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SUPPLEMENT

GROWTH OF SCIENTIFIC PERIODICALS IN INDIA (1788 - 1900)

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*To be continued in IJHS Vol. 37(2-4) (2002)

INTRODUCTION

Genesis

Indian National Scientific Documentation Centre (INSDOC) compiled a number union catalogue of periodicals during 1960s to 1980s. During the compilation it was customary to trace the history of each and every periodical. Quite frequently, this task used to pose problems. The historical elements looked for comprised date of starting, ceasing (in case the periodical was ceased), changed title (with the date of change), sponsor, place of publication, etc. There was no single tool, which could provide all the required information for all the periodicals. As such, systematically the search had to be conducted in the *World List of Scientific Periodicals, British Union Catalogue of Periodicals, Union List of Serials in Libraries of United States and Canada,* and in many other library and union catalogues till the information could be retrieved. Even after searching all these sources, numbering fifty or so, sometimes the searcher had to draw blank and provide incomplete and unconfirmed information with a question mark. The painstaking job of retrieving various historical elements relating to scientific periodicals, undertaken by the Union Catalogue Division of INSDOC under the able stewardship of Sri Sambhu Nath Dutta, was the first systematic and most sincere steps towards the comprehensive bibliographical control of scientific periodicals emanated from India. A thorough volume by volume search of the periodical holdings of more than eight hundred libraries of the country unveiled many new titles not recorded in the library and union catalogues earlier, provided faithful information relating to historical elements which helped to rectify the entries prepared earlier, and fill in gaps in innumerable cases to complete the hitherto incomplete entries. The culmination of Dutta's most painstaking efforts is the *National Union Catalogue of Scientific Serials in India* (NUCSSI), brought out in 1988 in four volumes. To date this is the most comprehensive document recording Indian scientific periodicals, both ceased and living.

The question arises whether it covers all Indian scientific periodicals,

or still there is some lacunae in it. Haunted by this question, the union catalogues of UK, USA, Australia and so on were manually searched entry by entry, and scores of titles were found not recorded in NUCSSI. The reason is very simple. The 800-odd libraries covered by NUCSSI do not possess those titles. It is almost certain that some of the titles are not present at all in any of the Indian libraries. The possibility of extinction of some of them cannot also be ruled out.

Apart from library and union catalogues, several laudable attempts were also made by some authors on their individual capacity towards bibliographical control. These authors have painstakingly either compiled the list of periodicals, sometimes with annotation, or written history about them. A brief account is being provided here only of those attempts which have got direct bearing on this study. The directories of periodicals published after independence are obviously being excluded inasmuch as they could not provide any information additional to what was collected from other sources.

1) Long, Rev. James. *Returns relating to Native Printing Presses.... and a Catalogue of Bengali Newspapers and Periodicals.... 1818 to 1855.* 1855.

In 1854, there were 19 Bengali periodicals with a circulation of more than 8,000 copies. In the same year came out another publication called

2) *Indian Press Guide and Eastern Advertisers Handbook* by Tom Luke. Madras.

3) Bandopadhyay, Brajendra Nath *Bangla Samayikpatrer Itihas* (=History of Bengali Periodicals). The book is a most comprehensive bibliography on Bengali periodicals emanated during 1818 to 1900. For each title, bibliographical details have been provided, and the significant contributions and their authors highlighted. The location of the periodical in libraries and some private collections have been indicated. Other information provided included the person or the body that was responsible for the starting of the journal, editor, quality of the articles, price, references of the periodical in other contemporary sources, etc. No such attempt in any other Indian languages could be located.

4) *Development of Medical Societies and Medical Periodicals in India 1780 to 1920* by Neelameghan published in 1963 is yet another important work. In this work, the author tried to achieve a comprehensive bibliographical control of periodicals published from India mainly in the field of medicine. In all, 95 periodicals have been covered of which 78 belong to medicine, two each to agriculture and biology, one to general science and twelve belonged to generalities mostly with a pronounced bias towards science. Of these periodicals six are in Portuguese, three in Urdu, one each in Arabic and Bengali. The rest are in English. The bibliographical descriptions apart, annotations covering historical elements have been provided. Of these periodicals 66 belong to nineteenth century. As Neelameghan has also traced the growth of medical societies along with the periodicals, the impact of the former on the latter can be easily seen.

5) *Research Periodicals of Colonial India 1780-1947*, by R.P. Kumar has also come out as a book. In the work, entries relating to Indian periodicals have been lifted verbatim from *British Union Catalogue of Periodicals* (BUCOP), which provide in most cases, such bibliographical details as the title, sponsor, place of publication, year of starting and so on. The fourth chapter of the book entitled Research Periodical in Sciences provides some more information about 120 scientific periodicals. The information varies from a passing remark to one paragraph of annotation. Of the scientific periodicals covered only 30-odd titles belonged to the nineteenth century, as such many common titles like *Memoirs of the Geological Survey of India, Records of the Geological Survey of India, Memoirs of the Geological Survey of India - Palaeontologia Indica; Indian Meteorological Memoirs, Journal of the Bombay Natural History Society* do not figure in the publication. All the publications that could be scanned could not equal the coverage of NUCSSI.

It has already been pointed out that NUCSSI, despite its best attempts could not cover all the periodicals, neither other authors could do so. If all the efforts are combined together, even then some gaps are found, sometimes pretty wide. Except the union catalogue of periodicals, and some library catalogues, others have completely ignored periodic reports brought out by various government departments related to science, and numerous

institutions. With the passage of time periodicals of the nineteenth century have aged, become brittle to defy in many cases photocopying or microfilming, or even using. The condition of some has become too precarious due to total lack of care, and their availability in libraries has dwindled so much, that an inquisitive researcher may not find any trace of them after some years. Taking into account their present physical condition, availability, etc. the periodicals can be grouped as follows.

(i) There are some periodicals, which in all probability, are extinct. References to these periodicals, or in some cases, brief descriptions are available in such sources, as are on the verge of extinction. For example, *Report of the Department of Agriculture and Commerce, North-Western Provinces of Agra and Oudh* for the year 1887/88 mentions about the publication of the *Agricultural Journal* in Hindi. The large number of catalogues and union catalogues, which could be seen, do not provide any indication about its physical existence anywhere. In all probability, it is extinct. Even the Report which makes a mention of this periodical, is on the verge of extinction.

(ii) Periodicals like *Forecast of Cotton Crops, India; Transactions, Bombay Veterinary Association,* and many others are found only in one or two foreign libraries. Their existence in Indian libraries could not be traced.

(iii) In the third category, those periodicals can be placed, which are available either in full or in parts only in one or two libraries in the country. In many cases, the librarian is unaware of his prized possession, and one day he may very well take a decision to weed out the worn-out and unused possession. Here, the case of *Pasvavali* the first regional language periodical published from India on a scientific subject, i.e. animals can be taken. In all 22 issues of the periodical came out during 1822 to late 1830s. Of these issues only about a dozen are possibly available in Radha Kanta Dev's library in Calcutta, and one issue in Rajshahi Public Library in Bangladesh.

(iv) In this category are placed those periodicals which are still available in more than one library, and care has been taken in some cases to preserve them. For example, *Gleanings of Science* (1829-1831) is available in

a few libraries, and at least in Geological Survey of India, the periodical is available in laminated condition.

From the foregoing pages, it becomes quite clear that still that there is no source, which exhaustively lists Indian scientific periodicals including periodic reports and provides a brief description (other than bibliographic details) highlighting among others the type of matter contained in the documents, important contributions and contributors.

The work is an attempt towards the partial fulfillment of the aforesaid lacuna.

Objectives

The objectives for which the study has been conducted are:

(i) to portray within the colourful fabric of the history of science in India interwoven with contemporary educational and other related developments, the scenario of scientific periodicals that emerged and flourished in India from 1788 to 1900 and acted as a very powerful medium to faithfully record the development within the country and beyond and carry the messages across the world;

(ii) to enlist

a) all scientific periodicals published in English, as can be located from primary, secondary or tertiary sources;

b) such scientific periodicals published in Bengali and other Indian languages as were encountered during the course of the study;

c) such general periodicals as were predominantly scientific (e.g. *Asiatick Researches*) or publishing important scientific contributions in sizable number;

d) annual and other periodic reports of government departments related to science and technology, and of scientific organizations, societies, etc.

so that

a) a librarian or information scientist can trace the same and obtain adequate information for compiling a catalogue or a bibliographic work or conducting a bibliometric study, and

b) a historian of science can trace and obtain necessary historical facts relating to our scientific periodicals and clue to various other scientific facts embedded on the pages of the periodicals.

Scope

Within the confine of this study the term 'periodical' encompasses all periodic publications; 'journal' includes all periodicals that publish research articles, review articles, technical articles, popular articles apart from other items; and 'serial' embraces all periodicals that publish reports, data, indexes, lists of organisations, peoples, instruments and so on.

The bibliography records 725 titles belonging to science in general; natural history; astronomy; surveying and geodesy, chemistry; mineralogy; geology; meteorology; marine science; palaeontology; archaeology; anthropology; microscopy; botany; zoology; industry; inventions and patents; medicine including health and hygiene; mental health; systems of medicine like allopathy, homeopathy, and Ayurveda; engineering including mining, construction, roadways, railways, irrigation and telegraphy; agriculture, including horticulture and gardening, forestry, animal husbandry and veterinary science; printing, chemicals like salts and explosives; building and architecture; and geography. Periodicals of such peripheral areas as museum, forensic chemistry and photography have also been covered.

