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S R Ranganathan: Making of the Man and His Method

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This study aims to explicate the mind and intellectual personality of Ranganathan through various genetic and environmental influences, both professional and social. Ranganathan's father Ramamrita Aiyer was an erudite and religiously respected man in his village. Ranganathan grew up in a centuries old deeply practising Brahmin family and he himself lived the very orthodox life of a Tamil Brahmin. During his college days he came under the influence of his Mathematics teacher Edward Ross, a Scottish missionary who taught him the connectedness of everything from flowers to stars in the cosmos. Ranganathan regarded professor Ross his intellectual father. It was reinforced by the principle of *Ekavakyata* introduced to him by his friend, Professor S. Kuppuswami Sastri, a professor of philosophy at the Madras Christian College. Professional influence was mostly from W.C.B. Sayers. Ranganathan learned the grammar of classification from Sayers and from his books and far excelled him in this field. Ranganathan copied his teaching method. Study visits to more than 120 libraries in the United Kingdom helped him to generalise and formulate his famous Five Laws of Library Science. Science, especially mathematics, made his mind analytical. Ultimately two methods reveal the secrets of his creativity. These are uncanny capacity for abstraction and use of inductive methods and keen observations. His tremendously huge work is explained by his practice of work-chastity and large capacity to take pains. His religious orthodoxy and superstitions had no effect on his intellectual work. His view of intuition, which he believed aided his creativity and productivity, is not in tune with current cognitive theories.

Keywords: Abstraction process, creativity, generalisation process, inductive logic; Ranganathan, S.R.--Personality; Ranganathan, S.R--Hindu Scriptures--Influence; research methodology.

"Le style c'est l'homme même" – George Buffon (1707-1788)

Preface

It is trite to say that Ranganathan was a *rara avis* in the library firmament and a multidimensional individual with seemingly contradictory traits in his personality: Ranganathan as religiously and culturally an orthodox Hindu, and Ranganathan as a rigorous scientist; Ranganathan as a barefoot crusader for the cause of libraries, Ranganathan as a firm believer in destiny. As a devout Hindu and a Tamil Brahmin, he procedurally practised all rituals and believed in traditional taboos and superstitions including astrology, numerology, auspicious days and moments, and even necromancy. For him supernatural forces did exist and influence the course of human life–a belief that strongly shaped his outlook on life and living. Though a workaholic, and a man of scientific method, he believed nothing could be achieved beyond the will of God. He sincerely practised the advice given in the Bhagavad Gita: "Our right is to action only, not to its fruits"[1]. At the same time, he practised work chastity–that is to say, complete and selfless devotion to assigned work and duty. And yet, as a scientist he was mostly an empiricist. He arrived at most of his influential theories through a process of inductive logic, yet he believed intuition played a clinching role in formulating his innovative theories on all sorts of topics relating to Library and Information Science. *The Five Laws of Library Science* (1931) is the shining outcome of inductive reasoning, intuition, and then deductive logic at work.

Hindu scriptures, especially the *Ramayana*, influenced him strongly as a person and his practice as a librarian. He professionally advised his fellow librarians to imbibe the ideals of the lord Rama in their daily life and professional work. There are many apt analogies in his body of writings from the *Ramayana*, the scripture which he recited every morning as a daily religious ritual[2].

The question is, can we separate Ranganathan's deep religious faith and scientifically inadmissible beliefs from his professional work and objective research methods? In other words, *what made Ranganathan Ranganathan?* Clues can be inferred from a study of formative influences on S.R. Ranganathan and his method, and the sources of his ideas. Answers may lie in identifying the various kinds of influences, whether cultural or scientific, that informed his thought and the figures, mortal and immortal, that served him as role models. He had his own beliefs and even theories regarding the creative process. We can try to know his mind and method through the following:

- His cultural and childhood influences including those of family, caste, and elementary school teachers, and later of some spiritual gurus;
- Influence of people like Edward B. Ross, S. Kuppuswami Sastriar, and W.C.B. Sayers;
- His formal study at the School of Librarianship, University College London, during 1924-1925 and his subsequent visits to more than 120 libraries in the United Kingdom advised and facilitated by W.C.B.Sayers;
- His work experience at the Madras University Library, his professional tours to Europe and America between 1948 to 1964, and work with international bodies such as the International Organization for Standardization (ISO), UNESCO and the International Federation for Information and Documentation (FID).

We will depend upon three primary sources[3-5] to explicate his mind and two of his books[6-7] to trace the sources of his ideas.

The Mind of Ranganathan

Knowledge is a human construct, and knowledge grows from knowledge in the human minds– and from nothing else. Thus the birth of an idea is an outcome of the integrative and cumulative influences of certain persons, work experiences, environmental exposures, reflection, creative thinking, a particular body of existing knowledge at a particular time, and many other unknown factors of creation. S.R. Ranganathan was strongly influenced directly or indirectly by his childhood environment and people. Apart from childhood influences, he came under the professional influence of the works and personae of such individuals as Ernest Cushing Richardson, Henry Evelyn Bliss, Melvil Dewey, and W.C. Berwick Sayers. The influence of classification systems such as the Universal Decimal Classification (UDC), the Dewey Decimal Classification (DDC) the Library of Congress Classification, Cutter's Expansive Classification, and others can be easily perceived, says Bernard I. Palmer[8].

