicals published in English language or available in English translation in the specified subject areas of study.

**Scope of subjects**

**Chemistry:** Chemistry deals with the preparation properties, structure and reaction of materials substances; since decrease of substances is present in nature the scope of Chemistry is immense. Chemistry interfaces with all scientific disciplines and knowledge of the subject is essential.

The field of Chemistry is large one. The subdivisions used to classify various aspects of Chemistry are: Organic Chemistry, Inorganic Chemistry, Physical Chemistry and Bio-Chemistry. Few of the newer developing and newly emerging fields of Chemistry are: Nuclear Chemistry, Astro-Chemistry, Geo-Chemistry, Environmental Chemistry, Industrial Chemistry, Electro-Chemistry etc. Chemical abstracts groups its coverage into 80 fields which in turn are grouped under five main sections – Organic-Chemistry, Macro-Molecular Chemistry, Applied Chemistry, Chemical Engineering and Physical and Analytical Chemistry.

The Present study covers all the above fields of Chemistry.
**Physics:**

Physics deals with understanding the structure of natural world and explaining natural phenomena. Fundamental questions on the structure of matter and the interaction of the elementary constituents of nature that are susceptible to experimental investigation and theoretical enquiry fall in the area of Physics.

The major branches of Physics are Mechanics, Electricity, and Magnetism. Physical phenomena involving magnetic fields and their effects upon materials; Acoustics—Science of sound and interpreting the phenomena associated with motional disturbances from equilibrium to elastic media; Heat, Energy while in transit; and Atomic Science, the science of atoms, its structure, dynamical properties including energy state and its interactions with principles and fields. All these major branches are linked by such concepts as energy, mass forces, acceleration and change. Few others which have contributed to the growth of Physics include Astronomy, Geophysics, Physical Chemistry, Bio-Physics, Aerodynamics, Hydrodynamics, Plasma Physics and Solid state Physics, etc.

Physics Abstracts\textsuperscript{55} covers the above subjects and has therefore put them under various headings as: General Physics, Vibration Waves acoustics, Heat, Electricity and Magnetism; Electro-Magnetism, Electro-Magnetic Waves and oscillations, Optics, X-rays and tubes, techniques, Quantum theory, Nuclear Physics, Fluids, Change of State, Atomic molecular Physics, Physical Chemistry Geophysics, Astro-Physics, Bio-Physics, Technique Material and Mathematical Physics. The present study covers all the above fields of Physics and its inter-disciplinary sub divisions.

**Mathematics:**

Mathematics is frequently encountered in association and interaction with astronomy, Physics and other branches of Natural Science, and it also has deep-rooted affinities to the humanities. It is a realm of knowledge entirely into itself, and one of considerable scope.

Relation to Science: Mathematics is not a branch of natural Science itself. It does not deal with phenomena and object of the external world and their relations to each other but strictly speaking only with objects and relations of its own imagery. One can practice
meaningful mathematics without being concerned with science at all, and philosophical attempts to reduce all origin of mathematics to utilitarian motives are wholly unconvincing. However, Mathematics is the language of science in a deep sense. Mathematics is an indispensable medium by which and within which science expresses, formulates, continuous, and communicates itself and just as the language of true literacy not only specific and express thought and process of thinking but also creates them in turn, so does mathematics not only specify, clarify and make rigorously workable concepts and laws of science, but also at certain crucial instances becomes an indispensable constituent of their creation and emergence as well.

Creative formulas: A formula is a string of mathematical symbols subject only to certain general rules of composition. To working mathematician a string of symbols is a formula if it is something worth remembering. Much Mathematics is concentrated is a propelled by certain formulas of unusual import.