All types of periodicals such as journals; annual and other periodic reports; data periodicals like tide tables, meteorological publications, forecast and estimation of crops, statistical periodicals have been included. Abstracting periodical in the true sense of the term was practically absent in nineteenth century India with the sole exception of *Calcutta Medical News*, which has been included along with such other periodicals as provided summaries of meteorological data and other records, abstracts/synopsis of

survey reports, extracts of reports, and selections from various government records. Indexing periodicals as are known today was not encountered. However, one or two periodic indexes such as *Index to Application for the Registration of Designs* have been included. Collection of various types of papers such as Reprints of records, Minutes of meetings, Collection of technical papers, Notes, Memoranda, that appeared periodically have been encompassed. This apart one or two review periodicals, periodic conference proceedings, monographic series (e.g. *Fauna of British India*), directories, etc. have also been covered to make the bibliography as comprehensive as possible.

The geographical limit of the coverage is confined to British India which now form India, Pakistan and Bangladesh.

Generally, English language periodicals have been covered. Periodicals in other Indian languages which have been encountered either physically or through reporting in some other sources, have also been included. Bengali periodicals could be covered more or less exhaustively because of the availability of a comprehensive work on Bengali periodicals by Bandyopadhyay. Such work is found to be lacking in other languages.

As is evident from the title, the period encompassed is 1788 to 1900 inasmuch as the year 1788 heralded the happy birth of the research periodical i.e. *Asiatick Researches* from this subcontinent and the year 1900 sounded the conclusion of the nineteenth century. When a 19th century periodical continued into 20th century, the changes undergone in the title etc have been shown in most cases up to 1947 or beyond.

PERSPECTIVES OF SCIENTIFIC PUBLICATIONS (C.1500-1788)

The history of science in Europe indicates that the development of certain perspectives, especially scientific research, paved the way for the emergence of scientific publications and periodicals. Now, let us see how the perspectives were conducive for such a situation as in India.

Portuguese navigator Vasco da Gama's successful expedition to India (May 20, 1498) led to the establishment of direct trade link between India

and Europe and within a short time, Cochin turned into a trading headquarter of the Portuguese. Following the Portuguese, came the Dutch and established their factories at the Coromandel coast as well as in Gujarat and Bengal.

The first English vessel to reach India was Hector belonging to the Company of Merchants of London trading with the East India. This is the Company which later on became famous in the name of the East India Company. In order to differentiate from other East India Companies, it is also referred to as English East India Company. However, in this study it will be referred to as only East India Company. The Vessel Hector which reached Surat around 1610 was captained by Williams Hawkins who travelled to Agra in order to obtain trading concession from the Mogul emperor Jahangir. After initial failures, by 1613 the English traders obtained permission for the establishment of a permanent factory at Surat. Compared to the Portuguese, Dutch and English, the French were quite late in reaching India. Only in the reign of Louis XIV the Compagnie des Indes Orientales (French East India Company) was formed in 1664. During 1666 and 1690, the French settlements grew up in a number of places like Surat, Pondicherry, Masulipatam, Chandernagore, Balasore, and Kasimbazar. Calicut and Mahe got added to this list in 1701 and 1721 respectively. By 1730s the Swedish company was also in the scene.

The gradual growth of European settlements in India brought, apart from European traders, doctors, engineers, missionaries, and persons belonging to various other professions. Through these people gradually entered into our soil Western science, technology and medicine (*Encyclopaedia Britannica*, 12).

The most important incident from our point of view is, of course, the unexpected arrival of a printing press at Goa in 1556. The ship carrying the printing press and its custodians to Abyssinia from Portugal at the behest of the emperor of Abyssinia, anchored at Goa on its very long, tiring and circuitous route via the Cape of Good Hope, for a few days of respite, when messages reached indicating the change of mind of the Abyssinian emperor, causing the off-loading of the press at Goa for good. This sheer

freak of history brought modern method of printing in India and laid the first building block of the long route that ultimately led to the origin of scientific journalism in the country (Kesavan, pp. 14-15).

The European professionals who came to India between 16th to 19th century, most of them were not primarily appointed for doing scientific research. Nevertheless, some of them took great interest in Indian plants, animals, medicine, and various other areas of scientific pursuit and produced excellent piece of scientific work. Garcia da Orta, a Portuguese physician, arrived in India in 1534. He set up a garden of his own, studied Indian drugs and plants and gave birth to the first scientific work produced from Goa in 1563 in printed form entitled *Coloquios dos simples e drogas e cousas medicinais da India* ...(nConversation on Indian plants and drugs referring to the medicine of India). This seems to be the first scientific work produced from India by a European (Subbarayappa, p.489). Another scientific work produced from Goa in 1582 entitled *Aromatum et Medica Mentorum in Orientali India Nascentium Iber,* authored by Christoval Acosta, also deserve mention (Neelameghsn, p.7; Mathew 1997).

From the two instances given above, it becomes clear that contributions to scientific literature by Europeans settled in India started in mid-16th century itself. The path shown by Garcia and Christoval was followed by others as time went on and better pieces of scientific work started emerging. The most noteworthy scientific contribution of the 17th century goes to the credit of Heinrich van Rheede tot Draakenstein, the Dutch Governor of Malabar. Draakenstein very systematically and meticulously studied the Indian plants and produced his magnum opus called *Hortus Malabaricus* in 12 volumes. The book published from Amsterdam during 1686 to 1703 contained apart from the leaf by leaf description of plants, numerous illustrations depicted in 794 plates. Karl Linnaeus, the famous Swedish botanist, and father of plant taxonomy, used this book for fixing the botanical nomenclature of Indian plants in his *Species Plantarum* (Subbarayappa, p.491).

Till the end of 17th century only one or two Europeans were taking interest in scientific pursuit in addition to their normal activities. In the

18th century it is found that that with the increase of British control over the Indian soil, mainly after 1757, more and more Europeans, especially British, were engaging themselves in scientific studies.

Printing, being one of the prime factors for the stupendous proliferation of publications, played also its yeoman's role in the origin of periodicals and its future nurturing. For the origin of Indian periodical a printing base was required. How the necessary printing base developed in India can be briefly seen from the next few paragraphs.

The modern printing facility which started at Goa in the mid-16th century gradually spread along the coastline of India, the places being Bombay, Cochin, Punnaikayal (close to Cape Comorin), Vapicottai (close to Cranganur), Ambalakkadu (close to Trichur), all in the western coast; and Tranquebar, Madras, Calcutta, and Serampore in the eastern coast (Kesavan, p.13) .

The construction of a wooden press by James Augustus Hickey, the father of Indian journalism, in 1777 marked the beginning of printing in Calcutta. The appearance of Hicky's *Bengal Gazette* or *Calcutta General Advertiser* on Saturday, on January the 29th, 1790 heralded with a single stroke the birth of first newspaper and also of journalism on Indian soil. The incident started off the proliferation of newspapers and news magazines not only in Calcutta but also in Madras and Bombay, and by 1729, their number went beyond 20. The proliferation of printing presses in Calcutta was also quite rapid, so much so that by the end of the century the city witnessed as many as 26 printers responsible for printing around 400 books (Kesavan, p.196).

The printing facility available in Calcutta towards the close of the 18th century can be considered good enough for the launching of a periodical. However, for the running of a periodical several other prerequisites like continuous flow of articles, editorial facility and financial support needed to be fulfilled. In the following paragraphs, it will be seen how these prerequisites got fulfilled by 1780s.

The defeat of Siraj-ud-Doulla at the battle of Plassey on 23rd June 1757

at the hands of Robert Clive, provided the East India Company a foothold in Bengal and paved the way for the establishment of British rule in India. The motive of the East India Company was primarily the expansion of trade in India and not to carry on scientific research except on those areas which were of direct trade interest to the Company. Having brought Bengal under its complete control, the Company must have dreamt of further expansion of its territory within India, and this very dream necessitated the survey of areas adjoining Bengal and beyond. To realise the dream. Bartholomeo Plaisted was engaged in the job and he carried on the coastal survey near Chittagong in 1761. His successor, James Rennel, conducted the survey of the Ganges, for finding out a waterway for upcountry traffic from Calcutta. For his fine job, Rennel was appointed by Robert Clive the first Surveyor General of India in 1767. In the following years, Rennel and his co-workers surveyed Bengal, Bihar and Assam frontiers. The first Map of Hindoostan was brought out by Rennel in 1783. The survey work continued in Bombay, Madras and some other parts of India as well by Robert Kelly, Michael Topping, and others. (Subbarayappa, p.493).

From 1763 onwards, the medical services of the Company for the three provinces of Bengal, Madras and Bombay were established. Medical professionals from Europe appointed in these services included Roxburgh, Berry, Ander, Fleming and others, who might be said to have formed the core of biological research in India (Prasad, p.xvii).

Similarly, scientific officers appointed by the Company in various services and survey departments of the Government of India and provincial governments formed the nucleus of scientific research in other areas. It is again to be noted that the aforesaid officers in most cases were not appointed for doing scientific research. They did scientific research only at their spare time mostly as hobby.

It can be imagined that the scientific officers who came to India from Britain to join various services and departments of the Government of India and provincial governments were adventurous. They knew fully well that the climate and environs of India, totally different from that of Britain, were more hostile than comfortable. Despite this, they traversed the oceans

and seas to set foot on India and to discover a land completely virgin for scientific exploration. It can also be imagined that most of the officers who came to serve in India were young and harbouring in them a volcano of enthusiasm to discover the unseen and explore the unknown. The indefatigable enthusiasm of theirs helped them to transgress with authority the boundaries of their specialisations and research efficiently in areas not well-known to them before.

In 1772, Warren Hastings was appointed as the Governor General of Bengal. This appointment was also of significance from our point of view as he was 'in his private station... the first liberal promoter of useful knowledge in Bengal' and also the great encourager of Persian and Sanskrit literature' (Jones -1) .