Childhood and Religious Influences

Born and raised in an orthodox Tamil Brahmin family, S.R. Ranganathan Iyer, remained staunchly religious and traditionalist right from childhood to the end of his life.Ranganathan himself divulged to Nasser Sharify "…My father was a religious man. He greatly influenced my thinking early in childhood. I grew up with religion and remained religious[all my life] …"[9]. This orthodox mode of life, which he owed to his family, totally influenced his thinking, beliefs, and outlook to life. His living remained chaste, unaffected by his constant exposure to the West and the fast spreading Western mode of living among the educated elite in India. His father Ramamritha Iyer (d. 1898) was cultured, erudite, and respected as the wise man of the village who used to recite the *Ramayana* to small audiences: this proved so influential on his impressionable son that Ranganathan always kept this sacred book with him[10]. In childhood, he used to imitate his father in reciting extracts from the *Ramayana* to his playmates. Lord Rama, the hero of the epic, was the model incarnation of all the virtues, which Ranganathan always strived to acquire and wanted other librarians to pick up. Rama's bravery, promptness, intelligence, devotion to duty, and, above all, tolerance were held in high esteem and deep reverence by Ranganathan. He never swerved from his religious chores even on foreign visits. According to J.S. Sharma, (1924-1993), librarian of the Punjab University, Chandigarh, when Ranganathan was visiting New York in 1951, "[o]n each Sunday he used to perform a *paath* [recitation] of Ramayana, and some prominent librarians of New York and both Shri S. Parthasarathy [1917-2021] and myself used to attend his religious discourses."[11] He was an inspired raconteur of the *Ramayana*. It gave him spiritual strength and concentration of mind. Ranganathan's son Yogeshwar (1932-2016) stated that "Ramayana had been a kind of guidebook for him throughout his life. All his published work and his interaction with people reflects this"[10]. His old mathematician colleague G.A. Srinivasan observed: "During his school days Ranga came under the influence of two of his teachers, who had a great part in shaping his mind, R. Anantharama Ayyar his primary class teacher and

Thiru Venkata Chariar, Sanskrit teacher. The former used to tell Ranga about Saivite Shrines and the life and teachings of Tamil Nayanmars [God-obsessed monomaniacs] chief among whom were Sambandar, Appar, Sundarar and Manickavachakar[12]! He found his friend Ranga so well informed about the history and tradition of all the temple-towns of his native district Tanjavur that he wished all his life to go on a pilgrimage to all these temples with Ranganathan as his guide. All such influence made Ranganathan believe in mystic and supernatural powers.

Ranganathan was always deeply influenced by persons of achievements. Hereverentially recalls the moment of his first meeting with the great American philosopher and educationalist John Dewey (1859-1952)[13]: "The very moment of my entering his room an unusual thrill came over me–a thrill usually experienced on entering into the sanctum sanctorum of Lord Venkatachlapathi in Tripuathi temple.[14] His face irradiated all love. The gleams from his eyes were charming. I felt transformed... [mesmerized]". The influence of Hindu philosophy and contemporary Hindu saints and spiritual leaders is perceptible in his outlook on life. His high school teacher P.A. Subrmanaya Iyer motivationally talked to him about Maharishi Aurobindo.[15] S. Ramanujan (1887-1920), a mathematician renowned for his innate genius, seems to have provided the unconscious inspiration for Ranganathan's aspiration to greatness. Motivated by modern political leaders and freedom fighters such as Pandit Madan Mohan Malviya (1861-1946)[16] and Mahatma Gandhi (1869-1948), he carved out his ultimate lifelong work of nation building through promoting the development of libraries, developing library services, and facilitating the free flow of information. The ethical ideals of Mahatma Gandhi seem to have possessed him. Ranganathan[17] was always moved by his dedication, wisdom, and above all simplicity and straightforwardness. He did not personally meet Gandhi, though he did hold a little bit of correspondence with him. He found the following life-long tenets of behaviour and conduct of life from Gandhi's life and teachings:

1. Control anger
2. Flirt not with fruit
3. Covet not
4. Do not fall prey to self-delusion,
5. Practice work chastity.

It may be noted that all these messages come ultimately from the *Baghavad Gita*, one of the sacred scriptures of the Hindus, in which Mahatma Gandhi had deep faith. Ranganathan wished that all of these virtues could be acquired by documentalists.

Role of Indian Mystic Tradition

In his autobiography,[18] Ranganathan mentions the mystic experiences of seers like Parmahansa Rama Krishna (1836-1886), a Hindu mystic and religious leader, and the most famous self-enlightened guru and saint Ramana Maharishi (1879-1950). He views his professional discoveries as spiritual experiences rooted in mysticism and intuition. As he puts it[19],

"[Mysticism] falls within a large debatable territory between sciences and philosophy, between theory and practice, which has been very little explored and is still *terra incognita* to all intents and purposes. Its difficulties are immense; from that wide and wild No Man's Land between Sciences and Humanities [...] Time may come when mysticism and spiritual experience may be the very keystone of the arch, and serve to complete the full growing circle of organised human knowledge. It will then synthesise all sciences and humanities and become the basis of a truer spiritual outlook than we can possibly have in the ignorance and confusion of our present state of knowledge".

