

THE RECORDS OF CIVILIZATIONS

An Inaugural Lecture delivered at the University of Ibadan
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by

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THE RECORDS OF CIVILIZATIONS

MR VICE-CHANCELLOR, DEANS, DISTINGUISHED LADIES AND GENTLEMEN

THIS is a unique occasion in two respects. It is the first occasion that an inaugural lecture is being given to defend a chair in Library Studies in Ibadan University. Librarianship is that profession which started off as the domain of scholars whose knowledge encompassed the bulk of the known intellectual products of their era to qualify them as the specialist in the records of the civilization in which they lived. Among our illustrious predecessors, who were custodians of the Alexandrian Library, were Greek scholars and writers. Callimachus was a poet and scholar (c. 305 B.C.—240) of the most erudite and sophisticated Alexandrian school. He was its librarian and wrote the catalogue of the library at Alexandria. Eratosthenes the philosopher, Greek scientific writer and astronomer, was director of the Library c. 225 B.C. Aristarchus of Samothrace, styled the foremost critical scholar of antiquity, was librarian at Alexandria c. 195 B.C. In more recent times Panizzi of Great Britain's British Museum added to the records of the illustrious. These men occupied renowned places in the field of scholarship and in early times were powerful in temples and courts of royalty as the custodian of the religious and cultural heritage of their societies.

As civilizations became more complex and knowledge increased, a more effective method of reproducing records through printing evolved. The records of civilization from thence increased at such a rate that a new situation was created whereby the keepers of these records were inundated with records of the society, beyond their capacity to absorb and comprehend. They were then reduced to being mere organizers of the formats of these records and not the intellectual content of the records. Librarians in the nineteenth century popular library movement lost their place among scholars and became the organizers of books, disseminators of information, and in effect, managers of media carrying bits of knowledge. The second quarter of the twentieth century witnessed a change in

this situation. With the emergence of American graduate schools, library science emerged once again as a subject worthy of scholarly investigation. The history of librarianship in Nigeria is only half a century old, if we are to accept the existence of the Tom Jones Library founded in 1920. In that short period, with the influence and contribution of British and American trained librarians, giant strides have been made in laying enduring foundations for librarianship. This has enabled the development that culminates in my standing before you today to defend the first professorial chair of library studies in Ibadan University.

Secondly, I stand before you as a privileged member and representative of that group who were once said by a distinguished scholar in antiquity not to possess souls. Yet the records show that this group of soulless humans had always championed the cause of scholarship. It is not often realized that over the centuries some distinguished women had always supported learning. In this connection it is pertinent to note that one of the oldest known printed books—a series of Buddhist incantations—was commissioned by Empress Shotoku of Japan between A. D. 764–770. Similarly, the earliest known record of language compilation, a glossary including that for 30 African languages, *Glossarium Comparativum Linguarum Totis Orbis* of 1787 was sponsored by Catherine the Great. More seriously, since the 1850 popular library movement, and the consequent reduction in status of the librarian and librarianship as a scholarly pursuit, the flag for the popularization of knowledge and its dissemination had been kept flying by modest unacknowledged battalion of women. This is borne out by statistical records in USA. Although in 1870 in America the professional labour force for librarianship was only 20% women, by 1900, the percentage had risen to 75%, and a steady increase was maintained until it reached 91% in 1930. Although this percentage has been gradually reducing with the influx of male candidates, woman power in the profession remained 82% in 1970. In Great Britain the woman personnel holding ALA award has risen from 14% in 1910 to 71% in 1970. Nigeria is far from this situation, but the rate of increase is encouraging. Our records show that the ratio of women in the labour force is about 30%. Nearer home still, women have, in our traditional societies, been the keepers of oral family history records in our oriki. However, this is not a Liberation Movement Speech; I have always maintained that the

African society was flexible and liberal and had always allowed its women to take part in all spheres of community life provided they can and are willing to pay the price. Today I am being called upon to pay the price and I will not digress any further.

The topic selected for the occasion of this inaugural lecture is *The Records of Civilizations*. This topic should not be confused with records as source material for history. I am concerned with records as intellectual products of man's reporting of phenomena that interact with his senses, that is of phenomena seen, heard, felt, tasted and touched. His need for more permanent record of this interaction with the world around has led to a report upon the mystery of existence.¹ The report of the cumulative wisdom of mankind beginning with the most primitive early cultures or civilizations is what differentiates us from animals. By it, man has made original contribution to the Universe. This contribution or intellectual product has been categorized as objective knowledge and defined as "the logical content of our theories, conjectures, guesses. . ." by Karl Popper the philosopher.² He also classified these products of man's reportage as the "third world"—the first being 'matter', the second 'life'. Man has always communicated orally but other more permanent forms of communication evolved as life became more settled and complex. I shall be concerned with the development of this permanent form of communication as civilizations emerged through writing. The development of the reproducing technique through copying and inscribing in more permanent forms culminated in the development of the printed book. My lecture is concerned with the revolution in scholarship that grew out of proliferation in the records of civilizations. I am concerned with the accumulated records arising from an exponential growth of literature that ensued in some subject areas. The introduction of the periodical literature that emerged as medium of scholarly and scientific communication created a problem, and a challenge for the keepers of man's records. The attempts of the keepers of the records to control this literature through bibliographic compilations has led to an accumulation of records of bibliographic citations. These bibliographic citations have in turn provided source material for studying the nature of knowledge, the

¹ A. Macleish, "The Premise of meaning." *The American Scholar*, 41 : 357, 1972.

² Karl Popper, *Objective Knowledge. An evolutionary approach*. Oxford, Clarendon Press, 1974.

patterns of growth of ideas, the use habits of scholars and scientists, and the basis for studying how knowledge is transmitted within a society and how such knowledge is translated into social action. These new emerging disciplines offer the promise of a theoretical base for library science and a precise, more scientific and logical premise for the practitioners. In the words of Shera, the new study emerging as part of librarianship is social epistemology, "the study of those processes by which society as a whole seeks to achieve a perceptive or understanding in relation to the whole environment—physical, psychological and intellectual. . . . Bibliography being the carrier system for ideas and information, the rockbed over which units of graphic communication move among the various parts of the society, making contribution to the shaping of societal structure, policy and action."³ Drawing an analogy with economics Shera further explained that social epistemology is:

. . .the analysis of the production, distribution and utilisation of intellectual products in much the same fashion as that in which the production, distribution of material products have long been investigated. Graphic communication provides objective evidence of the process.

Finally, I hope through an exposition of these new developments in the study of man's records of civilization to draw your attention to the changes in the formats of these records and the trends and patterns that might emerge in the institutions that handle man's records in the twenty first century. As users you are entitled to know how your study habits may be radically altered.

THE BEGINNINGS OF WRITING AND EARLY WRITTEN RECORDS

First let me start from the beginning. How did these records of civilization emerge? Archaeological evidence and other sources have confirmed that writing emerged first as pictorial or visual communication. This is as an extension of oral language, gesturing or signalling, which are of momentary value, since it can only be

³ Jesse H. Shera, and Margaret Egan. "Foundations of a theory of Bibliography," in *Libraries and the Organisation of Knowledge*. London, Crosby, 1966, p. 38.

used for persons in close proximity. It was therefore restricted in space and time. Visual communication first occurred as a pile of stone objects, mounds and monuments. Later small objects, flowers, gem or a string of beads were used to convey messages. Thus the Yoruba used cowrie shells (mussels) to effect communication

One shell meant defiance
two placed together meant agreement
two placed apart meant enmity

These were called object writing. Subsequently, as the ear'y communities became more settled farmers, and evolved systems of organization, they instituted carving, drawing, or painting as more permanent records, making visible signs that became conventionally understood by third parties. A phonetic system later evolved from this communication device carrying with it categories of language or linguistic elements. The forerunners of writing were pictorial representations arising from purely aesthetic urge as seen in the rock paintings of paleolithic man in Europe, and other cave drawings in America, India and Africa. The most developed of these pictographic representations which evolved had identifiable mnemonic devices to record an event, identify a person or an object. Such were the pictographs of the Egyptian or Hittite civilizations—early civilized societies. The pictographs later developed to become conventionalized into written signs with meaning. This system of written signs such as the Cherokee writing or Chinese writing was categorized as logo-syllabic writings or logographs. Some of these logographic writings developed into full systems like the Sumerian, the Egyptian, and Chinese system of writing. The simplification of logo-syllabic writings of these groups by other heterogeneous group led to the development of syllabaries. Thus the Sumerian logographic writing became the syllabic writing of Elamites and Hurrians while the Semites of Palestine modified the early Egyptian writing. The Japanese adapted the Chinese logographs. It was the Greeks who first introduced phonemes through adopting forms of the West semitic syllabary to evolve a system of vowel signs and consonant signs to create a full alphabetic system of writing.⁴

⁴ D. Diringer, *The Alphabet: a Key to the History of Mankind*. 3rd ed., London, Hutchinson, 1968. 2 vols.