Foundations – Mathematical logic - A prime demand on mathematics is that it is deductively rigorous and a traditional model for intended rigor is Euclid’s presentation of mathematical assertions in theorems. A theorem is a position which has been provide, excepting certain first theorems called axioms, which are admitted without proof, and to prove a theorem means to obtain it from other theorems by certain procedures of deduction or inference. It had long been common place that each branch of Mathematics was based on its own axons, but during the 19th century, Mathematicians arrived at the insight that even the same branch might have alternate axioms. Specially, there were envisaged alternate versions of two and three dimensional geometry; the axioms varied being the axioms on parallels. It was also recognized that a set of axioms becomes mathematically possible if it is logically consistent, that is, if one can not deduce from the axioms to theorems one which, as a preposition, is negation of the other see EUCLIDEAN GEOMETRY; NONEUCLIDEAN GEOMETRY.
JADAVPUR UNIVERSITY

Jadavpur University\textsuperscript{56} was formally established by the Jadavpur University Act XXXIII, in 24\textsuperscript{th} December, 1955. Dr. Bidhan Chandra Roy, President of the National Council of Education, Bengal became the first President of the University for a period of four years with effect from 4\textsuperscript{th} December, 1955 (The position of the President in the University is analogous to that Chancellor in other Indian Universities) and Triguna Sen was appointed to exercise the Powers and perform the duties of the Rector on and from 24\textsuperscript{th} December, 1955 (The position of the Rector in the University is analogous to that of vice Chancellors in other Indian Universities).

At present JU is imparting education in two sprawling campuses having old 60 acres and newer 80 acres in Jadavpur and Salt lake, W. B. respectively.

Central Library, Jadavpur University

Jadavpur University Library started along with the establishment of the University in 1955 and has been catering to the academic and research needs of the Faculty members, Research scholars, Students and other Staff members of the University as well as outside the Scholars. Apart from the large Central library (approximate total area of 48,000 sq. ft.) and the campus library at its Salt Lake Campus, the University has 34 Departmental Libraries under the Faculties of Arts, Science, Engineering and Technology. Schools and centers of interdisciplinary research have their own libraries. This is the third largest library in West Bengal. Another annex building (4000 sq. ft.) to the central library has utilized to render the services of the bound volume Journal and thesis and a digital library has been set up on the first floor of this building.

There are 10,858 members in the library. The total number of books in the Central Library, Salt Lake Campus and the Departmental Libraries has now risen to 565745.

There are 87,026 back files of research Journals, 6224 Thesis and dissertations, 38000 other reading materials, including reports. Standards, maps, microfilms, etc. in the library. The library subscribes to nearly 3431 Journals, out of which 2850 are online. The JU Library has been taking the appropriate steps to computerize the libraries house
keeping operations. The work related to retrospective conversion of the library collection is on the way to completion and the library catalogue has been computerized. The LAN between the Central Library and the Departmental Libraries has been established through fibre optics connectivity and LIBSYS is used for automating the library. The total no. of books in the Central library is 5,98,9663 (upto 31st March 2008).

**Library Publications**

1. JU library – a brief profile.
2. Know your library.
4. Sudhindranath: Jiban O Rachanapanji (a bio-bibliography in Bengali, compiled by JU Library Published by JU).

**Digital Library and Documentation Centre**

- Completion of retro conversion of information sources available in JU library;
- Regular updating of bibliographic databases and membership databases in JU library;
- Digitization of the synopses of theses and dissertations available in JU Library and then, Full Text theses;
- Digitization of very old and rare books / Journals, etc. available in JU Library and then, from other age-old libraries of West Bengal.

**Procurement of Digitized information Sources**

- Online Journals including abstracting and indexing Journals,
- Bibliographic databases in CD format;
- Negotiations are going on with vendors / distributors for purchasing electronic books;
- Reference books and also text books in CD format of selective basis.

Several services of the JU Library are being augmented for improved user access to the information sources. Some of these are listed below:

**Services provided through Internet**

- Current contents
- New arrival of books
- Departmental (including Centre / Schools) Library and Salt Lake Library integration
• These / dissertations synopsis access
• Resources Centre (60 network enabled needs have been installed in the first floor of the Central Library for use of the members)
• User Education program / Awareness program
• online access to selected Journals
• Interconnection to external Library / sides
• Access from Salt Lake Campus
• Dial up Service

Enhancement of Existing Library Services (Non-network) / other activities

• Help Desk
• Collection Development of Information Sources in all formats
• Reduction of time processing of books
• Building bibliographic databases
• Restoration and preservation of old and rare books
• Photocopying / Printing Services
• Extension of Library Services (360 days X 12 Hours through Physical Services) (365 days X 24 Hours through net work)
• Close circuit TV some areas
• Bar Coding in circulation
• Electronic Security System

Besides these services, there are also departmental libraries in the Department of Physics, Chemistry and Mathematics and the departmental students, Scholars and teachers use this libraries.