Ranganathan had studied the *Vedas, Upa-Vedas, Puranas*, and other classics of Hindu literature. All this made a deep impression on him. He drew inspiration for his seminal discoveries from the rich intellectual traditions of India. In the UNESCO- and IFLA (International Federation of Library Associations)-sponsored international summer school held from 2 to 27 September 1948 in England, he traced the roots of philosophy of librarianship back to the Vedas and considered his *Five Laws* (1931) as simple corollaries of this principle[20].

Ekavakyata: S. Kuppuswami Sastri (1880-1943)

His creativity was fuelled by a blend of mathematical methods, intuition, and mysticism. An outstanding Oriental scholar and a friend of Ranganathan at Madras University, S. Kuppuswami Sastri (1880-1943) informed him of *Ekavakyata*, a fundamental Vedic principle. *Ekavakyata* is the principle of integrative interpretation and interconnectedness of all the phenomena under the sun[21,22]. By this principle, Ranganathan became aware of the unity of all the sciences and the interconnections between all entities in this universe with the ultimate purpose of the continuance of the universe.

The basic premise of *Ekavakyata* is the unity of all knowledge. The systems approach is a weaker form of this principle; mysticism and intuition are its main instruments. Its core tenets are that all entities in this universe are interconnected with one another and that, therefore, one should not view individual entities in isolation. An *Ekavakytic* mind, such as that of Ranganathan, hungers after understanding and assimilation of the newly unleashed forces, and defies hollow academic conventions and practices. This approach is reflected in his series of masterpieces. Underlying the vast and varied works of Ranganathan is a seminal unity that brings together many seemingly disparate elements. Unity is its method and strength. Ranganathan's enactment of *Ekavakyata* in his thought is a thread which binds his work into a unified whole.

Ranganathan built the whole edifice of his subject on Normative Principles, the Five Laws of Library Science. The sparkling brilliance of these seemingly simple laws is acclaimed the world over. They are both the pattern makers and pattern setters in every branch of library science and service. They are the fountainhead from which he coaxed theories and principles for every branch of his discipline, be it classification, cataloguing, documentation, collection building, library administration, reference service, or library movement. All his ensuing books and papers, as he repeatedly states, are interpretations of the Five Laws from one viewpoint or the other: they constitute extended chapters of the Five Laws, so to speak. According to Ranganathan's brilliant student M. A. Gopinath,[23] "[t]hroughout his life, Ranganathan endeavoured to mark out a path for library science. His objective was to find a theoretical base for the subject, which has intense practical implications. Such a base, he felt, would give scope for predictability and help the organized development of the profession. His contributions to library science stem from his inquiring mind, which was set in search of a structured pattern or paradigm for library science."

Ekavakyata not only fired and excited Ranganathan's imagination but was a source of inspiration that changed his very spiritual and professional outlook. He started thinking and talking, teaching and preaching in that mode. It boosted his creative surge and brought excellence to his work, which was indigenous in origin yet truly universal in tenor.

Professional Influences

Eard Burns Ross (1881-1947)

From 1913 to 1916, Ranganathan earned a B.A. and then an M.A. in mathematics from the Madras Christian College. There he came under the tutelage of Edward Burns Ross (1881-1947) who was a Scottish mathematician, educator, and missionary. Ross had studied with the great mathematician G. H. Hardy(1877-1947) in Cambridge and so served as a link between Hardy and mathematicians from Madras, especially Srinivasa Ramanjuan (1887-1920). During the course of his college studies, Ranganathan came to know of S. Ramanujan and his legendary prowess in mathematics. This knowledge of Ramanujan's mathematical exploits inspired him subconsciously[24]. Ross became his mentor and guide who also helped him financially: on the first day of every month, Ranganathan would find a gold sovereign under his pillow for his monthly expenses[25]. Insofar as Ranganathan was a favourite student of Ross, they had an excellent *Guru-Shishya* relationship. Their interaction was not confined to the classroom but spilled over into informal discussions in the school-college corridor and staircase. Ranganathan ingrained this trait into his own discipline later in his teaching. Ross remained his favourite Guru throughout his life.

Ranganathan considered Ross to be his intellectual father, the one who trained his thinking process to perceive the intrinsic interconnections of entities with one another and to see nothing in isolation. Ross trained Ranganathan in the art of thinking and made him adept in perceiving those ambient but hard-to-notice things that an ordinary mind tends to overlook. He reminded Ranganathan of the *Ekavakyatic* truth that "thou cannot stir a flower without troubling of a star". In our cosmic world, stars and flowers, fire and rain, Nature and God, to take a few examples at random, are all linked together in a Great Chain of Being. Ranganathan was fond of quoting these lines from the poem *Mistress of Vision* (1887) of the Victorian mystic poet Francis Thompson (1859-1907):

All things by immortal power,
Near or far,
To each other linked are,
That thou canst not stir a flower,
Without troubling of a star[26].