All other main word systems are based on this. There are thus three types of Alphabet systems—Greek-Latin; Aramaic, Hebrew and Arabic; Indian and Ethiopic.

From Paleography, including epigraphy, we know that early writings were made first on tablets of clay, stone, metal or wood incised with sharp tools. Others were drawn or brushed or painted on soft materials—leather, papyrus and later paper, with pen, pencil or brush and paint or ink. Archaeological and historical evidence seem to indicate that, full writing reproducing a language started 5,000 years ago in Mesopotamia and Egypt from where it dispersed East and West. Its development was accompanied by the simultaneous growth of a civilization. The records of the history of writing and its emergence always seem to have occurred among groups that have settled down as farmers, and have evolved a culture associated with development of the arts, some scientific and technological achievement, commerce, industry and mobility of people. In the words of I. J. Gelb: "It seems rather that all factors—geographic, social, economic—leading towards a full civilization simultaneously created a complex of condition that could not function properly without writing."⁵

We have two general views of civilization—the Universalistic view and the Pluralistic view. The Universalistic view as defined in 1871 by E. B. Tylor, the English anthropologist asserts that:

Culture or civilization taken in its wide ethnographic sense is the complex whole which includes knowledge, belief, art, morals, law, custom and any other capabilities and habits acquired by man as a member of a society.⁶

The Pluralistic view which confines its concept of culture to a single group is well enunciated by Kluckhohn and W. H. Kelly:

A culture is a historically derived system of... designs for living which tends to be shared by... members of a group.⁷

These definitions, as you notice, refer to culture. Civilization evolves only when a culture has become complex enough to sustain a

⁵ I. J. Gelb, "The nature and origin of writing." *Encyclopaedia Britannica Macropaedia*, 15th ed. Chicago, 1973. Vol. 19, 1033-1044.

⁶ E. B. Tylor, *Primitive cultures*. . . 3rd ed. London, Murray, 1891, 2v.

⁷ C. Kluckhohn, and W. H. Kelly, "The concept of culture" in R Linton, ed. *The science of man in World Crisis*.

variety of people and ideas and have the means to preserve its past and encourage innovation. A civilization must also possess the resources to ensure transmission of its style, values, as well as the unity of the people who comprise it. The use of a permanent record—writing—therefore becomes an essential tool to a civilization. Only such groups that have evolved a system of writing have been identified as having the hallmarks of a civilization—cities, technology, division of labour, leaders, elite, priest, etc., as well as a complex economic organization and a life style. Oswald Spengler, and Arnold Toynbee, who accepted the multilineal concept of civilization also introduced the idea of a life circle marking the rise and fall of a civilization with stages identified as birth, youth, maturity, senescence and death. Thus several civilizations all of which have evolved a system of writing and permanent record have been identified. Most of them are distinguished by a system of writing and literature.

Sumerian

The earliest known civilization according to archaeological evidence so far revealed, developed in 3100 B.C. in the valley of Euphrates and Tigris, in Mesopotamia. It consisted of farming groups that developed into a civilized culture with urban centres and literate traditions. They gave us the first written records on clay tablet listing stores and crops kept by the Sumerians. The Kish tablet which belonged to this civilization has been dated c. 2750–2660 B.C. This and other sources indicated that the Sumerians had city states with a technology and culture that flourished until 200 B.C.

Egyptian

Around 3100 B.C. another culture in the valley and mouth of the River Nile, Egypt gave us a civilization that survived through twenty dynasties to Roman times. The civilization gave us Egyptian writing—hieroglyphics. The Egyptians used a 365-day calendar and they had the technology to build the pyramids. Their writings formed the basis of other civilizations and writings that developed in the Middle East.



Fig. 1. Kish Tablet

Sign, Symbol and Script

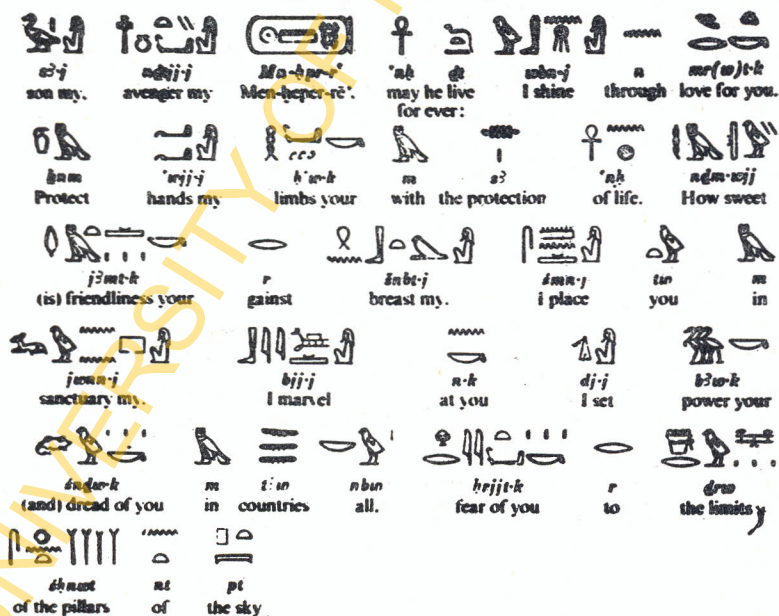


Fig. 2. Egyptian Hieroglyphics



Fig. 3. Egyptian Hieroglyphics

Minoan

The Minoan civilization with Minoan linear writing developed c. 3000–2000 B.C. around Crete. This writing consisted of pictographs similar to the Egyptian hieroglyphics. There are archaeological evidence of towns, palaces and fine art and a developed culture and international trade at Knossos and Phaistos belonging to this civilization before the people were conquered by the early Greek Mycaenian states.

Indus

Between 2300 B.C. and 1750 B.C. a civilization known as the Indus civilization had developed in the Indus valley in Asia

Old Cretan H hierogl. script A and B linear scripts		Cypro- Minoan	Cypriot	
			sign	sound
⌘ B	⌘ B	⌘	⌘	va a
⌘ A	⌘ B	⌘ ⌘	⌘	si
⌘ B		⌘	⌘	pa
⌘ A	⌘ A	⌘ ⌘	⌘	ke
⌘ A	⌘ B	⌘	⌘	lo
⌘ A	⌘ B	⌘	⌘	ta
⌘ A	⌘ A	⌘	⌘	le
⌘ A	⌘ B	⌘	⌘	na
⌘ A	⌘ A	⌘	⌘	ko
⌘ A	⌘ B	⌘	⌘ ⌘	ti
⌘ H		⌘ ⌘	⌘	pi
⌘ A		⌘	⌘	pu

Fig. 4 Minoan Writing

Archaeological evidence—excavation findings in the form of inscriptions and works of art—show that at Mohenjo-Daro near the mouth of the Indus valley, there were settlements of agricultural communities and urban settlements.

Chinese

The Chinese civilization also evolved between 1500 and 1000 B.C. Archaeological findings of oracle bones and Chinese bronzes showed inscriptions with scripts some of which have been dated as belonging to the Shang-Yin dynasty c. 1122 B.C. The scripts consisted of over 1,098 preserved characters established to form the alphabet.