UNIVERSITY OF KALYANI

The University of Kalyani\(^{57}\) was established in the year 1960. Its objects as defined in the Act with amendments in the West Bengal Ordinance No X of 1974 are to provide facilities for the study of Humanities & Sciences. However the University is presently governed by the Kalyani University Act, 1981 (West Bengal Act XL of 1981)

CENTRAL LIBRARY:

At the initial stage the Central Library had no building of its own. The library was housed initially in the B. T. College building. It was thereafter shifted to a hostel building and from there to the sociology building and lastly to the administration building.
The Central Library had its own separate two-storied building in the year 1979. The Shortage of space and dearth of professional staff linked its satisfactory development.
There is a departmental library in each academic department manned by non professional staff members. It is a matter of hope that the provision of supervision of departmental library managed by professional staff under the direct control of the central library has been envisaged in the new statute.

There is a Library Advisory Committee to regulate Policy Planning Process and all the developmental activities of the library. In the new statute it has been converted into Library Committee changing its advisory nature. It renders instructions regarding of funds apart from the functioning of the Library System. The Chairman of the Library Committee is the Honorable Vice-Chancellor and the Head of the Central Library as Secretary, ex-office member. At present the total number of books as per accession register is 1,36443. Books in the special and private collection section 8000. The total number of bound volumes of Journals as per accession register is 6306. The LAN between the Central Library and the Departmental Libraries has been established through fibre optics connectivity and SOUL software is used for automating the library. The total no. of books in the Central library is 1,30788 (upto 31st March 2008).

**Library Publications**

1. KU library – a brief profile.
2. Know your library.

**Digital Library and Documentation Centre**

- Digitization of the synopses of theses and dissertations available in KU Library and then, Full Text theses;
- Digitization of very old and rare books / Journals, etc. available in KU Library and then, from other age-old libraries of West Bengal.

**Procurement of Digitized information Sources**

- Online Journals including abstracting and indexing Journals,
- Bibliographic databases in CD format;
- Reference books and also text books in CD format of selective basis.

Several services of the KU Library are being augmented for improved user access to the information sources. Some of these are listed below:

**Services provided through Internet**

- Current contents
• New arrival of books
• Departmental Library and Central Library integration
• These / dissertations synopsis access
• Resources Centre (10 network enabled needs have been installed in the first floor of the Central Library for use of the members)
• online access to selected Journals
• Interconnection to external Library / sides

Enhancement of Existing Library Services (Non-network) / other activities

• Help Desk
• Collection Development of Information Sources in all formats
• Reduction of time processing of books
• Building bibliographic databases
• Restoration and preservation of old and rare books
• Photocopying / Printing Services
• Extension of Library Services

Besides these services, there are also departmental libraries in the Department of Physics, Chemistry and Mathematics and the students, Scholars and teachers of the respective departments use this libraries.

SPECIAL AND PRIVATE COLLECTIONS UNIT

The central library has a special and Private Collections Unit which is rich Comprising of approximately 8000 books. Some eminent scholars donated their collections of books to the Central Library, the Particulars of which are mentioned below.

1. Parul Devi Collection of books of Rabindra Nath Tagore and the original letters of Rabindra Nath to Parul Devi. This collection includes first edition books of Tagore and another book of Tagore bearing his signature. This collection is considered as an invaluable asset of the library.
2. Sajani Kanta Das collection;
3. Nihar Ranjan Roy collection;
4. N. K. Majumder collection;
5. Special collection of rare and out-of-print books and Journals;
6. S. N. Dasgupta collection;
7. N. K. Sinha collection.
Burdwan University:

The University of Burdwan was established under the West Bengal Act XIX of 1959 as a teaching and affiliating University. It should functioning from 15th June 1960 with six post graduate teaching departments and thirty under-graduate colleges spread over five districts viz. Burdwan, Bankura, Birbhum (other than the areas served by the Visva Bharati University) Hooghly (excluding Serampore sub-division), Purulia and Midnapore (one Homeopathic College).