It means that there is a phenomenal world imperceptible to our senses which only yogis and mystics can perceive–Ranganathan was one such being.

Ross remained his favourite and highly revered Guru throughout his life. In gratitude Ranganathan dedicated his very first and most famous book *The Five Laws of Library Science* (1931) to him[27]:

To Professor E. B. Ross, to whom the author owes so much more, for a casual remark of his which convinced the author of the need for a book of this sort which seeks to reduce and relate all the principles and practice of library work to a few fundamental laws.

In 1925, Ranganathan endowed a mathematical fellowship at Madras Christian College in honour of Ross[28].

W. C. Berwick Sayers (1881-1960)

After diverting his career path from mathematics to librarianship, Ranganathan travelled to England, where, in 1924-1925, he learned his early lessons in classification from W.C. Berwick Sawyers at University College, London. Ranganathan was impressed by the dynamic personality of his teacher, who would soon become his mentor and life-long friend, and inspired by his knowledge of classification and his way of teaching. Ranganathan himself writes[29]:"He was a born teacher. He was eloquent, enthusiastic and his teaching of classification left us (students) inspiring... His first three lessons were sufficient to make me embrace the subject.... I cannot still escape from his grip."

He held many discussions with Sayers both in the classroom and outside; and expressed his dissatisfaction over the then existing classification systems which were unable to give coextensive class numbers (his favourite concept and primary goal in classification) to the majority of compound and complex subjects. In addition to the formal classroom tuition that Ranganathan received from Sayers, he also benefited from informal discussions with his teacher. They often took long walks during which their conversation centred on classification[30].

One day while visiting the Selfridge's department store in Oxford Street in London, Ranganathan came upon a demonstration of the Meccano Set, a kind of toy construction kit[31]. Immediately a train of ideas struck his synthetic mind. Philosophically, he knew that knowledge is composed of interconnected granular concepts. He thought that, just as the Meccano Set allows for the combination and recombination of different elements to form new wholes, so new subjects could be formed by disentangling, combining, and recombining these granules of knowledge. The idea of assembling interchangeable components in industrial production too had become popular in the early twentieth century. Such ideas about knowledge and assembly methods can be seen at work in Ranganathan's conceptualization of faceted classification.

Ranganathan proposed his new idea of a new facet-structured classification to Sayers, who assured him that the idea was worth exploring but warned him about the problem that might occur in listing classes in higher-order arrays. Ranganathan acknowledged his debt to Sayers in his *Prolegomena to Library Classification* (1937) in the following words:

Mr. Sayers, whose lectures on classification were a source of inspiration to the author [i.e., Ranganathan], encouraged construction of a new [classification] scheme[32].

The importance of Sayers identifying and relating the principles of library classification with logic and more specifically with the language and ideas of Aristotelian logic, and his passionate and influential teaching cannot be overestimated. By clearly identifying library classification with logic, Sayers was able to structure the methodology of library classification in terms of canons and axioms. The emphasis is important especially because of its influence on the thinking of Sayers's most famous student, S.R. Ranganathan.[33] Ranganathan was also influenced greatly by the published works of Sayers, who had achieved a great reputation at the international level through his books on classification, such as *Introduction to Library Classification* (1918)[34], and *Manual of Library Classification* (1926)[35], as well as a small book, *Canons of Classification* (1915)[36], which named and described fourteen canons, or regulative principles, of library classification. According to Sayers, "my brief discussion of the canons was not intended as a theoretical treatise, but as a guide to the students of classification who were trying to comprehend the structure of the leading schemes of the day"[37]. However, his canons did influence Ranganathan, who categorically mentioned that Sayers was the first person in the field of librarianship to formulate principles or canons to build a theory. Ranganathan always revered him as the first grammarian of library classification[38].

In 1937, Ranganathan published his *Prolegomena to Library Classification*, which encompassed, *inter multa alia*, twenty-eight canons of library classification. Twelve of his canons paralleled Sayers' canons closely. The influence of Sayers was duly recognized by Ranganathan with the formal acknowledgement in the first edition of his *Colon Classification* (1933), where he wrote[39]:

To W. C. B. Sayers, FLA, of Croydon, whose inspiring lectures on classification are still ringing in

Author's [i.e., Ranganathan's] ears, for his words of encouragement which the Author [i.e., Ranganathan] received in 1924 while discussing with him the layout of the scheme.

This dedication, as well as the deep relationship between the canons of classification articulated by Sayers and Ranganathan, clearly indicates that Sayers' personality and theories left an indelible mark on the thought of his Indian student.