John Gerard Koenig, a Danish by birth, came to Tranquebar in 1768 as a surgeon and a naturalist. Later on in 1778, he was appointed Naturalist to the Government of Madras. His prime contribution to botany lies in the introduction of Linnaeus's binomial system of nomenclature into India. According to some, Koenig was responsible for the creation of a small botanical society called United Brothers. The members of the Society did some excellent job in the field of botany (Subbarayappa, pp. 491-2).

By 1780s there were sufficient number of officials, all white in colour, had enough potential in them to carry on research in large number of areas encompassing arts, humanities and science. What was needed is a towering personality who could bring them together under a forum and enthuse them to conduct research in a soil which was lacking it for centuries.

At this juncture, Sir William Jones, a young man of 37 set foot on Indian soil in October 1783 as a puisne judge of the Calcutta High Court. Such was his enthusiasm and organising capability that just by 15th January 1784 he succeeded in establishing the Asiatick Society [*From the title page of the first volume of Asiatick Researches - it appears that the name of the Society was 'Society, instituted in Bengal, for Inquiring into the History and Antiquities, the Arts, Sciences, and Literature, of Asia'. Possibly later on the name was changed to Asiatick Society'- author*] following the plan of the Royal Society of London

(Subbarayappa, p. 495). In fact, the idea of establishing a society got into his mind in August 1783, when he was on the sea en route to India. How the remarkable idea got into his mind can be seen from his own words in the following lines. "When I was at sea last August, on my voyage to this country,... I found one evening, on inspecting the observations of the day, that India lay before us, and Persia on our left, whilst a breeze from Arabia blew nearly on our stern. A situation so pleasing in itself, and to me so new, could not fail to awaken a train of reflections on a mind, which had early been accustomed to contemplate with delight the eventful histories and agreeable fictions of this eastern world. It gave me inexpressible pleasure to find myself in the midst of so noble an amphitheater, almost encircled by the vast regions of Asia, which has been esteemed the nurse of sciences, the inventress of delightful and useful arts, the scene of glorious actions fertile in the productions of human genius, abounding in natural wonders, and infinitely diversified in the forms of religion and government, in the laws, manners, customs and languages as well as in the features and complexions of man. I could not help remarking, how important and extensive a field was yet unexplored, and how many solid advantages unimproved; and when I considered with pain, that, in this fluctuating, imperfect, and limited condition of life, such inquiries and improvements could only be made by the united efforts of many, who are not easily brought, without some pressing inducement or strong impulse to converge in a common point, I consoled myself with a hope founded on opinions, which it might have the appearance of flattery to mention, that, if in any country or community such an union could be effected, it was among my countrymen in Bengal" (Jones -2).

Sir William Jones, apart from his being an organiser of very high order, was a great visionary. He could envision the object of the Society in its broadest possible perspective - 'MAN and NATURE; whatever is performed by the one, or produced by the other' (Jones -3).

The founding of the Society with a very broad spectrum of objective was decidedly the most important milestone towards the launching of a learned periodical from India. The idea of launching such a periodical for

disseminating the results of research of the members of the Society and others was definitely harboured by William Jones. However, the publication of such a periodical required regular flow of sizable number of research or learned articles, a good printer, and also fund. It can be imagined that the Society, being at its infancy had practically no fund to spare for the launching of the periodical. Hence, a local printer was needed who could publish the periodical on his own without depending on the Society for fund. Despite the presence of more than half a dozen printers at Calcutta during mid-1780s it must not have been an easy task to convince a printer for undertaking such a job at his own risk. Any way, Manuel Cantopher, an employee of the East India Company became ready to undertake the job on the mutual understanding that each member of the Society would buy a copy of the periodical at Rs. 20.(Kumar, p.193]. Imagine, how much Rs. 20/- in 1788 costs today. By 1788 articles enough to publish two large volumes of a periodical accumulated to make the launching of the first learned periodical from India, called *Asiatick Researches*, a reality. Sir William Jones's planning of bringing out a volume each year did not materialize. Till his untimely death in 1794 at the very premature age of 49, only three volumes were published. As has been described in the objective, the journal in its life time of 51 years published original contributions belonging to practically all fields of knowledge. In all, 20 volumes of the journal were published till 1839, when the last volume appeared. From volume 18, the journal was divided into two parts, one was to publish scientific papers, and the other literary papers. In reality, this, however, did not happen. Both the parts of volumes 18 and 19 published only scientific papers, with the bare exception of two papers providing description of North-west coal district and Spit valley.

It may not be out of place to mention here that several newspapers and magazines, i.e. *Hicky's Bengal Gazette or the Calcutta General Advertiser* (Weekly) (Jan. 1780); *Calcutta Gazette or Oriental Advertiser* (Weekly) (Mar. 1780); *The India Gazette or Calcutta Public Advertiser* (Weekly) (Nov. 1780); *Bengal Journal* (Weekly) (Mar. 1785); *Oriental Magazine or Calcutta Amusement* (Monthly) (Apr. 1785); *Madras Courier* (Oct. 1785); *Dharma Pracharini Patrika* (1786); *Calcutta Chronicle and General Advertiser* (Weekly) (Jan. 1787);

Calcutta Advertiser (Weekly, April 1787) that appeared before the advent of *Asiatick Researches* were popular in nature and there is no indication to suggest that the research articles of value were published in them.

BACKGROUND & PUBLICATION OF SCIENTIFIC PERIODICALS
(a) 1788-1820

The Beginning

The advent of *Asiatick Researches* in 1788, no doubt, heralded the beginning of learned periodical publication in the country.

Starting from 1788 till early 1820s *Asiatick Researches* reigned unrivalled and supreme as a research periodical of very high order. No doubt, during this period appeared a number of newspapers, magazines and other periodic publications, i.e. *Asiatick Mirror; and Commercial Advertiser* (Weekly) (Feb 1788);*Bengal and East India Calendar* (1788); *Bombay Herald* (1789); *Bombay Gazette* (1790); *Calcutta Sunday Recorder* (Weekly) (Nov 1790); *Bengal Universal Intelligencer* (Twice-weekly) (Nov1790); *Calcutta Monthly Register, or India Repository of Instruction and Entertainment* (Monthly) (Nov 1790);*Calcutta General Advertiser* (Weekly) (1791); *Calcutta Magazine* (1791); *Asiatic Museum* (Monthly) (1791); *The Journal* (Weekly) (Oct. 1791); *The World* (Weekly) (Oct. 1791); *The Times* (Weekly) (Feb 1792); *Bengal Calendar and Register* (1792); *Bombay Courier* (1792); *Calcutta Friday Morning Post; and General Advertiser* (Weekly) (May 1792); *Indian Observer* (1793); *Oriental Star,* Calcutta (Weekly) (Jan 1793); *Calcutta Monthly Journal* (1794); *Hircarrah,* Madras (1794); *Hircarrah* (= *Bengal Hurkaru*) (Weekly) (20 Jan 1795);*Indian Apollo* (Weekly) (Oct. 1795); *India Herald,* Madras (Apr 1795); *Indian World* (1795); *Madras Gazette* (1795); *Madras Racing Calendar* (1795); *Calcutta Telegraph* (Weekly) (Apr. 1796); *Asiatic Magazine* (Monthly) (1798); *Calcutta Courier* (Weekly) (1798); *Oriental Miscellany* (1798); *The Reactor* (1799); *Asiatic Annual Register* (1799); *Circular Letters* (Monthly) (1807); *Indian Magazine and European Miscellany,* Calcutta (1807); *Memoirs of Translations* (Annual) (1807); *Bombay Magazine* (1810); *Bengal Almanack and Annual Directory,* Calcutta (1815); *Calcutta New Price Current* (1815); *Periodi-*

cal Accounts (Yearly) (1815); *Asiatick Miscellany*, Calcutta (1818); *Calcutta Journal or Political, Commercial and Literary Gazette* (1818); *Dig-darśan* (Monthly) (Bengali) (1818) [First Bengali journal]; *Friend of India* (1818); *Madras Price Current* (1818); *Samācār Darpan* (1818) [First Bengali newspaper]; *Digdarśan* (Monthly) (English) (1819); *Digdarśan* (Monthly) (English-Bengali) (1819); *Digdarśan* (Monthly) (Hindi) (1819); [First Hindi journal]; *Friend of India* (and Statesman) (1820) *Kriśter Rājya Bṛddhi* (Bengali) (1820); *Madras Price Current*, Vepery (1820); *Missionary Intelligence*. Calcutta (1820); but, none of these were research periodicals, neither they could equal *Asiatick Researches* in terms of the high quality of the papers and vast scope.

This statement is being made on the basis of the fact that none of the papers published in *Asiatick Researches* refers to any paper published in the aforesaid journals. I could not find any reference to any journals from the aforesaid list in the papers/books on history of science in India. It is quite possible that some articles or write-ups of value from scientific point of view might have appeared in those periodicals, but the number of such items in them were definitely not so much as to accord them the status of a learned or a research periodical.

Now, let us have a glimpse of the scientific contribution of *Asiatick Researches*. In the life span of the *Asiatick Researches* more than 350 papers appeared covering almost every branch of knowledge known at the time. Of the papers, 219 (62%) were devoted to various branches of science, which clearly indicates that the periodical was predominantly scientific. In the journal, papers on astronomy and related disciplines accounted for the largest number of articles (48), followed by zoology (29), botany (27), archaeology (21), geology (17), anthropology (16), palaeontology (11), and others. It contained also a very large number of monographic papers quite often exceeding 100 pages. The publication of 353 papers in 1072 pages shows that on an average each paper was of 30 pages, which is quite high compared to the present day size of a paper averaging between eight to ten pages.