Burdwan University Central Library:

The B.U. Central Library started along with the establishment of the university in 1960. The University Library situated at Golapbag provides facilities and services to its faculty, student staff, and other members' research scholars, students, officers and information users of the University as well as outside scholars. Library Service of Readers (Circulation) loan facility of documents (books) is available to all members but periodicals are not lent out to the members. The Reading Room of the Central Library remains open from 7.30 A.M. to 6 P.M. from Monday to Friday and 10 A.M. to 5 P.M and Saturday and Sunday from 11 A.M. to 5 P.M. for the regular use of the students' teachers / scholars and others. The Periodical Section is also kept open from 7.30 A.M. to 6 P.M. The Students, Teacher & Scholars to consult the current as well as back volume of journals for the academic purpose. The Reference section has a rich collection of Encyclopedias, dictionaries, handbooks, year books within the section. It has a display board where new books are displayed regularly. The thesis of Ph.D. /D.SC. /D.Lit. Degree awarded by the University is kept for reference and for the use research scholars, teachers and others. The Central library has a report section which includes Census reports, world development reports, Govt. publication; reports on education are available in the Report section. Reprints of research papers published by the teachers, scholars are kept for the reference purpose. Students guide to different foreign Universities are available in this section. About 2000 readers used the facility of the section yearly.

The text books on different subjects are kept in the study centre with a view to cater the needs of the users providing them with Post-Graduate / M.Phil / U.G.C. users for providing NET old question papers in the section. The candidates appearing in the
National / State Level Examination are allowed to make use of the previous year model question papers reference guide books on NET / SLET examination are available in the study centre. There is archival cell which requires acquisition of the unit consist 2500 nos. of old and rare manuscripts in Sanskrit / Old Bengali Script, 8000 nos. of old and also rare books on various topics received from the Burdwan Raj Family library are preserved for reference. The Departmental Science Library of the Physics, Chemistry and Mathematics is highly rich collection of books and periodicals. All the books are stored in the Departmental science Library such as Physics, Chemistry and Mathematics. No books and Journals are kept in the Central Library. All the books and Journals are available in this departmental Science Library. The total no. of books in the Central library is 2,62112 (upto 31st March 2008).

**Library Publications**

3  BU library – a brief profile.
4  Know your library.

**Digital Library and Documentation Centre**

- Digitization of the synopses of theses and dissertations available in BU Library and then, Full Text theses;
- Digitization of very old and rare books / Journals, etc. available in BU Library and then, from other age-old libraries of West Bengal.

**Procurement of Digitized information Sources**

- Online Journals including abstracting and indexing Journals,
- Bibliographic databases in CD format;
- Reference books and also text books in CD format of selective basis.
- CD ROM of biological abstracts, Physics abstracts and chemical abstracts

Several services of the BU Library are being augmented for improved user access to the information sources. Some of these are listed below:

**Services provided through Internet**

- Current contents
- New arrival of books
- Departmental Library and Central Library integration
- These / dissertations synopsis access
- Resources Centre (15 network enabled needs have been installed in the first floor of the Central Library for use of the members)
- online access to selected Journals
- Interconnection to external Library / sides

Enhancement of Existing Library Services (Non-network) / other activities

- Help Desk
- Collection Development of Information Sources in all formats
- Reduction of time processing of books
- Building bibliographic databases
- Restoration and preservation of old and rare books
- Photocopying / Printing Services
- Extension of Library Services
- Bar code generation of books for going on progress
- Reprographic services
- Staff Training programme for betterment of services
- Data base services is going on porogress
- Internet searching for the research scholars and teachers

Besides these services, there are also departmental libraries in the Department of Physics, Chemistry and Mathematics and the students, Scholars and teachers of the respective departments use this libraries.