Henry E. Bliss

In his early career, Ranganathan became acquainted with the ideas of two notable American librarians and classificationists, Charles A. Cutter (1837-1903) and Ernest Cushing Richardson (1860-1939), though neither exercised much influence on his thought. Much more consequential for him was his engagement with the ideas of the American classification theorist Henry Evelyn Bliss (1870-1955). Bliss had no formative influence on the genesis of the Colon Classification (CC), but his writings certainly had an impact on Ranganathan's *Prolegomena*. These works were *The Organization of Knowledge and the System of Sciences* (1929)[40] and *TheOrganization of Knowledge and the Subject Approach to Books* (1933, 1939)[41]. Various principles enshrined in these two books constitute Bliss' theory of classification. Bliss, in turn, was influenced by Richardson's *Classification: Theoretical and Practical* (1901),[42] which he characterised as a "little book"[43]. Ranganathan claims to have read Bliss's two books in the course of a single night in 1936, when he took them up for bedtime reading. The reading proved to be both bracing and generative, for, as Ranganathan later recalled, "I was pressed through the pages in so intimate and critical way that.... my own book emerged clear cut."[44] For his part, Sayers prefaced the second edition of Ranganathan's *Prolegomena* (1957) with the judgement that "while it [sci., Ranganathan's book] acknowledged the influence of Bliss' two well-known books", it was "still intensely original" in its own right"[45].

From Empiricism to Normative Principles

Ranganathan was of the considered opinion that the practice of a discipline, as a rule, precedes its theory[46]. Science is mostly empirical in that phenomena provide the inductive ground from which logical conclusions flower. Most of his work was empirical leavened by what he calls intuition. For example, during Ranganathan's first study trip to England, he studied all the books in the library of the London School of Librarianship and Archives[47]. He considered the treatises available there to be faulty and inadequate in their approach, and this led him to revolt against the established conventions in library science theory and applications. His discontent led him to resolve that, when he had returned to India, he would replace the theoretically weak and foundationless structure of library practice with one that was systematic and based on sound principles.

His mind, attuned to scientific methods and procedures, reacted against the library education of the day. As Ranganathan himself later noted[48], "[p]rior experience of scientific study and pursuit induced a sense of revolt against having to hold in memory and deal with myriads of unrelated pieces of information and independent types of practices. Cannot all these empirical aggregates of information and practices be reduced to a handful of basic principles? Cannot the process of induction be applied in this case? Cannot all known practices be got by the process of deduction out of the basic principles? Do not the basic principles contain as necessary implications, many other practices not current or known at present? Will they not become unnecessary as and when boundary conditions set by society change? Such questions began to simmer in the mind". He had thus diagnosed the malady which was the lack of normative principles.

Sayers invited Ranganathan to the Third Library Conference in London in 1925, which was sponsored by Carnegie United Kingdom Trust (CUKT). He introduced Ranganathan to several librarians and asked them to allow Ranganathan to visit their libraries. Afterwards, Ranganathan visited about 120 libraries and acquainted himself with their practical procedures and problems[49].

He found libraries to be in different stages of development. As he would later put it "This facilitated the comparative study of library practices.... The lines of development in the different sectors of library practices appeared unrelated. Discussion with those working in the different sectors led to the impression that each was working in his own sector without much of contact or correlation with other sectors.... There was no evidence of an overall view. All these factors tended to hide the common point of emergence of trends in the different sectors. Consequently, what could be seen was only an aggregate of diverse practices without an integral relation. It looked as if future developments were totally unpredictable. It all appeared to be a matter of rule of thumb, and severely empirical"[50].

After a great deal of pondering, Ranganathan ascribed all these weaknesses to the lack of any normative principles for library science. Accordingly, he set himself the ambitious goal of formulating such a set of principles. This stupendous task could not be executed in one stroke. In July 1925, Ranganathan came back to India and found himself totally occupied with the overwhelming task of organising the Madras University Library. This pressure drove the problem of normative principles back to the subconscious levels of his mind. Working from scratch to organise the Madras University Library provided the necessary firsthand experience. It was helpful both directly and indirectly. "Every step in the design of the Colon Classification, every rule in the formulation of the Classified Catalogue Code, and every clause in the drafting of the manual on Library Administration radiated from and got irradiated by the Normative Principles, hidden away by that pressure, at the subconscious level," Ranganathan would later recall.[5]

This interaction between the not yet crystallised, embryonic normative principles and Ranganathan's experience at the workbench subliminally reinforced each other for three years. During this period, Ranganathan did not find the time to develop an explicit account of the laws. But for the sake of objectivity it was necessary to formulate and enunciate them. Finally, Ranganathan was invited to deliver vacation lectures in December 1928 at his own university. He ambitiously wished to announce the discovery of laws at this forum. This pressure led to the formulation of the laws[52]. Thereafter, the elaboration of normative principles for various sectors of librarianship would characterise much of his work. As he noted while writing *Library Administration* (1935),[53] "[l]ibraries vary in size, type and outlook. It would be impossible to write a manual that would exactly fit every kind of library. At any rate this manual does not claim to be one such. All that attempted here is to provide certain patterns which can be varied according to local conditions." Such an approach has given library science more the status of a profession than a vocation.

Ranganathan was a workaholic with a great capacity for taking pains in the pursuit of his goals. The unorganised state of the Madras University Library turned out to be, in fact, a blessing in disguise for him. It offered him a rare opportunity to gain valuable personal experience in building a library and its services from the ground up. He got a chance to translate his dream into practice. In order to refine his theories of reference service and shelf arrangement of books according to the CC, he observed the reactions of readers utilising all types of services in the newly introduced open-access spaces in the library of the Madras University. Moreover, he gained much insight while providing reference service on the floor[54].