The journal published articles on almost every branch of science. In other words, the first articles that appeared from India on various branches

of science mostly are to be found on its pages. This being the common query of many, the first paper/s on all scientific subjects published in the journal is/are listed below..

Mathematics

Burrow, Reuben : Demonstration of a theorem concerning the intersections of curves. 1, 330-1,1788.

Astronomy, Geodesy, etc.

Burrow, Reuben: A method of calculating the Moon's parallaxes, in latitude and longitude. 1, 320-6 1788.

Burrow, Reuben: Remarks on the artificial horizons. 1, 327-9, 1788

Burrow, Reuben: Correction of the lunar method of finding the longitude. 1, 433-5, 1788.

Pearse, Thomas D: Astronomical observations in Fort William, and between Madras and Calcutta. 1, 57-121, 1788.

Physics

Burrow, Reuben: Hints relating to friction in mechanics. .1, 171-95. 1788.

Chemistry

Keir, Archibald: On the method of distilling as practised by the natives at Chatra in Ramgur and in the other provinces, perhaps, with but little variation. 1, 309-19, 1788. The article is dated 24.12.1786.

Geology

Warren, John: An account of the petrifaction near the village of Treevikera in the Carnatic. 11, 1-10, 1810.

Pearse, Thomas D: A meteorological journal from 1st March 1785 to 28th February 1786. 1, 441-465,

It is to be noted that Herry Trail maintained a meteorological diary at Calcutta from 1784, which is not considered an article.

Palaeontology

Voysey H H: On some petrified shells, found in the Gawilgerh Range of Hills in April 1823. 18.1, 187-194, 1829.

Archaeology

Sarman, Radhacanta: Inscriptions on the staff of Firuz Shah. Tr. from the Sanskrit. 1, 379-82. 1788.

Wilkins, Charles: Royal grant of land, engraved on a copper plate, bearing date twenty three years before

Christ, and discovered among the ruins of Mongueer, from the original Sanskrit. Remarks by W. Jones. 1, 123- 30, 1142-4, 1788.

Wilkins, Charles: Inscription on a pillar near Buddal. Tr. from Sanskrit. Remarks by W. Jones . 1, 131- 44, 1788

Anthropology

Jones, William: Third anniversary discourse, delivered 2nd February 1786 on the Hindus. 1, 415-31, 1788.

Jones, William. Fourth anniversary discourse delivered 15th February 1787 on the Arabs. 1, 1-7, 1788.

Wilkins, Charles: Seeks and their college. 1, 288-94, 1788.

Botany

Hamilton, Charles : Description of the Mahwa tree. 1, 300-8. 1788.

Zoology

Leslie, Mathew: On the pangolin of Bahar. 1, 376-8, 1788.

Chemical Technology

Macdonald, John: On the gold of Limong on the Island of Sumatra. 1, 336-9, 1788.

Polier, Lt. Col: Process of making attar or essential oil of roses. 1, 332-5, 1788.

Indian Contributions

It has been stated earlier that *Asiatick Researches* was started by the Europeans under the stewardship of Sir William Jones, and in those days research in modern lines was being carried out mostly by the Europeans. Hence, it was but natural that *Asiatick Researches* would reflect mostly the contributions by the Europeans. However, a few contributions by non-Europeans including Indians figured in the publication. In the first volume itself there is a contribution by an Indian, i.e. Inscriptions on the staff of Firuz Shah by Radhakanta Sarman (p.379-82); In the 2nd volumes two more contributions figured, they were by At'har Ali Khan, one on baya, the weaver bird (2, 109-10), and the other on the cure of elephantiasis (2, 149-58). Incidentally, these two papers take the credit of becoming the first scientific papers by Indians, published in a learned journal.

Contributions by Europeans

In the case of Indian authors all have been covered, their number being small. In this case, the number being large, only prominent authors are being covered.

In all, more than one hundred authors are found to have contributed scientific articles in the journal. Predominant amongst them are: William Jones, Reuben Burrow, H T Colebrooks, Brain Houghton Hodgson, P T Cautley, William Roxburgh, William Lambton, William Hunter, Hugh Falconer, James Prinsep, John Warren, Charles Wilkins, J D Hervest, J A Hodgson, H H Voyesy and others. The articles of the noted celebrities like William Carey and George Everest also figured in the pages of the journal.

The largest number of articles has emanated from the prolific pen of Sir William Jones. In a brief period of just six years (1788-1994), Jones has contributed seventeen articles covering such diverse fields as Hindu chronology. Indian zodiac; races like Arabs, Chinese, Persians and Tartars; botany; and even zoology. Reuben Burrow's twelve articles also covered such diverse fields as mathematics, astronomy, geology, physics, building and architecture. P T Cautley's nine articles (four singly and five jointly

with Hugh Falconer) are on palaeontology excepting one which is on geology. Of the nine contributions by Roxburgh, as can be expected eight are on botany, and one on lac insect. Eight articles by Colebrooke, the noted Indologist, appeared in the journal also covers such diverse areas as astronomy, geodesy, archaeology, botany, zoology, and even the incense called the Frankincense. The articles by Lambton, the noted surveyor, also covers the areas like geodetic astronomy, physics and theory of structures. Hunter's contributions total seven, of which four are devoted to astronomy, and three to botany. All the five papers by Prinsep belong to earth sciences. Four of the five papers of Warren belong to astronomy and the remaining one to geology. Similarly four of the five papers of Wilkins belong to archaeology, and the fifth one to the seeks . The remaining authors have contributed less than five papers.

Impact

The impact, the journal made, not only in India but also abroad, by any standard, is great. The journal opened up to the European audience a huge vista of new knowledge encompassing language and literature, art and culture, land and people, religion and mythology, plants and animals, diseases and cures, games and sports, fares and festivals, scientific attainments and technological practices of the largest continent of the globe, which were little known and in many respects quite unknown to them. The writing figured in the journal betrayed faithful recording of keen observation of many enthusiasts who tried to venture into the unknown with the zeal to unfold before the world many interesting and mind boggling facts that the continent of Asia harboured.

The periodical obviously attracted the attention of knowledge-thirsty intellectuals in Europe and its demand went sky-high. It is, therefore, no wonder that by 1798, by which time five volumes of the periodical had published, a pirated edition appeared in England. Several more editions of the periodical appeared later. A French edition of the journal also appeared under the title *Researches Asiatiques....* and two volumes were published in 1805.

Asiatick Researches, no doubt continued till 1839, its predominance virtually came to an end with the appearance of several scientific periodicals like *Transactions of the Medical and Physical Society of Calcutta, Transactions of the Agricultural and Horticultural Society of India* and *Gleanings in Science* in 1820s.

Now, the happenings of the period from 1788 to 1920 will be covered which directly or indirectly influenced the growth and development of scientific periodicals.

Scientific and other related Developments

The rich vegetation of India, perhaps the richest in the globe, attracted the attention of many European officers and others working at that time in India. According to Burkill (p.232), till the end of the nineteenth century, there were as many as 457 persons interested in the botanical explorations, among them 104 persons were surgeons or physicians and 111 were administrative officers. They started scientifically identifying, naming and describing the plants. It can be well-imagined that the absence of a botanical garden was proving to be a big hindrance for botanical studies, as many of the officers studying the plants were not basically botanists. In addition, the then government, i.e. the East India Company, had several other interests like acclimatization of foreign plants on Indian soil, development of a nursery for exporting plants to other parts of the globe, and so on. Robert Kyd, an officer of East India Company, and a noted botanist, took a lead in this direction and prepared the plan for the botanic garden, which was sanctioned by Lord Cornwallis in 1786, and established at Sibpore in 1788. Joseph Bank stated the purpose of the Garden with the following words: The Botanic Garden was established with four fold purposes of conferring economic benefit to the region, increasing their resources in food and raw materials, importing from other parts of the world newer types of plants of economic importance and acclimatizing them here, as well as for extending the interesting sciences of natural history and particularly botany (Santapau, p. 2). At the time of its establishment, the Botanical Garden was perhaps not given any name, as such it became known as East India

Company's Botanical Garden or simply called Company Botanical Garden, or Company Bagh. After the Queen's proclamation in 1858, the name was changed to Royal Botanic Garden. The present name, Indian Botanic Garden came into effect from 26th January, 1950. (Rajagopalan et al, p.238) The establishment of the Garden was undeniably a milestone in the history of botanical study in India.

East India Company came to India with the basic object of trading. Gradually, the idea of empire building got into their mind and they started working in that direction. Hence, understanding of the vagaries of Indian weather assumed paramount importance not only for safe navigation, but possibly for fighting battles as well.

William Petrie, a member of the Madras government, set up in his own interest an observatory with the initiative of Charles Oakeley, the then Governor of Madras. The Company's Observatory was established in 1792, with the object of 'promoting the knowledge of astronomy, geography and navigation in India (Subbarayappa pp.494-5) . I strongly feel that the establishment of the Observatory apart from the aforesaid objectives was also meant for understanding the vagaries of Indian weather which was of paramount importance for fighting battles as by this time the dream of empire building covering entire India had already crystallised in the minds of the authorities of East India Company. On the establishment of the Observatory, the instruments of Petrie's Observatory was shifted to the Company's Observatory. John Goldingham, FRS was appointed the first astronomer of the Observatory. The establishment of the Observatory laid down the solid foundation of meteorological research in India, and gave birth to several periodicals in later centuries.