Lists of Resources provided under UGC Info net

E-Journal: BURDWAN UNIVERSITY

<table>
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<tr>
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<th>Name of the Publishers</th>
<th>Number of Journals</th>
<th>Website Address</th>
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<tr>
<td>1</td>
<td>American Chemical Society</td>
<td>31 Journals</td>
<td><a href="http://www.pubs.acs.org">http://www.pubs.acs.org</a></td>
</tr>
<tr>
<td>2</td>
<td>American Institute Of Physics</td>
<td>18 Journals</td>
<td><a href="http://www.aip.org">http://www.aip.org</a></td>
</tr>
<tr>
<td>3</td>
<td>American Physical Society</td>
<td>10 Journals</td>
<td><a href="http://www.aps.org">http://www.aps.org</a></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>29 Journals</td>
<td><a href="http://www.ormjournals.annualreviews.org">http://www.ormjournals.annualreviews.org</a></td>
</tr>
<tr>
<td>5</td>
<td>Black Well</td>
<td>489 Journals</td>
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<td>6</td>
<td>Cambridge University Press</td>
<td>189 Journals</td>
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<tr>
<td>7</td>
<td>Emerald</td>
<td>28 Journals</td>
<td><a href="http://eremeldsight.com">http://eremeldsight.com</a></td>
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<td>Encyclopedia Britannica</td>
<td>National site licensing</td>
<td><a href="http://search.ib.com">http://search.ib.com</a></td>
</tr>
<tr>
<td>9</td>
<td>Institute Of Physics</td>
<td>38 Journals</td>
<td><a href="http://www.ibp.org">http://www.ibp.org</a></td>
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</table>
11 Project Muse  222 Journals  http://muse.jhu.edu/journals
12 Royal Society Of Chemistry  23 Journals & 6 databases  http://www.springerlink.com
14 Taylor & Francis  1105 Journals  http://journalsonline.tandf.co.uk
15 Eucid  18 Journals  http://projecteuclid.org
16 Oxford University Press  100 Journals  http://www.oup.co.uk

SPECIAL COLLECTION

a) Very old rare manuscripts
b) Burdwan Maharaj Collection
c) Sri Aurobindo Collection
d) K. C. Chatterjee Collection
e) Census Report
f) Annual report of various Organization
g) Thesis of Ph.D. / D.Sc. / D.Phil. degree awarded by this University
h) Various reference collections such as Encyclopedias, Dictionary, Hand Books, Gazetteers, Almanac, Who’s who etc.
i) N. C. Chatterjee Collection on law.

CALCUTTA UNIVERSITY LIBRARY

The University of Calcutta\(^{(60,61)}\) was established in 1857. The university is now being governed by the Calcutta University Act, 1979. The act provides for the for the reconstitution of the University to enable it to function more effectively in the fields of teaching and research in various branches of learning and courses of study and for higher education to meet the growing needs of the society. It has given sufficient autonomy to the academic bodies of the University.

The University library continued in its humble way till the passing of the University Act in 1904 and the appointment of Sir Asutosh Mukherjee as Vice-Chancellor.

The first notable acquisition by the University library was by way purchasing in 1909 of the entire library of Prof. R. Pischel of Berlin. His collections contained practically everything that had been published within the preceding thirty or forty years in Europe and North America in the fields of Sanskrit, Pali, Philosophy including comparative Philosophy, in addition to many other works of interest.
As the University activities were expanding in all directions, pressure for accommodation was being increasingly felt at the Senate House Building.

In 1912, the library had a new home, thanks largely to the munificence of the then Maharaja of Darbhanga. The Central Hall with its side compartments in the first floor as well as the Big Hall with its side rooms in the second floor were set apart to accommodate the rapidly expanding collections of the library.

The Post-Graduate Lending Library (Arts) was first housed in the ground floor of Darbhanga Building and then in 1935 it was shifted to the top floor of the Asutosh Building where it functioned till 5th March, 1967.

From 6th March, 1967, it started functioning in the newly constructed ten storied building. The building had some covered area on the roof too. Each floor of the building had a gross area of about 8,400 sq. ft. (60’ X 140’) without any internal permanent constructional obstruction except the column centers which were evenly set up 20 ft apart from one another. The six top floors of the building had ceiling heights of a little over 8ft and were mainly meant to be to other functions of the Library. The total no. of books in the Central library is 14,22540 (upto 31st March 2008).