Influence of the Methods of Mathematics and Science

As a student and teacher of mathematics, Ranganathan assimilated fully the fundamental methods and tools of physical sciences. Mathematics as a discipline and as well as an intellectual tool continued to hold his interest. He remained a life member of the Indian Mathematical Society. Even while fully engrossed with library science and librarianship he found time to write on mathematics[55]. Likewise, science had a dominating influence on his thinking and writings. He always wrote with a scientific rigour and mathematical precision. W.C.B. Sayers[56] considered his codification of classification to consist of "a statement in formal mathematical shape of the process and a discourse on terms." His language has an air of exactitude. Ranganathan fully exploited mathematical concepts to solve problems in library science, most notably, perhaps in his *Prolegomena*, which D.J. Foskett[57] would later compare to the *Principia Mathematica* of Whitehead and Russell. In the same vein, a review for *The Library Quarterly* characterized the *Prolegomena* as the "philosophical dissertation of a mathematician and a Hindu scholar"[58]. Above all, Ranganathan found and logically elaborated a parallel between classification and mathematics. Indeed, he drew many analogies between mathematics and classification, some of which he elaborated in the third edition of the *Prolegomena*[59]. Some of Ranganathan's seminal ideas like the postulational approach to classification are tributary to mathematical methods, as has been discussed in detail by Francis Miksa[60]. Ranganathan made a sustained attempt to visibly note the influence of mathematics on CC and suggested that the capacity of mathematics to forge new tools for solving emergent problems was something that classification should emulate. According to Miksa[61], "mathematics provided a basic model for Ranganathan's initial approach. The model consisted of the standard practice in each of these areas of delineating pure abstraction, rigorously defining the terms, rigorously determining the relationships, and eliciting the axioms by which these relationships could be delineated".

Generalisation and Abstraction

The intellectual processes of abstraction and generalisation constituted the methodological core of Ranganathan's approach to library science. He had an uncanny gift for both of these processes. Ranganathan considered the abstraction of entities, explanation of relationships, and creation of axioms to be the outcome of scientific and mathematical thinking. As he observed[62],

"Generalisation and abstraction, forming part of scientific method, are helpful intellectual tools…. Without the aid of generalisation and abstraction, much of progress would have been impossible […].Every step in generalisation and abstraction increases the versatility of a subject. […] This capacity to abstract and generalise without limit has enabled mathematics to become ubiquitous and make itself serviceable in any subject whatever–whether it is in the region of physical, biological, or social sciences, or in the field of humanities. It is the versatility thus got by it that made the German mathematician Johann Carl Friedrich Gauss (1775-1855) call it the 'Queen of Sciences'".

Long after Ranganathan discovered facet analysis, he developed his theory of the Five Fundamental Categories through the process of abstraction. This process allowed him to reduce the conceptual complexity of the conceptual universe to a manageable compass, a point that he expressed as follows in the *Prolegomena*[63]: "Millions and millions of isolate ideas, facets and subjects confuse and taunt us at the phenomenal level. Several millions of immediate-neighborhood-relations put in their claim to be kept invariant in the mapping of the subjects on a line…. A suitable method of escape would be to descend from the phenomenal level nearer and nearer to the seminal level. […] As we descend, we see at first the number of neighbourhood-relations among the individual isolate ideas falling into a few patterns irrespective of their respective universes of isolate ideas. A study of such patterns leads to the formulation of some general principles to help in deciding on the competing claims of isolate ideas. … Their use makes the mapping of isolate ideas relatively easy".

Role of Intuition in Creativity

Ranganathan believed that intuition plays a significant role in creative work. In his view, intuition stands in sharp contrast to intellection. By intellection, he meant the cognitive process wherein concepts are formed from the integration of sense experience and then synthesised through a deductive process to form ideas.[64] Intuition, on the other hand, he defined as a form of knowing that is entirely independent of sensory perception and ratiocinative deduction, and so allows the person possessing it to experience entities in the world in a way that "transcends the space-time matrix"[65]. On this view, a flash of intuition for a split second can yield insights that invariably lead to important discoveries in whatever realm one is exploring[66]. Interestingly, Ranganathan found a place for both intellection and intuition in his "Spiral of Scientific Method"[67],though he otherwise held that "research is only intellectual" (sci., relies on intellection)[68]. Ranganathan's concept of intuition does not fit easily into current paradigms of cognitive science: nevertheless, he considered it to be an important component of creativity. For him, intuition is the trigger that inspires a series of thoughts eventually leading to true creativity.