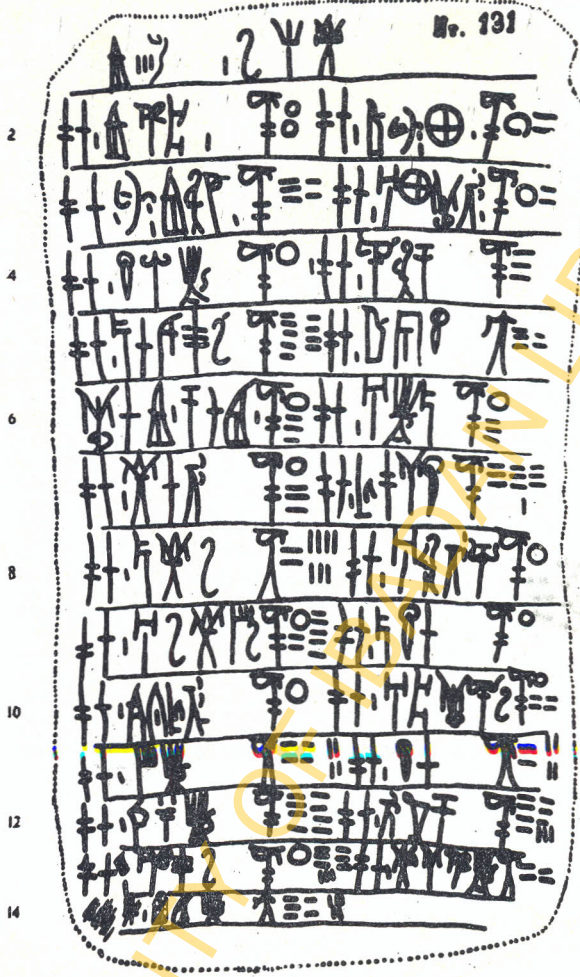


Fig. 5 Minoan Writing

Hebrew

Between 1600 and 1500 B.C. a Hebrew civilization emerged among semitic tribes that migrated from UR. Parallel to this was the development of commercial activities and the emergence of sophisticated urban areas as the Phoenician ports of Tyre, Sidon and Byblos where the Phoenician alphabet was evolved. Both the Phoenician script of Byblos and the Egyptian hieroglyphics



Fig. 6 Oracle bone inscriptions from the village of Hsiao-t'un, Shang dynasty, 14th or 12th century BC

influenced the development of Hebraic writing. The findings of the Dead Sea Scrolls, historical evidence for literary and bible history, are evidence of this higher civilization.

Greek

Around 1500 B.C., the Greek civilization emerged with the establishment of the Greek city states. The Greek alphabet with the first modern linguistic elements emerged. Paleographic evidence shows that the script was a modification of the Semitic alphabetic scripts. The Greeks however improved on them by introducing phonemes and evolved a system of vowel and consonantal signs to create a full alphabetic system of writing.



Fig. 7 Phoenician Alphabet

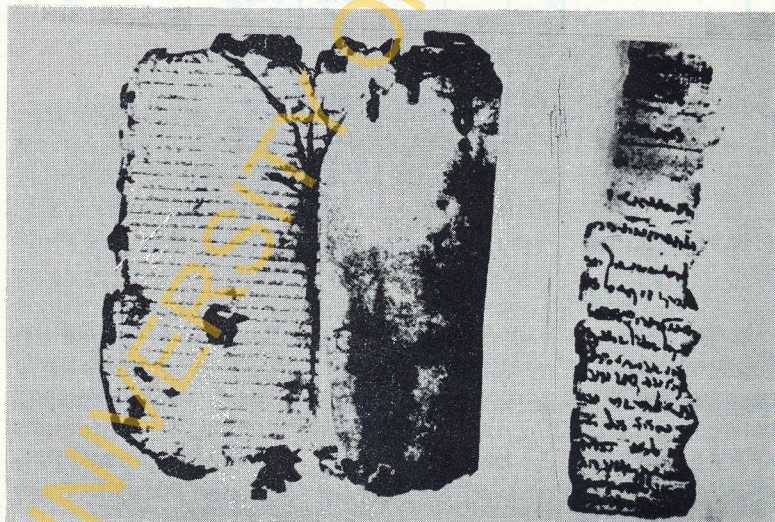


Fig. 8 Dead Sea Scroll

Dead Sea Scroll

Phon. val.		Modern printed script	Modern Greek running hand		
Old Greek	Modern Greek				
a	α	Α	α	ΑΑ	α α
b	β	Β	β	ΒΒ	β β
g	γ, i	Γ	γ	ΓΓ	γ γ
d	δ	Δ	δ	ΔΔ	δ δ
e	ε	Ε	ε	ΕΕ	ε ε
dz	ζ	Ζ	ζ	ΖΖ	ζ ζ
θ	ι	Η	η	ΗΗ	η η
th	θ	Θ	θ	ΘΘ	θ θ
i	ι	Ι	ι	ΙΙ	ι ι
k	κ	Κ	κ	ΚΚ	κ κ
l	λ	Λ	λ	ΛΛ	λ λ
m	μ	Μ	μ	ΜΜ	μ μ
n	ν	Ν	ν	ΝΝ	ν ν
ks	ξ	Ξ	ξ	ΞΞ	ξ ξ
o	ο	Ο	ο	ΟΟ	ο ο
p	π	Π	π	ΠΠ	π π
r	ρ	Ρ	ρ	ΡΡ	ρ ρ
s	σ	Σ	σ	ΣΣ	σ σ
t	τ	Τ	τ	ΤΤ	τ τ
u	υ	Υ	υ	ΥΥ	υ υ
ph	φ	Φ	φ	ΦΦ	φ φ
kh	χ	Χ	χ	ΧΧ	χ χ
ps	ψ	Ψ	ψ	ΨΨ	ψ ψ
o	ω	Ω	ω	ΩΩ	ω ω

Fig. 9 Greek Alphabet

Olmec and Maya

In the new world the Olmec civilizations which preceded the Maya and Aztec civilizations of Mexico and Yucatan respectively gave us the Olmec writing. This was estimated to have developed between 900 and 300 B.C. At the time of the Spanish expeditions of 1516 and 1517, the Maya and Aztec were found to possess fully developed civilization with abundantly developed literature. They

employed a picture script consisting of partly idea and graphic symbols. Writing was made on stones, skins and on a kind of paper manufactured from the bark of trees.

Africa

Africa has not been left out in the development of writing. Besides the development in Egypt and Ethiopia, recent studies have unearthed evidence of the development of writing in West Africa. Besides the object writing of African city states and kingdoms and the introduction of Arabic to support those Islamic civilizations, some of the indigenous cultures are now known to have evolved secret writing. Four pictographic scripts have been identified by Hans Jensen.⁸ The *Nsibidi script* of the Ibo and Efik is a pictograph writing representing objects or ideas pictorially or symbolically. The *Bamum script* was said to have been devised by King Njoya

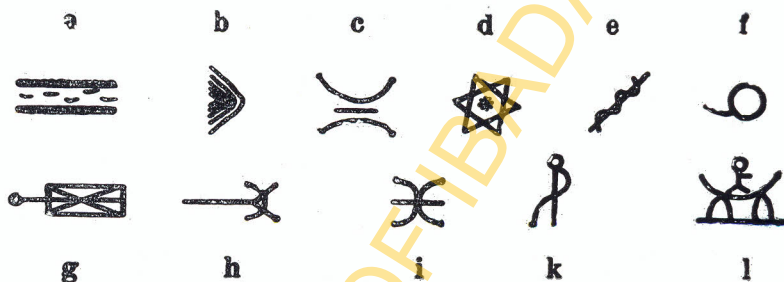


Fig. 10 *Nsibidi Script*

of Bamum in the Cameroon, influenced by Arabic writing early in this century (1903–1911). This was a system of picture signs for concepts. The *Vai Script* of the Vai negro in Upper Guinea in the Republic of Liberia, was first discovered in 1849 and was said to have been two hundred years old at the time. The *Mende script* is closely related to the Vai script. It is similar to it, being a syllable script consisting of 190 signs for vowels, consonants and diphthongs. The original picture signs have been replaced by a more simplified phonetic script. There are traces of Arabic influence in it, which may indicate a reminder of the influence of the old