CENTRAL LIBRARY
The University library now consists of the Central library, two campus libraries, thirty-nine departmental libraries and two libraries are spread over seven campuses. Departmental libraries are located within the department concerned.

The University library has a collection of more than 10 lakh of books. In addition to that, the seven campuses of the University together posses more than 2 lakh volumes of hard bound Journals, M.Phil and Ph.D. dissertations, proceedings & conferences, reports, maps, patents, newspapers, manuscripts, micro-films and CD-ROMs.

Computerization and networking of the Central library has been undertaken under the INFLIBNET program of the UGC. It has started automation of the library activities using SOUL, a versatile and user friendly software from INFLIBNET Centre. The library has its own local Network connected to a server with terminals within its premises. Online Public Access Catalogue (OPAC) of the library has databases of books, journals,
thesis, CD-ROMs and Microfilms. In addition to these, the University provides access to nearly 5000 (five thousand) electronic journals to its users in all the campuses under the UGC INFONET program.

The University library has posted an on-line catalogue in the university Website consisting of records of books, Ph.D. thesis, medical dissertations, BNCC Collections, Peace Studio collections and many more. New users from across the globe can get access to all the collection of the library. In this context it might not be out of place to mention that our University has now become one of the few select institutions in India where collections can be known through the Internet. Since the University library contains more than 10 lakhs documents, the task to complete the whole process on-line cataloguing is a daunting one. But efforts are on to put the entire collection of the libraries on-line.

The University Website is getting very popular among the masses inasmuch as it contains the detailed information of the University including those on seminars and employment notifications and it also provides the advantage of downloading the application forms or admissions to the Post Graduate courses.

Individual e-mail IDs that have been provided to the teachers of the University, are being used to a large extent by those for whom this facility is intended. To meet the growing requirement of the academic community, the web space for the e-mails and University Website has been increased.

At present the Central Library is providing the following services:

a) Reference Service  
b) Bibliographic Service  
c) Documentation Service  
d) Internet Service  
e) Reprographic Service  
f) UGC-NET Service  
g) Lending and Reading Room Service  
h) Access to back issues of Journals  
i) Inter-Library Loan

Steps have been taken to form a separate section in the Central Library to house the rare publications of the University for example old issues of Calcutta Review, old minutes of the Syndicate, old calendars of the University etc.
A separate space for study has been created for research scholars and teachers of the University, in the 3rd floor of the Central Library.

The Reference Section has been shifted to a spacious room at the 4th Floor of the Central Library adjoining the Thesis Room.

The old loose issues of journals and their hardbound volumes have been displayed in a room on the 5th Floor of the Central Library. A complete list of all the journals currently subscribed to by the libraries of the University have been compiled to keep the teachers, research scholars and students informed about the journals available in these libraries.

The book-jackets of the new books acquired by the Library are displayed at the display board opposite to the Controlling Gate and the said books are kept separately for two weeks at a prominent place at the entrance of the circulation section.

The Central Library is playing special attention in building up career prospects for the benefit of the students appearing in various competitive examinations like IAS, WBCS, SLET, GRE, GMAT, SSC, etc.

A Text Book Section has been formed in the 2nd floor of the Central Library, adjoining the Reading Room, so that the text books and all other essential reading materials pertaining to different courses of study can be made available to the students under one roof.

The University has been identified by INFLIBNET-UGC for access to Chemical and Biological Abstracts under UGC-INFONET program through ‘Sci-Finder Scholar’. ‘Sci-Finder Scholar’ is oared by Chemical Abstract Service (CAS) – a division of the American Chemical Society. It is the world’s most comprehensive collection of published Scientific Research. It covers all disciplines such as Chemistry, Biotechnology, Chemical/Biomedical Engineering, Material Sciences, Physics, Environmental Sciences, etc.

With ‘Sci-Finder Scholar’, we soon shall get electronic access to:

1) More that 22 million Abstracts (1907 – till date);
2) 21 million organic and inorganic substances;
3) Over 3 million Bio-sequences;
4) Over 8 million single/multi-step reactions;
5) Over 14 million biochemical references;
6) Abstracts from 9000 journals and 45 patent Offices.