Yogi and Scientist: A Seamless Melding of Hindu Culture and Scientific Method

At the very moment that our budding discipline was designated as a science, sceptics raised doubts about whether it indeed deserved such a status. The term was even ridiculed. But the handling and the treatment of the subject by Ranganathan has vindicated, beyond any shadow of doubt, the conception and stand of the Chicago School in 1930s, which held that librarianship can be treated as in a scientific way[69, 70]. Regarding this novel approach, Jesse H. Shera[71], a distinguished proponent of the Chicago School's views and an early American admirer of his distinguished Indian colleague, wrote that Ranganathan was "striking the most fundamental problems of library science in ways that they had never been attacked before...". Science taught Ranganathan to go to the very root of the things. He went on dissecting a problem bit by bit until it admitted no further division. To study a whole, he resolved it into its parts. He employed a master triangular analysis to view a problem in terms of "what", "why", and "how". This analytico-synthetic approach resulted in the most revolutionary classification scheme of its time. Brian C. Vickery[72] considered Ranganathan's scientific approach to classification to be "his most enduring contribution to librarianship." To show how classification had become a science through the application of his methods, Ranganathan[73] saw it fit to quote, in his *Elements of Classification*, a review by Bernard I. Palmer entitled "New Vistas in Classification" and published in the

October 1944 issue of the *Library Association Record*[74]: "For the first time practical classification can claim to approximate to a science... Normally, while most students could grasp the theory of classification, when it comes to the practice they found it demanded an elusive gift called "flair". For "flair" Ranganathan has substituted reasoned analysis: perhaps flair was a meagre or a quasi-intuitive form of the same process. Ranganathan brings the whole problem from the regions of subconscious perception to those of the intellect. This act makes it at once possible to train any intelligent person to classify, instead of merely demonstrating to the classification-aspirant".

Charles David Batty[75] sums up the matter by saying that "Dr. Ranganathan's early experience as a mathematician and teacher as well as a librarian and his sense of the limitations of many of the existing schemes of library classification prompted him to reassess the traditional principles of classification and to add new principles which took account of the increasing and changing demands of library materials and readers in the 20th century."

In a review of the first edition of Ranganathan's *Prolegomena* that he wrote for *The Library Quarterly*, Henry Evelyn Bliss[76] stated that "[t]he author combines the culture of India with the scholarship of England."Abdul Rahman[77]puts the whole argument into metaphorical language as follows: "Dr Ranganathan is born of his Father Mathematics and Mother Indian Philosophy into the young world of Library Science, With a harmonious blending of the gifts of his parents, he has made Library Science stand out as a strong, sound and supple youth. He has made Library Science as deep as philosophy and as precise as Mathematics."

Frits Donker Duyvis,[78] in enumerating Ranganathan's contributions to FID/CA, observed that "[a]ll [of his] publications show that he possesses:

1. the quality of being a trained philosopher,
2. the tolerance and wisdom of a countryman of Gandhi of the best sort; and
3. the knowledge and capacity to bring together and unify the thoughts which have directed the present important classifications.

Summarizing those three characteristics make together Ranganathan and more than that."

Ranganathan, in line with Pierce Butler (1886-1953), was among the few pioneer advocates of the use of scientific method in library science. His Five Laws, the highest normative principles, form the rock bottom of his theories, including those in knowledge organisation. His mathematics- inspired postulates and laws enunciated axiomatically were precipitated through intuition. Postulates are given assumptions that are not themselves objects of demonstration. Ranganathan made use of them because he believed that it is more important to enable a system to function than to resolve all philosophical problems–some of which may be inherently insoluble–at the beginning.

Indeed, as we noted earlier in this paper, the discipline of mathematics exerted a strong influence on the thinking of Ranganathan as he evolved the various principles and canons of Colon Classification. Francis L. Miksa states in this regard that "[m]odern science and Hindu thought provided general sources for Ranganathan's classificatory ideas, both contributing many specific analogies for his ideas. Of these two realms, however, it was mathematics which supplied the base for Ranganathan's most powerful classificatory ideas and in turn his most enduring contribution to library classification theory"[79].

In December 1923, Ranganathan prepared a biographical essay on the mathematical genius S. Ramanujan to be used as a preface to a volume of his collected papers published by Madras University. He took the draft to his Vice Chancellor Rev. E. Montieth Macphail for his approval. Reflecting on of the mysterious genius of this great mathematician, Ranganathan[80] surmised: "It is not possible to explain the phenomena of Ramanujan except on the hypothesis of the ever-increasing *Purvajanma-vasana*—the psychogenetic reinforced force from incarnation to incarnation – gaining momentum all through the march of soul from embodiment to embodiment". The vice chancellor reading it dismissed his view as the unfounded thinking of a Hindu mathematician. But at the phenomenal level Ranganathan had the mind of a classificationist, a mind which is endowed with "[s]harpness in thinking, clarity in expression, expedition in response, and exactness in communication …"[81]. Such a mind makes full use of the innate power of deliberate classification–a power that he amassed in abundance.