⁸ Hans Jensen, *Sign, symbol and script: an account of man's effort to write*. 3rd. rev. ed. translated from the German by George Unwin. London, George Allen & Unwin, 1970.

symbol	sound	symbol	sound	symbol	sound	symbol	sound	symbol	sound
7	ki	ḡ	ka	ḡ	ku	ḡ	wi	ḡ	bi
l	i	ḡ	a	ḡ	u	lll	si	lll	sa
lll	su	ḡ	he	ḡ	ha	ḡ	ho	ḡ	wə
ḡ	mbe	ḡ	mba	ḡ	gbə	ḡ	gbo	ḡ	le
ḡ	kpa	ḡ	mbu	ḡ	ndi	ḡ	nua	ḡ	hā
ḡ	ɪ	ḡ	kpi	!	ḡ	ḡ	sō	ḡ	mbi
ḡ	o	ḡ	kpo	ḡ	be	ḡ	ə	ḡ	bē

Fig. 14 Mende Script

and were replaced by logosyllabic writing, a system of word signs such as developed under the Sumerian, Egyptian and Hittite and Chinese civilizations. The third phase is the further simplification of the logosyllabic writings of these four groups by other groups. Finally, the Greek gave us the first alphabet which formed the bases for modern alphabetic writing.

These early writings were however restricted to the thin upper stratum of society—the priests, royalty, courtiers, scholars and scientists. The records of early civilizations therefore consisted of monuments, carved artifacts, writings on clay tablets, scrolls of leather or papyrus and later the manuscript codex. In spite of the formats of these records, they were substantial enough to constitute libraries. Library history tells us that the temple in the Babylonian town of Nipure 3000 B.C. had rooms full of clay tablets and the collection of King Ashurbanipal, last king of Assyria (668–627 B.C.) contained an archive of some 25,000 tablets. The famous Alexandrian library founded by Ptolemy I and II and manned by famous scholar-librarians had over 100,000 papyrus or vellum scrolls of Greek literature and others. The library at Pergamum consisted of over 200,000 volumes of parchment. It was said to have been given by Antony to Cleopatra to become part of the Alexandrian library. During the Roman wars many private libraries were acquired as war booty by Lucullus and made a public library in Rome.

PRINTED GRAPHIC RECORDS AND BIBLIOGRAPHIC CONTROL

The contents of these early written records have been found limited mainly to literature, philosophy, religion. They were also limited in their communication value as only the priest, royalty and scholars or scientists had access to them. The records were laboriously written and copied by hand when necessary. In fact the scriptoria, a special copying institution, was a necessary adjunct of the library or temple in the Greek empire. It was not until mechanical reproduction devices evolved that modern records of civilization accrued in substantial numbers. Although popular knowledge attributed the invention of printing to Johannes Gutenberg of Strasbourg in 1454, records show that the Chinese had evolved a mechanical system of reproducing and printing from wooden blocks by the sixth century. The three elements of printing—paper, ink, and surfaces bearing text in relief were known to the Chinese since the 2nd century. By A.D. 175, the Confucian text had been carved into stone tablets and reproduced by rubbings. The oldest known printed book to survive was dated between A.D. 754 and A.D. 770. It consisted of Buddhist incantation that has already been mentioned as commissioned by Empress Shotoku. In China the earliest known book *The Diamond Sutra* was printed in 868, and a collection of Chinese classics in 130 volumes was printed in 932. Between 1041 and 1048 a Chinese alchemist, Pi-Sheng, appeared to have invented movable types. This invention however died with him because the Chinese characters (logographs) did not lend themselves to the use of movable types. These skills and art of printing, especially paper making, were transmitted in the 12th century to Europe where paper mills flourished in Baghdad and Spain and later in Italy, France and Germany.

The invention of printing reached full development in the West, where the simple alphabet writing prepared the way for easy manufacture of types. The Zyglographic printing from wood of China was replaced by metallographic printing. These developed first in Holland and later, in Rhineland and Strasbourg. Johannes Gutenberg was a printer in Strasbourg and Mains in the fifteenth century. Although his actual contribution was clouded in doubt arising from lawsuits instituted by his sponsors Fust and Peter

Schoeffer,⁹ his ex-colleagues, there was no doubt that he had been connected with the invention of typographic printing, the printing press, the casting of types from metal alloy and the reproduction of the first printed Bible. This invention led to great strides and revolution in the spread of knowledge and ideas.

The sixteenth century witnessed the development of the book trade and the first efforts at bibliographic control. Scholars had begun to make bibliographic compilations prior to the advent of printing as evidenced in the work of Claude Galen's bibliography *De Libris* of the second century and Venerable Bede's own list at the end of his work, *Historia ecclesiastica gentis Anglonum*. The first substantial bibliographic work was the famous bibliographic compilation by Johann Trithem, *Liber Scriptoribus Ecclesiasticis* . . . 1494. This was the first systematic bibliography which earned for Trithem the title, "the father of bibliography." In 1545 Conrad Gesner, a scientist, doctor and philologist introduced the idea of Universal Bibliography by compiling a bibliography of the world's printed books of the Medieval period in his *Bibliotheca Universalis sive Catalogus omnium scriptorum. . . in tribus linguis latina, graeca et hebraica*. This was a bibliography of over 12,000 books in Latin, Greek and Hebrew which were the languages of scholarship in the then civilised world. Conrad Gesner's bibliography was subjected to analysis and classification, thus presenting the first content analysis and arrangement. This gave the users subject access as well as accurate bibliographic identification. Conrad Gesner therefore also became the forerunner of modern bibliographic control.

The seventeenth century witnessed the introduction of the journal as a medium of communication among scientists. The first scientific journals were established in 1661. These were the *Journal des Scavants* and the *Philosophical Transactions of the Royal Society* of Italy and Great Britain respectively. Prior to this, scientists exchanged information on each other's investigations by letters. The introduction of the journal as a medium of communication further increased the spate of world published literature. Iwinski¹⁰ reported rapid growth in the world's book publishing as follows :

⁹ Sean Jennet, *The making of books*. London, Faber and Faber, 1973. pp. 23-28.

¹⁰ M. B. Iwinski, "Bulletin de l'Institut International de Bibliography" XVI, 1911 in L. H. Linder, *The rise of current complete national bibliography*. New York, Scarecrow Press, 1959, p. 24.

Book Publishing 1436–1908

<i>Year</i>	<i>No. of Books by title</i>
1436	1
1436–1500	30,742
1600–1700	972,000
1858	65,000
1908	190,000

He also reported that when books doubled, the output of periodical literature quadrupled.

The subject content of early records were also indicators of the level and type of civilization. The first catalogue of printed books published by the elder Aldus in 1498, *Libri Graeci impressi*, was divided into five classes—Grammatica, Poetica, Logica, Philosophica and Sacra Scriptura—all of which are in the area of the humanities: language and literature, logic and philosophy and religion. In 1546 the books in the catalogue published by a bookseller and publisher, Robert Etinne, were divided into fourteen classes.¹¹

Hebraea	Rhetorica
Graeca	Oratoria
Sacra	Dialectica
Profana	Philosophia
Poetica	Geometrica
Historia	Medica

This showed that learning in the Middle ages was limited to the humanistic studies. Only the addition of Mathematics and Medicine showed that knowledge of the sciences was beginning to interest man as a scholarly pursuit. The increase in printed books, periodicals and other records began to pose problems of organisation for the keepers of records of libraries. Many of the libraries began to introduce registers of books in libraries, giving them numbers to indicate their location in the collection as in the British Museum Library. But these were later replaced by the author device now used in many library catalogues. Before 1840 there was no adequate means of finding out what were the resources of a library in a

¹¹ S. C. Bradford, *Documentation*. London, Crosby, 1948, p. 13.

particular subject area. Around 1840 the library catalogue had developed not only author entries but also subject entries. Another catalogue with subject entries was introduced to solve the problem of subject access, in England, by the famous librarian, Panizzi. This arrangement was not found adequate and Melvil Dewey introduced the *Dewey Decimal Classification and the Relative Index* in 1873. This classification was put into practice at the Amherst College Library in USA. It established a systematic basis for the organization of books in libraries. This classification formed the basis of the Universal Decimal Classification (UDC), devised for better subject access. An Indian, Ranganathan, devised an even more logical, if complicated classification which has influenced the multi-facet approach to indexing and subject analysis.