For the rare books, the University Library is going to start the digitization process very soon. The preliminary work is already over. Another work, relating to bar coding of documents, has also been taken up.

The Central Library has undertaken the task of holding computer awareness program for all members of the staff of the University. The formal inauguration of the computer awareness program took place on 24th January 2006, the 150th Foundation Day of the University.

The libraries of the University continuously endeavour to upgrade and expand their services for the benefit of their users.

THE VISVA-BHARATI LIBRARY

The genesis of the library in Visva-Bharati goes back to 1901, with the founding of the Brahmacharyasrama at Santineketan. The formal inauguration of Visva Bharati took place on December 22, 1921. The constitution was registered in May 1922. It was declared as a central University and institution of national importance by an Act of parliament May, 1951. The Act was amended successively in 1961, 1971, and 1984.

Rabindranath Tagore emphasized the use of books in the educational development of students. He personally supervised the selection of books, remaining alert to the needs of Santineketan students and teachers and keeping himself aware of what was being published. When he found any lacunae in the kind of books available, he arranged to have books written and published. The library at Visva-Bharati grew under his care with help coming from great minds all over the world. With the evolving of Visva-Bharati, Rabindranath Tagore toured Europe and America with the intention of collecting funds. He was often given large donations of books from Universities, including and groups of well-wishers. In 1921, Sylvain Levi and his colleagues at Strasbourg gifted a collection of French classics for the library at Santiniketan. In 1925, the Italian Government under Mussolini sent a handsome gift of Italian classics to Visva-Bharati as a part of art and
periodicals like Studio International to Rabindranath who in turn gave these to the library. While in Japan, he collected a set of the famous Kolkata magazine, renowned for its works of art.

**CENTRAL LIBRARY**

The central library has today 372000 volumes of books, around 4000 users and a daily transaction of 3000 books. The library has number of important collections; mention may be made of the collections of Prabodhchandra Bagchi, Pramatha Choudhuri, Humayun Kabir, Satikumar Chattopadhyay, Lila Ray, Ashoke Rudra and Abanindranath Tagore. The central library is doing Boook database with the help of the Lib-Sys software.

Out of twelve sectional libraries “Rabindra Bhavana Library; is the important Research library catering to Tagore Scholars. It is enriched with in its collection the personal library of the poet”

The Siksha-Bhaban library caters to the needs of students and faculty members of the science department. A new building was opened in April 1990. There are more than 7123 books (1998).

Manuscripts of great value in various languages such as Bengali, Oriya, Arabic, Persian and Chinese life scattered in various departmental libraries. The manuscripts of Rabindranath and some members of the Tagore family are preserved in the Rabindra-Bhaban Archives.

Along with a rich tradition of libraries in Visva-Bharati, the University has also made some progress in the modernization of the library system. In January, 1996, the University awarded a Rs. 96.5 lakhs contract to C-DAC, Pune to implement a campus-wide 10mbps fiber-optic network to link the Bhabana libraries with the Central Library with a library automation system comprising a Sun SPARC-based server; 3 Pentium / 75 multimedia PCs and 10 multilingual VT100 / GIST terminals under the UGC-funded INFLIBENT project. The total no. of books in the Central library is 4, 07 294 (upto 31st March 2008).
The Physics Department has its own departmental library to satisfy the needs of the Research scholars, Post graduate students and the teachers of the department.

The Chemistry Department has its own departmental library to satisfy the needs of the research scholars, post graduate students and the teachers of the department.

The Mathematics Department has its own departmental library to cater the needs of the research scholars, post graduate students and the teachers of the department.

**Limitation of the study**

A large number of data is available in the West Bengal University Libraries. My topic includes the use of Physical Science (Physics, Chemistry & Mathematics) periodicals in selected University libraries of West Bengal: A comparative study. Due to large number of data I did not include the two University libraries of West Bengal such as Vidyasagar University & North Bengal University. I did not also include citation analysis due to non-available of the publication of the Faculty & Research Scholars of the five Universities.

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