The survey work which was initiated by the East India Company after the fall of Siraj-ud-Doulla continued unabated. In the closing years of the 18th century, William Lambton (1753-1823), one of the most remarkable figures associated with the Survey of India, proposed a mathematical and a geographical survey across the peninsula from coast to coast which could serve as a foundation for a general survey for the whole country. Accordingly, in 1800 the Trigonometrical Survey was organised at Madras, and

Lambton began his operation in Mysore area. The method he followed for the survey and the results he obtained, all appeared in *Asiatick Researches* in the form of lengthy articles ranging from 25 to 127 pages. By 1815, Lambton was successful in compiling a general map of the southern region of India. In 1815 Mackenzie was appointed as the Surveyor-General of India with the object of controlling the surveys of three Presidencies, however, he had little control over the works of Lambton. In 1818, the Trigonometrical Survey was transformed into the Great Trigonometrical Survey of India, and Lambton's activities came under its overall control. The survey of the Himalayas also commenced with John Anthony Hodgson and William Spencer Webb around mid-1810s. In the western region James Southerland began surveying the Deccan around 1810 (Subbarayappa, pp. 507-11). All these activities generated quite a few periodicals on surveying in the 19th century such as *Report on the Survey Operations ... Lower Provinces* and *General Reports on the Operations of the Survey of India.*

The 10th January of 1800 is a red letter day in the history of Indian printing. It is on this day William Carey, the revolutionary of Indian printing set foot at Serampore along with Marshman and Ward. Within no time he established the Serampore Mission and the printing press, and the first sheet of Testament rolled out of the press on 18th March 1800. Panchanan Karmakar, whom Carey literally smuggled from Charles Wilkins, another father figure of Indian printing, was able to establish Asia's greatest type foundry of the time. So fast was the progress of printing that by 1803, there were 17 printers and 5 book binders in Serampore Press. Through the efforts of Joshua Rowe, a paper mill also came up in Serampore in 1809. A happy combination of all these gave a tremendous fillip to printing in Bengal, and no wonder, by 1831, as many as 212,000 volumes in 40 different languages of the world had rolled out of the Serampore Press (Kesavan, pp. 247-61).

It is to be noted that *Digdarsan* (1818), the first Bengali periodical; and *Digdarsan* (1819), the first Hindi periodical came out from Serampore Mission. A few great scientific works of the time like *Hortus Bengalensis,* Roxburgh's *Flora Indica* also came out of the Serampore Press. These apart, quite a few other periodic publications also issued from the Serampore Press (Kesavan, pp.237-40).

Education

In the field of education also quite a few landmarks are found in these three decades. The Fort William College was established at Calcutta by Wellesley in 1800 to teach Indian languages to Europeans in order to enable them to govern the country more efficiently. Modern textbook writing in Bengali also started at this College under the guidance of William Carey (Kesavan, pp.237-40).

In the first two decades of the nineteenth century planters and missionaries established a number of vernacular schools in various parts of Bengal, Bombay and Madras and also brought out textbooks in Bengali and other Indian languages. The authors of the books among others were Ellerton, Robert May, Pearson, Harley, Capt. Stewart and Serampore missionaries-Carey, Marshman and Ward (Deb Roy, pp.440-1).

The schools established were not only ill-equipped but also devoid of any progressive outlook. Lord Minto in his Minute on the subject of education in India presented in 1811 the pitiable condition of the schools drawing attention to the abandoning of abstract sciences from the curriculum, and neglect of polite literature. He pointed out that the type of encouragement to education which used to be afforded by the native princes, chieftains, zamindars, and the rich individuals to sustain people's interest in education, was totally missing during Company's rule. Lord Minto expressed his great dissatisfaction over the prevailing condition of education with the following words "It is seriously to be lamented that a nation particularly distinguished for its love, and successful cultivation of letter in other parts of the Empire, should have failed to its fostering care to the literature of the Hindoos and to aid in opening to the learned in Europe the repositories of that literature" (Sharp, 1, pp19.)

Following Lord Minto's Minute and through the attempts of the enlightened MPs of British Parliament, the charter was renewed in 1813 to the effect that "a sum of not less than one lac of rupees in each year shall be set apart and applied to the revival and improvement of literature, and the encouragement of the learned natives in India, and for the introduction and promotion of a knowledge of the sciences among the inhabitants

of the British territories in India; and that any schools, public lectures, or other institutions, for the purposes aforesaid, which shall be founded at the Presidencies of Fort William, Fort St. George, or Bombay or in any other Parts of the British territories in India" (Sharp, v.1, pp22). For various reasons the proposal was not implemented for about a decade.

However some of the elites of Calcutta including Raja Rammohun Roy, the Raja of Burdwan; Raja Radha Kanta Deb; David Hare, a great philanthropist; and Sir Hyde East the then Chief Justice of the Supreme Court, did not remain quiet and took the matter seriously.

In May 1816, they collected over a lac of rupees and on 20th January 1817 founded a 'Seminary for the instructions of the sons of Hindus in the European and Asiatic languages and sciences'. The subjects taught included among others arithmetic, astronomy, chemistry and natural philosophy'. The institution comprised a school teaching English, Bengali, grammar and arithmetic, and a college teaching languages, astronomy, mathematics and chemistry, and was called Mahavidyalaya or Mahapathasala. Later on it became the Hindu College wherefrom sprang up the present Presidency College at Calcutta (Subbarayappa, pp.543).

The establishment of the institution was of great significance in the sense that many of its products devoted themselves to the spread of English education and pursuit of science. The latter in many cases led to the growth of scientific literature, which was so much essential for giving birth and sustaining scientific periodicals in the country.

Societies

Starting from 17th century the societies played signal role in the launching and nurturing periodicals. In the beginning, the scope of the societies was general. For example Royal Society of London (1662), Accademia dei Lincei, Rome (1603), etc. were devoted to the promotion of learning in general. The same situation is observed in India as well. The scope of the Asiatick Society, was very broad, and not restricted to any particular subject. The societies that sprang up during the three to four decades following the foundation of the Asiatick Society, were also general in scope.

Some of the societies of our interest are: Literary Society of Bombay (1804), Calcutta School Book Society (1817), and Madras Literary Society (1818). The Literary Society of Bombay became the Bombay Branch of the Royal Asiatic Society of Great Britain and Ireland in 1835. It gave birth to its Journal in 1841. The exacting demand for textbooks generated by the founding of the Fort William College in 1800, and Hindu College in 1817 resulted in the formation of Calcutta School Book Society in 1818. "The aim of the Society was to get the books written, published and supplied free of cost, or at a very cheap rate, on the basis of three criteria (i) the development of primary schools; (ii) the opening of ideal English and Bengali schools; and (iii) brilliant students among the school be prepared for higher education. The Society founded through the joint effort of the Europeans and Indians, published many titles in different subjects including science, and distributed more than a lakh of books in the schools of Calcutta and mofussil in a period of just eight years. The launching of the periodical *Paśvavālī*, the first periodical in Bengali, devoted to a scientific field goes to the credit of the Society (Kesavan, pp.267, 273). The Madras Literary Society was founded in 1818 with the object of establishing and maintaining a complete public library, collecting and recording and occasionally publishing information relating to physical, political and religious history of southern India. In 1829 the Society was mergred with the Madras Auxiliary of the Royal Asiatic Society. In 1833 the Society started the journal called *Journal of Literature and Science* (Neelameghan, pp.13, 14)

Museums

When Asiatick Society was founded by Sir William Jones in 1784, he could not envisage the need for a museum. The curios collected by the enthusiastic members of the Society from various parts of India and outside began to accumulate and in 1796 the idea was mooted for the erection of suitable building to properly house the curios for preservation and reference. Despite sincere attempts the Society could not manage to have its own building till 1808. In 1814 "definite effort was made to give effect to the intention to establish a museum, when, on the 2nd February, 1814 Dr. Nathaniel Wallich, a Danish botanist, who had been taken prisoner at

the siege of Serampore but released in recognition of his scientific attainments wrote a letter to the Society in which he strongly advocated the formation of a museum and offered not only to act as Honorary Curator but also to supply duplicates from his own valuable collection to form a nucleus. The proposal found ready acceptance with the members of the Society, and it was determined to establish a museum to be divided into two sections, one which would now be called archaeological, ethnological and technical, the other geological and zoological. The Librarian of the Society was placed in charge of the former section. While Dr Wallich was appointed superintendent of the latter", thus came into existence the museum of the Asiatick Society (Mookerjee).

Seeing the satisfactory functioning of the Raniganj coal field and realising the vast potential of the development of mineral resources in the country, the then Government decided to found a Museum of Economic Geology at Calcutta in 1835. The Museum came into being in 1840. In the following year, Capt. G B Tremenheere was sent to England to collect specimens to form the nucleus of the Museum. The large and valuable collection he brought was kept at the Society's rooms, and a separate curator was appointed with government grant to organise the collection. Thus took shape the Museum of Economic Geology, which was transferred to Geological Survey of India in 1856 (Mookerjee).

The Society's endeavour which ensued in mid-1830s for the establishment of a national museum bore fruit in 1862. When the present Indian Museum came into being under the Act no. XVII of 1866, the entire collection of the Museum of the Asiatic Society was transferred. (Mookerjee).

The importance of the Museum here is not for its contribution to scientific literature, but for its immense help to the researches on archaeology, geology, zoology, and so on (Mookerjee).

The development in the fields of science, technology, and education that took place and the societies that were formed during the period could not lead to the immediate birth of the learned or scientific periodical. These developments decidedly laid the foundation for the birth of scientific periodicals in the subsequent decades.

The period, however, was not totally barren from the point of view of scientific literature. The data of meteorological observations carried out by the East India Company's Observatory at Madras during 1796 to 1825 was brought out under the title *Tables containing Results of Meteorological Observations, East India Company's Observatory at Madras.* The third and fourth volume of *Meridional Observation,* conducted by the Observatory, was brought out in 1812 and 1825 respectively. There is no indication to suggest that the first two volumes were ever published.