The industrial revolution accompanied by the growth in knowledge of science and technology of the eighteenth and nineteenth centuries led to the development of scientific literature. The journals, as transactions of societies, and others as independent journals included papers of original contribution required by scholarship and the scientists, even more urgently than books. The need to organize the original papers in these journals first led to the compilation of the *Catalogue of Scientific Papers* by the Royal Society initiated in 1867. It consists of nineteen volumes of bibliographic citations of scientific literature covering the period 1800–1900. The subject indexes were completed in 1908–1914. The follow-up work, the *International Catalogue of Scientific Literature* covering the period 1902–1919 is in fourteen volumes. Each annual issue was devoted to seventeen scientific subject areas. Before the completion of this work the need was felt for a new bibliographic control periodical to contain and give reviews of world periodical literature. The first abstracting service to appear was *Pharmaceutisches Centralblatt* which was initiated in 1830. Another abstracting journal was *Quarterly Journal of the Chemical Society* in 1847 which became *British Abstracts* and now *Science Abstracts*. The *Zoological Record* started in 1864 and the *Engineering Index* in 1884. These journals are all indicative of the growth in the size of the records of modern civilizations. In this period scientific studies seem to have emerged as dominant. There were also indications that social science literature was also increasing at a fast enough rate to pose a problem for social scientists. Paul Otlet and Harry La Fontaine were collecting documentary material

in the social sciences when they met and set up the "Office Internationale de Bibliographie" in Brussels in 1892. Their efforts led to the International Conference on Bibliography in 1895 which formally set up the Institute. The aim of the International Institute for Bibliography was to collect, by cooperation with other librarians and scholars, a complete record of world's intellectual literature—a complete world bibliography based on the founding of a central universal library at Brussels. The record was to be organized by subject classification into a bibliography. The idea which was utopian for the time failed, but the Institute remained to develop a more subject orientated classification—the Universal Decimal Classification. This classification was designed to cope with literature analysis in depth, and in particular, periodical literature. The establishment of national or subject documentation centres arose from the activities of the Institute, which also trained documentalists and published journals on the problem of documentation and bibliographic control in *U.D.C. Communications* which became *Revue de la Documentation*. The UDC was first used for organizing periodical literature by the Concilium Bibliographicum, a documentation centre established in Zurich to control the literature of zoology in 1892. It published three works: *Bibliographia Physiologica 1893*, *Bibliographia Zoologica 1896* and *Bibliographia Anatomica 1897*. Several other efforts at world analysis and control of subject and especially scientific literature were made which culminated in the establishment of important national documentation centres. Unesco in 1950 made plans to coordinate national efforts at bibliographic control and instituted a World Bibliographic Survey. It subsequently sponsored the creation of national scientific documentation centres in developing countries in Africa, Asia and Latin America.

After World War II the world production of books and periodical journals increased out of proportion, and a state of impending documentary chaos was declared by librarians.¹² It was termed information explosion by others. Since 1950, statistical studies show that we now have for literature an annual growth rate of 4–8% and a consequent doubling every 10–15 years for world's published literature. There are estimates to show that there are now about 80,000 regular scientific periodicals alone out of a total

¹² S. C. Bradford, *Documentation*. London, Crosby Lockwood, 1948, p. 106.

of 150,000 world journals; 1,500 science abstracting journals out of a total of 3,500 world abstracting journals. There are said to be 3,000 million titles of books in print. While it had taken thirty-two years, 1907–1938, for Chemical Abstract to reach one million titles, subsequent growth are indicated as follows:

1940	2nd million in 18 years
1948	3rd million in 8 years
1952	4th million in 4 years 8 months
1956	5th million in 3 years 4 months

There was panic in the early 1960 in case this trend should continue and the world became so inundated with literature that man himself would be displaced by his own records! Studies made by Solla Price in 1961 showed that world scientific literature was increasing at the approximate rate of half a million a year.¹³ While in the seventeenth century there were only a few scientists, the USA alone in 1961 had over a million scientists. The intellectual products of these scientists especially in a 'publish or perish' situation had caused the information explosion. Solla Price observed that if the rate of growth continues, projections for the year 2000 A.D. show that there will be over 1,000,000 scientific journals and over 3,000 abstracting journals for science alone.¹⁴

The panic situation that ensued led to a number of propositions to control world literature output. Restrictive editorial practices in accepting contributions for publication and language restriction of certain topics for serious scientific articles were suggested. This proposal did not receive any serious consideration for obvious reasons. A second proposal was concerned with instituting review journals—abstracts and digest—an alerting service to enable information on pertinent subjects to reach individual scientists. The Philadelphia Institute of Scientific Information series *Current Contents* is one such useful service for scientific publications in the world. Many documentation centres not only provided these current awareness service but introduced micro reproduction service in the form of microfilm, micro card or micro fische services.

¹³ Derek J. de Solla Price, *Science since Babylon*. New Haven, Yale University Press, 1961.

¹⁴ Derek J. de Solla Price, *Little science, Big science*. Columbia University Press, 1969, p. 9.

This enabled the whole 26 or 30 pages of a journal to be processed and compressed on a small 3 x 5 inch card or transparency.

The third proposition arising from the panic reaction was concerned with the use of computers for storage, subject analysis and matching for retrieval on request of pertinent bibliographic information. Various attempts have been made to put the catalogues of libraries on to computers. Today various computer compiled bibliographic tools and information tools are published. Computer information systems have also been established both for general catalogues and special subject areas. Examples of these are the Machine Readable Catalog of the Library of Congress (MARC project) which with the British MARC extension has now become an international project. This is an attempt to process on to tapes bibliographic citations of books in the Library of Congress and make the tapes available to other libraries. Now other library catalogues have been added to the project. The MEDLARS (Medical Literature Analysis and Retrieval System) is providing a control and retrieval service for world medical literature. *Chemical Abstract Inc.* and *Biological Abstract* are effectively controlling the literature for Chemistry and Biology respectively. Some large University Libraries not only have computer information systems of their holding but are linked to each other's computer data base.

BIBLIOGRAPHIC RESEARCH AND CITATION STUDIES

The introduction of machine and automation in bibliographic information processing has led to the emergence of problems not previously considered. This concerned the nature of the literature of specific subject areas, patterns of authorship, publication and citation now called *literature statics*. The second area is concerned with the growth-pattern changes in literature of a specific subject area over time, a study referred to as *literature dynamics*. These studies of changes in citation occurrence suggesting growth, obsolescence, or decline in a particular subject has become of great significance to bibliographic control and services. Secondly, computer technology failed to solve the problem of information control and processing as was hoped. Its retrieval efficiency was as low as 40 per cent in some cases. This did not justify the expenditure of large sums of money incurred. Librarians,

documentalist and scientist began to study the use and study habits of scientists and scholars to ascertain the needs that are required to be met by the new information systems, so that computer retrieved information may have a higher relevance ratio.

The material, forming the basis for these studies are the bibliographic citations of records of the scientific twentieth century world civilization. A new science of Bibliometrics has evolved using empirical statistical method to ascertain patterns of growth and use habit of scientists, using bibliographic citations of the relevant subject area. The evolution of such a study was anticipated by Jesse Shera and Egan in their work at the Graduate Library School, University of Chicago since the 1930s. In his article "Putting Knowledge to work"¹⁵ Shera suggested that :

The librarian must accept the responsibility for synthesizing the results of this scholarship into a unified body of knowledge that will equip him to become an effective agent in bringing man and his graphic records together in a truly productive relationship.

In order to do this he advocated that librarians must collaborate with other disciplines and use their methods to answer the question : what are the characteristics of knowledge and how is it put to work.