Conclusion

Ranganathan's life and work show that his seemingly paradoxical identities as an orthodox Hindu and a rationalistic scientist coexisted harmoniously within him. His Scottish mentor Edward B. Ross and his Hindu friend S. Kuppuswami Sastriar both influenced his way of thinking in a

synthetic way to see the interconnections among entities in the world from flowers to stars. His library school classification teacher and a practising librarian, W.C.B. Sayers influenced him professionally. Sayers' knowledge, his books, and teaching were role models for him. He facilitated his life changing visit to over a hundred libraries in England, an experience that opened his eyes to the fundamental problems of libraries. He perceived the lack of principles underlying the library services that he observed. The instruction given at the library school that he attended provided only rule-of-thumb solutions to the problems of library services, as there was no explanation for the how and the why of library processes. Take it or leave it were the options. After finishing his sojourn in England and returning to India, Ranganathan realised that his true calling was in library science and services rather than in the teaching of mathematics to a small circle of students, for he now saw that libraries are a force in national development. From that day onwards, he devoted himself completely to investigating the science of organising libraries and its science to the near-total exclusion of everything else from his social and personal life. The Hindu way of life and scripture motivated him to excel in his work and to live a disciplined life of "work chastity". And yet, living a rigorously religious life had no effect on his theories. This Ranganathan confirmed in May/June 1964 during a tête-à-tête with Nasser Sharify at the latter's residence in Pittsburgh, where he had gone to receive an Honoris Causa doctorate from the University of Pittsburgh, when he told his host "Son…. My father was a religious man and he greatly influenced my thinking early in my childhood. I grew up with religion and remained religious. At any rate, I do not understand how this could have harmed the theory of classification of knowledge that I have developed"[9].

Ultimately, Ranganathan's creativity was fuelled by a blend of mathematical methods, intuition, and mysticism. He had an uncanny capacity for generalisation and abstraction. Empiricism and inductive methods were a methodological mainstay that allowed him to crystallise his Five Laws. The theory of five Fundamental Categories emerged from his capacity to abstract and generalise from myriads of phenomena. His spiritualism flowered whenever he was able to apply abstraction to the mass of details that were incubating in his mind. According to his professional heir, M.A. Gopinath, "[t]he integral nature of Ranganathan's theory emerged from occasional intuition; and his intellect strove to make it more explicit to the rational mind of the scientific worker"[82].

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15 Shri Aurobindo Ghose (1872-1950) was a contemporary philosopher, yogi, an inspiring spiritualist, and an active nationalist. Best known for his spiritual philosophy of human evolution, he carries immense influence on the Indian educated elite.

16 Pandit Madan Mohan Malaviya (1861-1946) was a great educational reformer and influential Hindu leader of the freedom movement of India. He was the founder of the Banaras Hindu University (BHU) and wished his university library to be the best in India. Ranganathan had promised the much revered Malaviya to serve the BHU after his retirement from Madras. That he did and singlehandedly classified the rich and diverse collection of books, etc. This project proved very helpful in further developing his Colon Classification.

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Appendix: Ranganathan's Vision and Life-Turning Resolutions on Completing His Library Education: 5 Analysis of the Benefits of Silence

Homeward journey after the completion of the course in 1925 provided a virtual solitude to recall all the experiences gained in Great Britain. Ranganathan could see in his mind what all he can and should do to serve his country and thereby to draw joy and delight for himself.

Benefit 1: Work-chastity

The industry, the devotion to work, and the patriotism of the British people had made a tremendous impact on his outlook. These formed the lasting and beneficial elements as the result of his informal and formal education in Great Britain. … This in turn induced in him a resolve to practice work-chastity for the rest of his life.

Benefit 2: Urge for library work

The penetration of library service into the different areas in Great Britain and almost into every home had impressed him tremendously. This convinced him that there was sufficient work to do in India in the library sphere. This induced in him an urge to work out a plan for a similar library provision in India.

Benefit 3: Realisation of the potency of library service

The positive correlation between the provision and acceptance of universal library service on the one hand and the well-informed conduct of the poorer classes, urge for creative work among the intellectuals, and a spirit of self-reliance and fullness of life in all the sections of the British people was unmistakable to him. It induced in him the feeling that the people of India should be helped in a similar way by a nation-wide library system.

Benefit 4: Realisation of opportunity for social service

Further, he realised the greater opportunity for nation-building, for the cultivation of the human resources, and for social service, which library work could give in any walk of life. This made him long for the formation of a vigorous, dedicated, and enlightened library profession in India, adequate in quality and sufficient in number.

Benefit 5: Appreciation of opportunity in library service

Ranganathan appreciated the opportunity which library work would give, to know and to work with a large section of people as against a handful of students with whom alone teaching of mathematics in the higher university classes would involve. This appreciation made him prefer library work to teaching at the university.

Benefit 6: Realisation of opportunity for research

Further, he also realised that there were as many problems offered by library science as those offered by mathematics to give an exhilarating and arresting challenge to intellect and intuition. This realisation made him accept the change over from mathematics to library science without any dilemma or regret of any kind.

Benefit 7: Determination to stay in the library profession

All these ideas born out of experience during the nine months of stay in Great Britain made him give up his old longing to go back to the teaching work in college and to make a willing decision once and for all to stay on in the library profession and seek therein his own emotional, intellectual, and spiritual fulfilment in the full measure of his capacity. … [He started] planning the way in which he should serve his country and the world at large through library service and work in library science.

(Adapted from: Ranganathan, S R, A Librarian Looks Back, Ed. by Kaula, 1992. Secs. AL5, pp. 52-53)