The advent of *Asiatick Researches* in 1788, no doubt, heralded the beginning of learned periodical publication as well as the publications of learned scientific articles in the country. However, the scientific periodicals in the truest sense of the term began to appear from 1820s. The detailed minute by T.B Macaulay dated 2nd February 1835 had a profound influence on the intellectual development in our country, and no doubt, was a historical milestone. In this section the developments from 1820 to 1835 are covered.

(b) 1820-1834

Scientific and other Related Developments

In 1820, Carey convened a meeting in Calcutta for the formation of an agricultural society. Though the meeting was poorly attended, Carey received official support, and the Society was founded in 1820 itself (Burkill -2). The objective of the Society was the development of agricultural and horticultural resources of India. The Society was originally named as Agricultural Society of India (Subbarayappa, pp. 500), and in 1826 it was renamed as Agricultural and Horticultural Society of India (Subbarayappa, pp. 50). In many places the name of the Society appears as Agri-Horticultural Society of India. It has been commented upon by Burkill that despite the word 'agricultural' figuring in the name, the Society did precious little for agriculture.

Thousands of articles that appeared in the organs of the Society, i.e. Transactions and Journals, do not substantiate the view of Burkill. These

publications remained the most important vehicle for the dissemination of agricultural literature, almost throughout the 19th century. The formation of agricultural and horticultural societies all over India on the line of the society can also be construed as its direct impact. Burkill's comment may be correct as to the research work done by the Society. The Society's publication, i.e. *Transactions,* was the first agricultural periodical from India.

As can be expected, medical education had a very modest beginning at the first quarter of the 19th century. The study of indigenous system of medicine formed part of the course at Calcutta, Madras and Sanskrit College at Banaras. In 1822, a 'Native Medical Institute' was established at Calcutta, to run a three-year course on the subject through the medium of Urdu. In 1826, the Sanskrit College at Calcutta also started running medical classes on orthodox lines with native language as the medium of instruction. The institution lasted for about ten years. Elphinston also started a medical institution at Bombay in 1826 itself. This institution also could not last beyond six years. In 1833 Lord William Bentinck appointed a committee to examine the state of medical education in the then Bengal, and suggest measures for its improvement. The Committee recommended the establishment of an institution to teach various branches of medical science as developed in Europe, following as closely as possible the most approved European system. This led to the abolition of the Native Medical Institution and emergence of the first modern medical college at Calcutta in 1835 (Subbarayappa, p.551) The first medical school at Madras was opened in February, 1835 (Rajagopalan, p. 225).

Moreover, the formation of the Agricultural and Horticultural Society of India in 1820 might have enthused some members of the medical profession to think of a society of their own. A society was also needed to launch a periodical which would record varied experiences of doctors, report new developments in the field, and make doctors working in various parts of the vast country aware of the facts. All these factors eventually seem to have led to the formation of the Medical and Physical Society of Calcutta in March 1823. The organ of the Society, i.e. *Transactions* started publication from March 1825.

Around 1830, the native medical practitioners or vaids of Calcutta launched the Native Medical Society (Neelameghan, p.23-4). Nothing is practically known about the activities of the Society.

East India Company supported two scientific activities: surveying, and meteorological observations. It set up the first observatory at Madras (already described), and the second one at Bombay, during 1823-26. However, the observational activity of the Observatory started only in 1841. In the same year, a magnetic observatory was started at Colaba at the suggestion of the Royal Society of London (Rajagopalan, p. 225) The name of the Observatory, as it appears from the title of its publication was initially Meteorological Observatory. Starting from 1842 till date, this Observatory (having undergone change in its name several times), has been continuously bringing out records of its observation in the form of periodic publications.

In Calcutta, the Company did not establish any observatory. However, the meteorological observation began there in 1824 at the Surveyor General's Office.

Two other societies that came up during the period were Bombay Geographical Society (1831), and Society for Translating European Sciences (c.1832). The first one brought out its *Transactions* from 1836, and the second one *Vijñan Sebadhi* from 1832, the first Bengali periodical on science in general.

Periodicals

The Table 1 shows that, in all 13 periodicals appeared in 13-year period. The number of periodicals starting per year was one on average. Of the periodicals 10 were journals, one proceedings, and two data periodicals. No periodical started in six different years. Of the 10 journals three were in Bengali - one on zoology, and two on science in general.

Table 1 - Growth of Indian Scientific Periodicals (according to types) during 1820 - 1834

Year	Journal	Proceedings	Data Periodicals	Total
1822	1		1	2
1825	1			1
1829	2			2
1831	1		1	2
1832	2	1		3
1833	2			2
1834	1			1
Total	10	1	2	13

No periodical started in 1820 -21, 1823-24, 1826-28, and 1830

From Table 2, it appears that of the periodicals, 6 were devoted to science; one each to astronomy, meteorology, and zoology; and two each to medicine and agriculture. To be precise, of the 6 periodicals shown under science, three were partially devoted to science. The periodicals on meteorology and astronomy were data periodicals owned by the East India Company, and the rest except one were owned by societies. Only one periodical, i.e. *Vijñān Sār Saṃgraha* seems to have come out through individual efforts.

Paśvāvalī (1822) holds an important position among Indian scientific as well as regional language periodicals, inasmuch as it was the first periodical from India devoted to a scientific subject. In other words, it was the first purely scientific periodical, meant for students and common man. Each issue was devoted to a particular animal. Apart from the lucid description of the animal, an illustration of the animal was also provided through block printing. Father Lawson compiled and illustrated the first six issues during 1822 to 1827?, when he died. W.H Pearse was responsible for the Bengali rendition. The second series of *Paśvāvalī* was brought out by Ramchander Mitter, a teacher of Hindu College. In all 30 issues were brought out devoted to both domestic and wild animals including cat, sheep, goat, lion, tiger, etc. The impact of the periodical seems to have been great in the sense that it pioneered regional language scientific periodicals in India.

The other two Bengali periodicals, i.e. *Vijñān Sebadhi* (1832) and *Vijñān Sar Saṅgraha* (1833) were popular in nature and devoted to science in general.

Table 2 - Growth of Indian Scientific Periodicals (according to subject) during 1820 - 1834

Year	Sci	Astro.	Met	Zool	Med	Agr	Total
1822			1	1			2
1825					1		1
1829	1					1	2
1831		1				1	2
1832	3						3
1833	2						2
1834					1		1
Total	6	1	1	1	2	2	13

Gleanings in Science (1829) is the first English periodical from India devoted to science in general. It was started by James Dowland Herbert, Deputy Surveyor General on his own effort. In 1830 Herbert had to leave Calcutta, when he handed over the periodical to James Prinsep, who incidentally became the Secretary of the Asiatic Society around the same time and continued the periodical with the title *Journal of the Asiatic Society of Bengal* (1832). From the scientific point of view, possibly this was the most important periodical of the century and carried a very large number of scientific contributions from distinguished scientists of the time. *Journal of Literature and Science* (1833), the organ of the Madras Literary Society, continued till the last decade of the19th century and carried numerous learned articles devoted to various branches of science

Transactions of the Medical and Physical Society of Calcutta (1825), the first medical periodical from India, used to receive contributions from all over the country and served as the most important link among the medical fraternity in India. *India Journal of Medical Science* (1834) was another important medical periodical of the time.

Transactions of the Agricultural and Horticultural Society of India (1829) started by William Carey, the famous printer, was the first agricultural from India. It used to publish articles on all aspects of agriculture, letters, queries, etc.

The two data periodicals of the period were *Meteorological Register kept at the [East India Company's] Observatory* (1822), and *Result of Astronomical Observations made at the Honorable the East India Company's Observatory at Madras* (1831).

(C) 1835-1857

Macaulay's Minutes to Premier Univeristies

Macaulay's Minutes was a document of far reaching consequence, not only from educational, but also from research point of view. Hence, the chapter begins with the Minute by Hon'ble T B Macaulay, dated 2nd February 1835. The portion of the Minutes, relevant to our purpose runs as follows:

"I think it clear that we are not fettered by the Act of Parliament of 1813; that we are not fettered by any pledge expressed or implied; that we are free to employ our funds as we choose; that we ought to employ them in teaching what is best worth knowing; that English is better worth knowing than Sanskrit or Arabic; that the natives are desirous to be taught English; and are not desirous to be taught Sanskrit or Arabic; that neither as the languages of law nor as the languages of religion have the Sanskrit and Arabic any peculiar claim to our encouragement; that it is possible to make the natives of this country thoroughly good English scholars, and that to this end our efforts ought to be directed" (Sharp, pp. 116).

Basing Macaulay's Minute, Lord William Bentinck laid down the educational policy in 1835. The government observed neutrality in religious matters, and decided to establish secondary schools and colleges in India to impart education through the medium of English. The policy also envisaged subsidizing of private educational institutions through the provision of grants-in-aid.

Medical Education

Almost simultaneously with the presentation of Macaulay's Minute came up the Calcutta Medical College in February 1835 following the recommendation of the Committee appointed by Lord William Bentinck in 1833 to examine the status of medical education in the state. With the foundation of the Calcutta Medical College, the Native Medical Institution functioning at Calcutta from 1822 came to a close. Dr M.J Bramley was appointed as the Superintendent of the Calcutta Medical College, with Drs. H H Goodeve, Nathaniel Wallich and W.B O'Shaughnessy as the teaching staff (Subbarayappa, pp.551-2) The courses of study comprised anatomy, physiology, chemistry, the theory and practice of physic, medical botany, materia medica and pharmacy (Deb Roy, pp.445)

One Medical School was also established at Madras in February 1835. In its 15th year the school was upgraded to Madras Medical College, which exists to this day (Rajagopalan, pp. 817).