In their work *Foundations of a Theory of Bibliography*, Shera and Egan advocated that librarians must adopt the macroscopic approach in their bibliographic organisation of world literature and urged that "*the study of human intellectual development as recorded in documents offers an academic discipline of interest to librarians and library schools.*"

They urged that quantitative methods should be used as required for studies in demography, economics and sociology, to establish the discipline. Shera expressed the hope that librarians and bibliographers will pioneer the development of the discipline and so provide "a rational guide for the planning of bibliographic services—a pattern of bibliographic organization that would not only facilitate the flow of communication throughout all parts of the scholarly world but would permeate the entire social structure."¹⁶

¹⁵ J. Shera, "Putting Knowledge to work" in *Libraries and the Organization of knowledge*. London, Crosby, 1966, p. 55.

¹⁶ J. H. Shera, *Foundations of a theory of Bibliograph*. op. cit, p. 18–33.

Shera advocated these initial studies as bases for provision of adequate efficient service. Such studies should include situational analysis requesting answers to the question—'What information is essential to a particular institution like Chemical Industry for example. The assumption that just indexing chemical literature alone is adequate has been found a fallacy. Other subject areas in technology and social sciences not covered by chemical literature index may be of vital importance. Shera and Egan also drew attention to the observed growth pattern of knowledge which today forms the basis of studies in obsolescence of literature. Writing twenty years ago, they observed that :

The history of the world of thought of scholarship suggest, that man's knowledge exhibits two striking characteristics : first that knowledge carries within itself the seeds of its own destruction—a kind of radio-active half life that terminates in exhaustion at the climax of its own exponential curve, and second, as knowledge becomes increasingly complex and inter-dependent it tends towards fragmentation and centrifugation.¹⁷

Studies in growth of knowledge and ideas using bibliographic citations—records of man's intellectual products—have proved their observation valid. In the study of growth of science and its literature, Solla Price observed that the chaos of scientific civilization predicting that there would be "two scientists for every man, woman, child and dog" of the population in less than a century will not materialize because like all normal growth patterns, production of scientists and therefore their publications follow the logistic curve. He proved that an exponential growth observed, eventually reaches a limit of saturation, when it becomes stable and growth ceases. In his book, *Science since Babylon*¹⁸ he observed that citation studies of physics and chemical literature follow the logistic curve showing a period of slow rate of growth, followed by a period of exponential growth, and a third period of tailing off at the saturation limit marking a decline in rate of growth. From studies of literature annual production in *Little Science, big Science*, he showed that human influences, due to refusal to accept

¹⁷ J. Shera & M. Egan. . . "In the beginning was the word," *Libraries and the Organisation of knowledge*, op. cit, p. 5.

¹⁸ Solla Price, *Science since Babylon*. op. cit, p. 116.

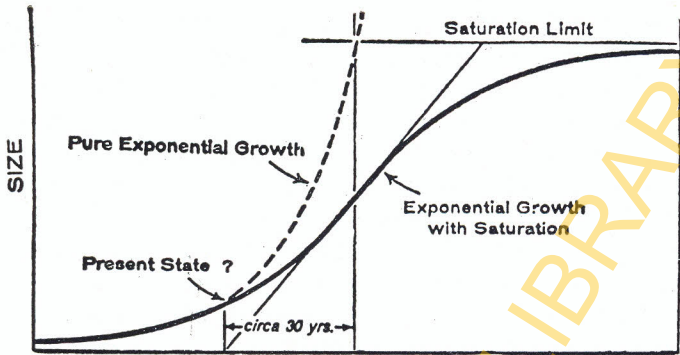


Fig. 15 General Form of the Logistic Curve

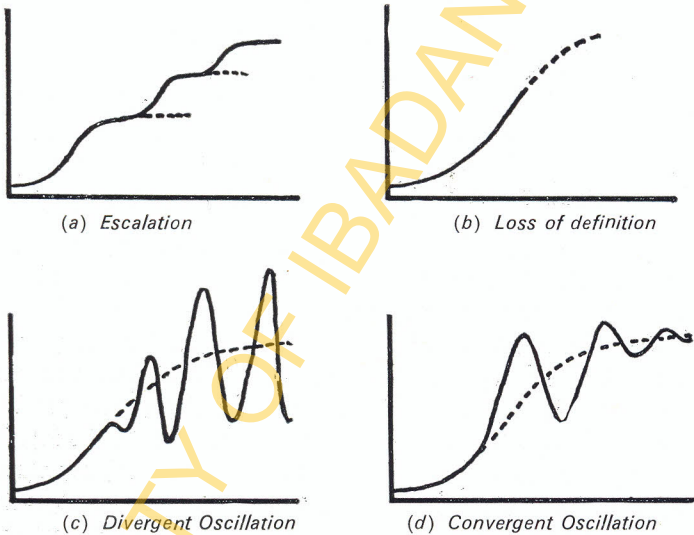


Fig. 16 Ways in which Logistic growth may React to Ceiling Conditions

normal failing growth tendencies, often varied this growth curve, and escalation curves or convergent oscillation tendencies may be observed.¹⁹

Other studies have also emerged related to this observation of Solla Price about knowledge growth patterns. William Goffman, who recently succeeded Shera as Dean of the Library School at

¹⁹ Solla Price, *Little Science, Big Science*. Columbia University Press, p. 24

Case Western Reserve, applying the epidemic theory (borrowed from medicine), postulated that dissemination of knowledge has affinity to the spread of infectious diseases. Using comprehensive bibliographies of sciences and quantitative methods applied to studies of symbolic logic, he found that the concepts of symbolic logic were 'endemic' in Western Europe during the nineteenth century with minor outbreaks from time to time. The epidemic however began in the early part of this century.²⁰ The mathematical theory of epidemic has been applied to studies of dissemination of scientific literature and epidemic curve patterns of the growth rate of some fields have now been drawn.²¹ Donohue studying the corpus of information science literature and growth rate or decline of researchers in the field, presents us with these epidemic curve patterns for studies in Automation, Electricity and Magnetism, Mathematics, Medical Sciences, Philosophy and Science as subfields of Information Science between 1959 and 1967. The graphs show that most of the subfield follow the 1963-65 decline of information science but some never recovered during the epidemic

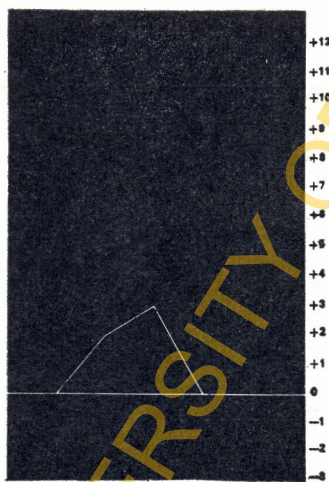


Fig. 17 Epidemic Curve Automation—general

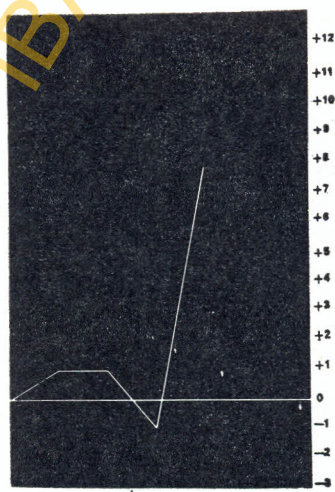


Fig. 18 Epidemic Curve—Electricity and magnetism

²⁰ W. Goffman, and V. A. Navill, "Communication and epidemic process," *Proc. Roy. Soc.*, 298, 1967, pp. 316-334.