In March 1844, the first batch of medical students comprising Bhola Nath Bose, Dwaraka Nath Bose, Gopal Chandra Seal and Surji Kumar Chuckerbutty was sent to England for medical training under Dr. Goodeve in the University College of London (Subbarayappa, pp.552)

In 1846 medical schools were established at such places as Hyderabad, Bombay, Travancore and Ajmere. The medical school at Agra was established in 1853. Almost all the schools were short-lived (Neelameghan, pp. 55-6).

Engineering Education

The training in some aspects of engineering started way back in 1794 by Michael Topping, East India Company's astronomer, at Madras. In his school, subjects like algebra, mensuration, building construction, surveying, plan drawings, etc used to be taught in a course of 1-1/2 years. In 1842, an attempt was made to establish an engineering college at Madras Presidency. The attempt bore fruit only in 1855 through the encourage-

ment of A J Abruthnot, the then Director of Public Instruction of Madras Presidency. This institution became the Civil Engineering College in 1859 and got affiliated to the University of Madras in 1877(Subbarayappa, pp.548-49)

Following the conclusion of First Punjab War (1845/46) steps were initiated to implement the construction of the Ganges canal. The big construction work occasioned the emergence of a few large workshops at Roorkee. James Thomason, Lieutenant-Governor of North-Western Provinces, proposed the establishment of an engineering college to supply trained manpower for the upper Ganges Canal Project. Accordingly the college was founded in 1847. Thomason passed away in 1853, and from the next year, the college very befittingly was named after him (Subbarayappa, p.552, Rajagopalan, pp. 817). The college was affiliated to the University of Calcutta in 1864.

On the suggestion of Lord Dalhousie that each of the three presidency towns should have an engineering college, came up the engineering college at Calcutta in 1856 and was associated with the Presidency College. It was affiliated to the University of Calcutta in the very next year, when the latter came into being. It 1880, the college was shifted to its present site at Sibpur (Subbarayappa, pp.548-9).

The engineering institution, which Elphinstone founded in 1821 continued functioning and gradually developed into a college. In 1854, Poona also had an engineering institution to impart training to the subordinate officers of the PWD The institution turned into a college in 1856 and was affiliated to the University of Bombay at a later date (Subbarayappa, pp.548-9).

In 1840, an industrial school, called the School of Ordinance Artificers was opened in Madras (Subbarayappa, pp.548-9). One medical man called Mr Hunter also started two industrial schools at Madras in 1850 and 1851. The first one was meant to create among the natives a taste for the humanizing culture of the Fine Arts and the second one to provide 'opportunity and means of acquiring useful handicrafts'. Both the schools were merged in 1855 under the title School of Industrial Arts and taken over by the government (Subbarayappa, pp.548-9).

Premier Universities

Following the educational policy laid down by Bentinck in 1835, though printing of Oriental works was discouraged and stipends to native institutions were discontinued, new schemes for scholarships for English education came up and a number of English schools and colleges started emerging all over India with a gradual pace as knowledge of English literature and science was to be imparted only to the upper classes. In the two years that followed Bentinck's education policy, a dozen new schools started in Bengal and by 1838, around six thousand students took to the new courses in English. Algebra, geometry, plane trigonometry, and natural philosophy, constituted the science stream in Bengal in 1843. By 1855, statics, dynamics, hydrostatics, optics, astronomy, physical geography, and surveying also formed part of the science syllabus (Deb Roy, p.446; Subbarayappa, pp.546).

The momentous decision that widened the path for the entry of English education in India was pronounced in 1844 by Governor General Lord Hardinge with the following words: 'In every possible case a preference shall be given in the selection of candidates for public employment to those who have been educated in institutions thus established, and specially to those who have distinguished themselves therein by more than ordinary degree merit and attainment (Sharp, pp. 20).

The growth of English schools and colleges in Bengal imparting education to thousands of students obviously prompted the educational enthusiasts to dream of a university in Calcutta. In 1845, the Council of Education submitted a proposal for the establishment of such a university. This proposal fell through not finding any favour from the Court of Directors in England (Sharp, pp. 116).

The next important event in the educational history of India is the famous Educational Despatch of Charles Wood, (popularly known as Woods Despatch) dating 1854 (Subbarayappa, p.547). The Despatch (i) aimed at improvement and extension of education both English and Vernacular, and (ii) "envisaged the creation of a separate department for the adminis-

tration, establishment of universities at the presidency towns on the model of London University, establishment of training institutions for raising up teachers, maintenance of the existing government colleges and schools and also to increase their number...."[15]

As a direct consequence of the Despatch, came up the three premier universities at Calcutta (January 1957), Bombay (July 1857), and Madras (September 1857). Initially they were only affiliating and examining bodies in the Faculties of Science, Civil Engineering, Medicine and Surgery, Law and Arts. However, they played active role in promoting collegiate education in different parts of the country (Deb Roy, pp. 449)

It is to be noted that these universities did not bring out any scientific periodical in the 19th century. However, medical and engineering colleges, affiliated to these universities brought out annual reports and other types of periodic publications. Of course, doctors, engineers and scientists produced by these universities did contribute to the sustenance of the scientific periodicals and in some cases starting of some.

Scientific Organisations, Institutions, Departments, etc

During the period, several observatories, Geological Survey of India, and Chemical Examiner's Laboratory at Madras came into being.

In 1836, the Raja of Travancore founded an Observatory at Trivandrum. John Allan Broun, the astronomer to the Rajah, carried out extensive observations from 1852 onwards. A Branch of this Observatory was established at Agustia Malley (a peak, 6,200 ft high) for conducting hourly observations (Subbarayappa, p.502).

The recordings of the two observatories for the period 1852 to 1869 were published from London under the title *Observations of Magnetic Declination made at Trevandrum and Agustia Malley in the Observatories of Maharaja of Travancore: being Trevandrum Magnetical Observations.*

The union catalogue holdings of the title *Meteorological Observatory, Simla* show two volumes of the publication dating 1841 and 1845. From this it can be inferred that the aforesaid observatory was established around 1841.

The Government Observatory at Bombay which was established by the East India Company in 1820s started systematic observation from 1842. George Buist, Orlebar, Montriou, Fergusson, Morland, Chambers were the eminent meteorologists associated with the observatory (Subbarayappa, p.502). The recordings of the observatory started appearing as *Meteorological Observations* from 1842.

In 1835, the East India Company became interested in the supply of coal for the steamers engaged in navigation. In 1830 itself the Governor-General Auckland constituted a committee for investigating coal and other mineral resources of India, with John M'Clelland of the Medical Services as its Secretary. The Committee urged the Government to take immediate steps for conducting geological survey of coal formation in India. The coalfields of eastern India being highly promising, DH Williams of the British Geological Survey (1835), was brought to India at the initiative of McClelland. The exploration of the coalfields of Raniganj, Jharia, Taldange, Dhanbad and Karanpura was his primary concern. He proceeded in a very planned way, but jungle fever cut his life short in 1848. Still, in a period of just two years he could lay the solid foundation of the geological survey in India. With the posting of Thomas Oldham in 1851 as the Superintendent of Geological Survey, the Geological Survey of India (GSI) came into being (Subbarayappa, pp.523-4). GSI gave birth to a number of periodical publications, of which *Memoirs* was the first one.

Sometime during this period Chemical Examiner's Laboratory was founded at Madras. Practically nothing could be found to fix the exact date of foundation. What can be said with some certainty is that the Laboratory was founded by the East India Company around 1853 to investigate various cases of poisoning (Rajagopalan, p. 474)

The activity on forestry commenced in 1837 with the appointment of Dr. Gibson as the Superintendent of Forests of the Bombay Presidency, was followed by Madras, where the activity started in 1848 (Balfow, 1886). Thereafter, gradually it spread to other provinces.

During this period several important departments were established by the government. They are: Forest Department, Bombay; Public Works

Department, Madras; Salt and Continental Customs Department, Bombay ; Salt Department, Bengal; Office to look after government charitable dispensaries, Bombay; Office to look after government botanical and horticultural gardens at Ootacamund ; Public Works Department, India ; Electric Telegraph Department in India ; Vaccination Department, Bombay ; Office to look after Insane Asylums in Bengal ; Geological Survey of India ; Vaccination Department, Madras. It can be observed here that the departments were being established mainly in the three Presidencies - Bombay, Bengal and Madras. As activities demanded, branches of various departments also started sprouting. For example, Public Works Department, Madras established Roads Branch to take care of road construction, Railways Branch to take care of railroad construction, etc. As these departments started their activities, periodicals emerged to reflect their activities mostly in the form of reports.

Museums

As noted earlier, the Asiatic Society started getting government grant for the Museum from around 1840. With this grant, the Society preserved government's collection of minerals, fossils, and the like under the name of the Museum of Economic Geology. In May 1841, Capt. G D Tremenheere was sent by the government to procure more such collections, which he did. For maintaining the geological collection Piddington was appointed Curator. The Curators Piddington and Blyth gradually built up the collection, classified the exhibits and made them usable as reference material. In 1856, the collection belonging to the Government were shifted and displayed in Geological Survey of India.

Societies

More than half a dozen societies belonging to agriculture and horticulture, medicine, science, photography and archaeology sprang up during the period. Chronologically the societies can be listed as follows:

Following the example of Agricultural and Horticultural Society of India founded by William Carey, Agricultural and Horticultural Society of Madras came up in 1836, and Agricultural and Horticultural Society of Western India most probably around 1838 (Neelameghan, pp.15-16).

Agricultural and Horticultural Society of Madras started publishing its *Proceedings* from 1839. The date of foundation of the Agricultural and Horticultural Society of Western India could not be very correctly ascertained. Issue no. 3 of the Transactions of the Society dates 1839. There are indications (*Journal of the Agricultural and Horticultural Society of India* 1843) that the Transactions of the Society was a quarterly. Taking this as a clue, one can assume that the society came into being either in 1838 or 1839. *Transactions of the Agricultural and Horticultural Society of India* (1839) acknowledges the receipt of an issue of the *Proceedings of the Agricultural and Horticultural Society of Bombay.* No other indication as to the existence of this Society could be found till 1852, when its *Transactions* appeared just for a year (*Journal of the Agricultural and Horticultural Society of India* 1858/59). The non-availability of any other information about the Agricultural and Horticultural Society of Bombay casts doubt as to whether this society was a separate society other than the Agricultural and Horticultural Society of Western India, or both of them were the same society, the word 'Bombay' being used either popularly or inadvertently.

Starting from the foundation of the Asiatick Society in 1784 till 1820, the aforesaid Society was the only learned society in India. In 1823, a new Asiatic Society called the Asiatic Society of Great Britain and Ireland (Royal Asiatic Society of Great Britain and Ireland)came into being. The Literary Society of Bombay founded in 1804 took the shape of Bombay Branch of the Royal Asiatic Society of Great Britain in Ireland in 1835 (Fermor, p.17). The Society started publishing its *Journal* from 1841.

The other societies that started during the period are Archaeological Society of Delhi (c 1849), Hyderabad Medical and Physical Society (c 1853) Students Literary and Scientific Society, Bombay (c 1854), Photographic Society of Bombay (c 1855), and Photographic Society of Bengal (c 1856).

Others

Madras Irrigation and Canal Company was also established to usher in irrigational activities. Botanical and horticultural gardens also sprang up at Ootacamund.

Events

The important events of the period can be summed up as follows. Medical education took deep root at Calcutta and Madras and spread to such places as Bombay, Trevandrum, Hyderabad and Ajmer. Engineering colleges were also put on solid footing at Roorkee and Sibpore, and industrial schools at Madras. Three premier universities were set up at Calcutta, Bombay and Madras. The government observatory founded at Colaba in 1820s started functioning, and two more were added at Simla and Trevandum. The foundation of geological survey was laid to unearth and exploit the hidden resources lying underground. The first chemical examiner's laboratory saw the light of the day at Madras. Also appeared on the scene many government departments/offices to take care of natural resources like forestry; public works to construct roadways, railways, buildings and so on; physical and mental health; electric telegraph to smoothen communication. It may be noted here that the first telegraph link between Calcutta and Diamond Harbour was established in 1851. The first train steamed off from Bombay on 16th April 1853 to reach Thana covering a distance of 34 km.

Agricultural and horticultural societies, medical and physical societies which emerged in Calcutta in 1820s started spreading to other places like Madras and Bombay and new societies devoted to photography and archaeology were also established

Another important event that needs to be recorded here is the promulgation of the Patent Act of India in 1856 (Ray BG)

Activities of all these organizations and institutions started generating a lot of information. The dissemination of this information needed some vehicles, hence arose different types of periodic publications which we can see from Table 3.

Periodicals

Table 3 depicts the distribution of periodicals according to types that started during 1835 to 1857. During the period 68 periodicals emerged. Of these, journals and reports accounted for 25 each, proceedings and data periodicals 8 each, and two were other types of periodicals.

Journals

The period witnessed the birth of 25 journals belonging to science (4), natural history (1), geology (1), geography (1), archaeology (1), ornithology (1), medicine (9), agriculture (5), and photography (2).

The science journals that started during the period are: *India Review and Journal of Foreign Science and the Arts.* (1837), *Journal of the Bombay Branch of the Royal Asiatic Society of Great Britain and Ireland* (1841), *Indian Journal of Arts, Sciences and Manufactures* (1851), *Indian Scientific and Literary Quarterly* (1851). It can be noted that all the journals were partially devoted to science.

Our country did not witness many journals on natural history. The first of them was *Calcutta Journal of Natural History* (1840). It continued for 8 years and made useful contribution to the subject. John M'Clelland was the editor of the journal, W. Ridsdale, the printer.

Memoirs of the Geological Survey of India (1856) is the most important journal on geological exploration from India. The journal started with the founding of the Geological Survey of India published comprehensive accounts of geological surveys along with maps and illustrations sometimes running up to 200 pages or more. The journal continues to this day.

Geography is another field which did not see many learned journals from India. It is, however, heartening to note that one of the earliest journals from our country was devoted to this subject i.e. *Transactions of the Bombay Geographical Society* (1836). It used to carry articles usually by the officers of the defence services covering all aspects of geography.

Journal, Archaeological Society of Delhi (1849), is the first journal on the subject from India. Most probably it was issued for about two years.

Pakṣīr Vivaran = Ornithology. (1844?), published in Bengali has the distinction of being the first journal on ornithology from India. It did not survive beyond one issue.

The period saw the emergence of as many as 9 medical journals. They are: *Quarterly Journal of the Calcutta Medical and Physical Society* (1837); *Transactions of the Medical and Physical Society of Bombay* (1838); *Madras Quarterly Medical Journal* (1839); *Āyurved Darpanaḥ* (1840); *Quarterly Medical and Surgical Journal of the Northwestern Provinces* (1844); *India Register of Medical Science.* (1848); *Madras Journal of Medical Science* (1851); *Indian Annals of Medical Science* (1853); and *Hyderabad Medical Journal* (1854). *Āyurved Darpanaḥ* was in Bengali and probably the first journal on Ayurveda.. *Hyderabad Medical Journal* on the other hand was in Urdu, and possibly has the distinction of being the first medical journal in Urdu.

The share of agriculture comes next to medicine. In all, the following five journals appeared: *Transactions, Agricultural and Horticultural Society of Western India.* (1839); *Monthly Journal of the Agricultural and Horticultural Society of India* (1842); *Planter's Journal.* (1842?); *Transactions, Agri-Horticultural Society of Bombay* (1852); and *Bhārat Varṣīya Kṛṣi-Viṣayak Vividha Saṃgraha. = Indian Agricultural Miscellany* (1854). The last one was in Bengali.

Quite a few journals on photography appeared in the 19th century. The first two of them appeared in 1850s: *Journal, Photographic Society of Bombay* (1855), *Journal, Photographic Society of Bengal* (1856).

Reports

The first reports that are encountered in this study are of the Calcutta Medical College (1836) and the Hon'ble Company's Botanic Garden (1836). Other reports belong to Grant Medical College (1845); Forest Department, Bombay (1849); Public Works Department, Madras (1850, 1851, 1852, 1853); Madras Medical College (1852): Salt and Continental Customs Department, Bombay (1852); Salt Department, Bengal (1852); Madras

Irrigation and Canal Company (1852[2]); Government Charitable Dispensaries, Bombay (1853); Government Botanical and Horticultural Gardens at Ootacamund (1854); Public Works Department, India (1854); Electric Telegraph Department in India (1855); Vaccination Department, Bombay (1855); Insane Asylums in Bengal (1856); Geological Survey of India (1856); Vaccination Department, Madras(1856). Besides these Reports on Meteorological Observations at Colaba (1841), Report on Survey Operations ...Lower Provinces ((1851); Report of the Executive Engineers in the Southern, Central and Northern Provinces (1856).

Proceedings

Table 3 shows the birth of eight proceedings during 1835 to 1857.As can be expected, all the proceedings belong to societies like Agricultural and Horticultural Society of India (1837), Agricultural and Horticultural Society of Western India (1838[2]), Agricultural and Horticultural Society of Madras (1839)[three proceedings]; and Agricultural and Horticultural Society of Punjab (1851[3]).The remaining two proceedings belonged to Hyderabad Medical and Physical Society (1853), and Students Literary and Science Society (1854).

Data Periodicals

The data periodicals also number eight and were brought out by the East India Company. Three of them were devoted to meteorological (1840, 1841), and five to magnetic observations (1841, 1846 and 1852).

Table 3: Growth of Indian Scientific Periodicals (according to types) during 1835 - 1857

Year	Journal	Report	Data	Proc.	Others	Total
1836	1	2				3
1837	2			1		3
1838	1			1	1	3
1839	2			3		5
1840	2		1			3
1841	1	1	4			6
1842	2		1			3
1844	2					2
1845		1				1
1846			1			1
1848	1					1
1849	1	1				2
1850		1				1
1851	3	3		1		7
1852	1	5	1		1	8
1853	1	3		1		5
1854	2	2		1		5
1855	1	2				3
1856	2	4				6
Total	25	25	8	8	2	68

No periodical started in1835, 1843, 1847 and 1857.

An idea about the subject-wise distribution of the periodicals can be had from Table 4. As far as the number of periodicals is concerned medicine tops the list with 18, followed by agriculture (12), engineering (11), geomagnetism (5), meteorology (4), geology and botany (2 each), survey,

archaeology, zoology i.e. ornithology and geography (1 each). Of the periodicals placed in "Others" category, , two belong to photography, two to salt, and one belongs to natural history.

Table 4- Growth of Indian Scientific Periodicals (according to subject) during 1835 - 1857

Year	Sci	Surv	Geom	Geol	Met	Arch	Bot	Zool	Med	Engg	Agr	Geog	Oth.	Total
1836							1		1			1		3
1837	1								1		1			3
1838									2		1			3
1839									1		4			5
1840					1				1				1	3
1841	1		3		2									6
1842					1						2			3
1844								1	1					2
1845									1					1
1846			1											1
1848									1					1
1849						1					1			2
1850										1				1
1851	2	1							1	2	1			7
1852			1						1	3	1		2	8
1853									3	2				5
1854	1						1		1	1	1			5
1855														
1856				2					2	1			1	6
Total	5	1	5	2	4	1	2	1	18	11	12	1	5	68