²¹ J. C. Donohue, *Understanding Scientific Literatures: A Bibliometric Approach*. Cambridge, Massachusetts Institute of Technology, 1973. pp. 57-66

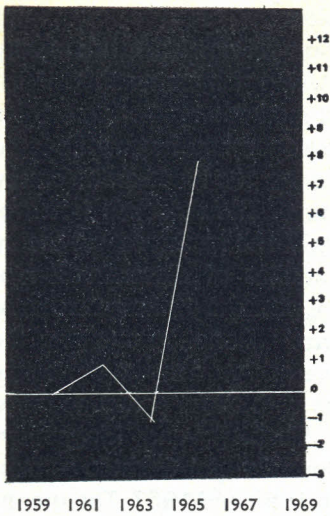


Fig. 19 Epidemic Curve—Mathematics

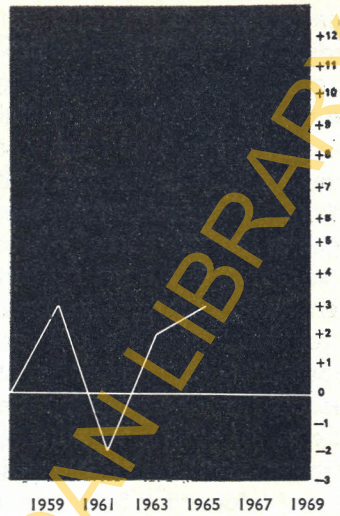


Fig. 20 Epidemic Curve—Medical Science, General

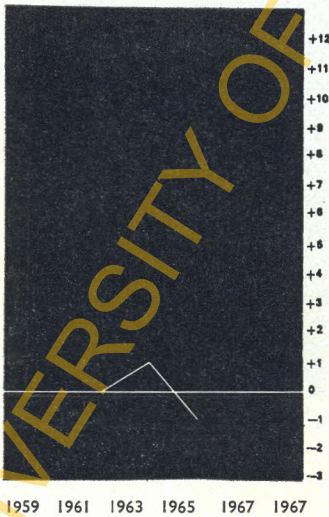


Fig. 21 Epidemic Curve—Philosophy

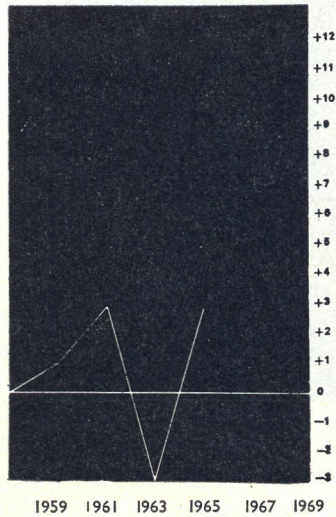


Fig. 22 Epidemic Curve—Science

period of 1965–67. Epidemiological studies can be used to trace the spread of ideas. They can also be used as basis for a diagnostic and probabilistic approach to the provision of materials and patterns of services offered by the keepers of the records of the scientific civilization.

It was, however, not only at Case Western Reserve that the idea of bibliographic citation studies as basis for records organization began. In Great Britain, Samuel C. Bradford, Keeper of the Science Museum Library and President of the British Society for International Bibliography in 1948 investigated the literature growth and use patterns of certain journals relevant to the clientèle of his library.²² He discovered that there is a statistical law governing the distribution pattern of productivity of authors in a corpus literature, if a large collection of papers is ranked in order of decreasing productivity of papers relevant to a topic.

Analysing the literature of applied geophysics 1928–1931 and lubrication 1931–1933 Bradford discovered that the scatter of papers were such that three zones could be discerned—a nuclear zone containing the most productive journals, for example eight journals. The second zone of moderate productivity will have $5 \times 8 = 40$ journals and the third zone will have $5^2 \times 8$ or 200 journals of low productivity.

Bradford's law of scatter has been formulated as follows:

If scientific journals are arranged in order of decreasing productivity of articles on a given subject, they may be divided into a nucleus of periodicals more particularly devoted to the subject and several groups or zones containing the same number of articles as the nucleus where the number of periodicals in the nucleus and the succeeding zones will be as in $1 : n : n^2 \dots$

This law has been found valid for only short time period search not exceeding five years and for small discrete subject areas where the equal chance of production and restriction operate.

Zipf, a humanist working on linguistic literature, also found that if all individual words are arranged in order of decreasing frequency of occurrence, a similar constant is observed in the

²² S. C. Bradford, *Documentation*. London, Crosby Lockwood, 1948, p. 106.

frequency of words used. This law which he termed 'the law of least effort' is similar to Bradford's law of bibliographic scatter. Brookes has modified the two statistical equations of Bradford and Zipf to derive a simpler equation to form the Bradford-Zipf²³ Bibliograph equation. This now forms the basis of Bibliographic Citation Studies in Bibliometrics.

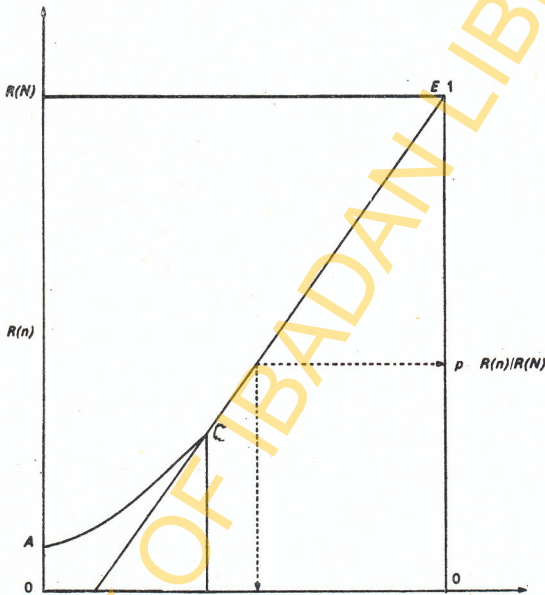


Fig. 23 Bradford's Law of Scatter

This discovery of statistical laws in bibliographic citation distribution has been used to identify important journals in a specific subject area. It is a significant development in bibliographical research and in formulating a theory of bibliography. It will enable the librarians, documentalists or information scientists to design effective information systems and services. Bibliometrics has been used to identify the relevant core journals for a specific subject. It has been used to determine the cost of collecting all journals

²³ B. C. Brooks, "The derivation and application of Bradford-Zipf distribution," *J.Doc.* **24**: **4**, pp. 247-265, Dec. 1968.

relevant to a topic. It may also be used to determine the optimum distribution between a given collection's central point and the branch points. Citation studies may also be used to group collections into frequent use, moderate use and rare access collections which in a library is useful for collection planning and organization. Zipf's law of least effort has also been applied to regional planning of public library sites. Research studies have shown "that the ease of use of information gathering method is more important than amount of information expected". Therefore, convenience is the dominant factor in determining library use.²⁴

Other sub-fields of citation tracing research is concerned with identifying the *research front* in a subject area.²⁵ This can be useful for librarians in their provision of relevant services to research. Through citation tracing and identifying the relevant journals, and a system of bibliographic coupling, a classification can be devised for use in an information system.²⁶ This gives a more rational basis for subject classification. Apart from identifying the corpus of a literature, citation studies is also used to identify the *support literature* by statistical methods.

A further development in bibliometric study is concerned with the effect of time on ideas. This is the study concerned with obsolescence rate of literature and is related to Goffman's epidemiological research. It postulates that "as soon as an idea has been documented its *effect* immediately begins to fade according to the exponential law of decay . . ."²⁷ The hypothesis assumes that every idea has a decay factor associated with it. Several studies on obsolescence had occurred since Gosnell's²⁸ findings in 1944 when he applied it to books in a college library. In more recent times, Kohut²⁹ (1974) investigated United States geoscience literature, with special reference to diversity among narrowly defined literature growth on obsolescence. We found that the traditional

²⁴ M. K. Buckland, & A. Hindle, Documentation Notes—Library Zip", *J. of Doc.* **25**: 52-57, 1969.

²⁵ D. S. Price, "Network of scientific papers", *Science* **149**: 510-115, 1965.

²⁶ M. M. Kessler, "Bibliographic coupling between scientific papers", *American Documentation* **14**: 10-25, 1963.

²⁷ J. C. Donohue, *Understanding scientific literatures*. op. cit.

²⁸ C. F. Gonet, "Obsolescence of books in college libraries", *College and Research Libraries*. **5**: **1**, 115-125, 1944.

²⁹ J. J. Kohut, "A comparative analysis of obsolescence patterns of the U. S. Geoscience literature", *J. Am. Soc. Inform. Sc.* **25**: 242-251, July-August 1974.

geoscience literature showed little change in obsolescence, in contrast with the area of geophysics which was fast changing.

Similarly, Maurice Line,³⁰ Director of the British Lending Library for Science and Technology investigating Physics literature found that obsolescence where it occurred, may be linear rather than exponential. Concentration of citations on articles for 1961–63 and 1970–1972 showed that in the first period, 18 per cent of articles accounted for 50 per cent of citations and 34 per cent for 75 per cent of citations; while in the second period, 11 per cent of articles accounted for 54 per cent and 25 per cent articles for 75 per cent of citations. This showed that many articles become obsolete while a few grow with time. Studies by S. M. Lawani³¹ of *Obsolescence of American and French Agronomic Literatures* has confirmed that there are changing rates of obsolescence which operate with time and like geology, that rate is slower for classic literature, than for ephemeral or new literature.

Nearly a hundred bibliographic citation investigations have taken place since Hulme³² in 1923 introduced statistical bibliographic studies. Bibliometrics, as it is now identified, has been applied to mainly scientific literature. Of the seventy-nine studies found listed in Library Science bibliographic tools (LISA and Library Literature), sixty-one are in science and technology and only sixteen have been recorded for social science literature. The humanities have been studied only in two general macro studies of library collections. The area of science most popularly investigated are general science and technology, chemistry, physics and medicine. The social science studies are limited to the literature of economics, sociology, public administration and geography. It seems the humanities literature may not be conducive to citation studies although there is really no fundamental reason why it could not be applied in this area.

Thus the records of civilization, the intellectual products of man offer us data for enunciating a theory of bibliography. Bibliographic citations offer material for a macro-bibliographic study to which objective, quantitative methods can be applied. If the laws of

³⁰ M. B. Line, "Does Physics Literature Obsolesce? A study of variation of citation frequency with time for individual journal article in Physics," *BLL Review* 2 (3) July 74, 84–91.

³¹ S. M. Lawani, "Obsolescence of American and French Agronomic Literatures," *J of Librarianship* 7: 12–30, 19, January 1975.

³² Edward E. Hulme, *Statistical bibliography in relation to the growth of modern civilization*, London, Grafton, 1923.

probability governing the process of writing and publishing now emerging can become established, it will provide library science with a methodology for theoretical research, as well as a rational basis for planning library and bibliographic information systems. Shera further suggested that these studies might form the basis of a new discipline of social epistemology which will provide a framework for studying the nature and characteristics of knowledge and the pattern of intellectual communication in the society. This knowledge, he suggested, might prevent the documentary chaos and eventual fragmentation and collapse associated with the decline of a civilization.

Information science has developed as an extension of documentation and librarianship in the second half of the twentieth century. It can be defined as the discipline concerned with the process of information transmission and is therefore concerned with man's intellectual products as one of the media of communication. Brooks defined it as the analysis, organization, dissemination of objective knowledge.³³ The Georgia Technology Conference in more detail, defined Information Science as:

The science that investigates the properties behaviour of information, forces governing flow of information and means of processing information for optimum accessibility and usability.³⁴

The new discipline of bibliometrics and computer applications to bibliographic information, storage and retrieval are extensions of library science with implications for revision of the educational programmes for librarians.

NON-GRAPHIC RECORDS AND MEDIA RESOURCES

I have been talking about the graphic records of civilizations. These must be taken to include archival and manuscript materials. Although the graphic records are the records of scholarship and intellectual interaction in a society, they are not the only record of civilization. The early civilizations left us monuments, artifacts,

³³ B. C. Brookes, "Fairthorne and the scope of Information Science," *J. of Doc.* **30**: 2, 139-150. Je 1974.

³⁴ Susan Artandi, *An introduction to computers and information Science*. New Jersey, Scare Crow Press, 1972, p. 19.

old cities and archaeological ruins. Their technology was such that these were the only records of their civilization that could survive. Modern technology has made it possible for other non-visual, non-tactile type of records to be made in the form of sound recordings or audio recordings as phonographs or tape recordings. Others are visual as in slides, film strips; others are both visual and audio as in films and video tape. Even intellectual graphic data can now be stored, in photographic micro forms as microfilms, micro card or as electrical impulses on magnetic tapes, disc or punched cards. These modern formats of information have been added to the records of twentieth century civilization. Now we have archives of sound, computer data banks, oral history collections and audio-visual material collections added on to the records of our civilization. They have now found their way into libraries and the old conventional book collections called libraries are now becoming *media resource centres*.

Although the idea has only been fully developed for schools, it is also now gaining acceptance for University Libraries. This new development is of great significance to cultures like ours in Africa that are non-literate and oral in tradition. It has been found in studies made by Aboyade³⁵ that primary source material for humanities research are not in libraries. The primary source materials are, in fact, largely non-graphic records, products of man's creativity consisting of art works, oral literature, music, dance and festivals and cultural events for our particular cultural setting. The bulk of knowledge of Africa's culture and history is still unrecorded. Such knowledge exists in living forms in the music, art, oral literature, social norms and habits of the contemporary society. The onslaught of foreign Western civilization and way of life is causing disintegration and a possible disappearance and loss of knowledge of Africa's cultural heritage. We are all aware of the dual world of split personality of the average African. One is the literate, Western civilization-oriented world and the other is the traditional, non-literate, oral, 'grass roots' world. If one may visualize and pronounce on what type of records our twentieth century Nigerian society will leave for posterity, it seems records

³⁵ B. O. Aboyade, "The provision of library materials and library services for the Humanities in Nigeria." Seminar Paper, Dept. of Lib. Studies, University of Ibadan.

of twentieth century Nigeria will be primarily concerned with its literate Western-oriented segment which consists of 5–10% of the population. How accurate and valid will those records be if posterity relied only on the graphic records being collected by archives and libraries in Nigeria today to evaluate our twentieth century civilization? The written records of contemporary Nigerian society are records of the ten per cent who are educated. These are the records of groups who now evaluate and report on their traditional society from the stand point of a foreign culture, foreign norms and values. Even the popular Onitsha literature and the local language publications³⁶ will only be partially accurate in presenting the other traditional non-literate world. It is true that only the records of the elite sections of past civilizations have been passed down to posterity. The records of twentieth century civilization however have a better chance of being more complete and more comprehensive. This is because we now use advanced technology, for live recordings of human activities. The current projects for collection of contemporary history data in the oral history projects³⁷ are indicative of this trend. The archives of visual records in the form of slides, films and video tape point to a more comprehensive record of twentieth century civilization. One hopes the arrangements for the Black and African Festival of Arts include plans for systematic record of the events on video tape.

With the integration of non-graphic materials into the records of civilizations, libraries, the institution for handling them, will have not only its resources drastically changed, but also its structure and organization. The libraries of the future will be media resource centres having book collections, micro-form collections for older materials and data bank computer terminals. They will have telex and other electronic or satellite systems linking them and their collections to a number of libraries in a national, regional or even world wide systems network. This has already been proposed by Unesco³⁸ in NATIS which is a proposal to establish a world wide information system. African countries stand most to gain from having direct access to the worlds store of scientific information

³⁶ F. A. Ogunsheye, *Yoruba language bibliography*. Ibadan University Press, 1976.

³⁷ Norman Hoyle, "Oral history," *Library Trends*, 21: 1, 60–82, July 1972.

³⁸ Unesco, National Information Systems (NATIS); objectives for national and international action. Paris, Unesco, 1974. COM 74/NATIS/3.

and knowledge and must be prepared to establish library processes and methods that will be compatible with the international network system. The libraries of the future will have to pursue a more aggressive policy in collecting and documenting records of civilizations. They will have to be, not passive collection centres, but active centres, collecting and generating knowledge and so pursue a more positive role in sustaining our civilization.

The studies and developments taking place in Library and Information Science offer promise that the scientist and scholars of the twenty-first century will have a more complete, comprehensive record of the world's literature. But their study habits may change with change in formats of information. It is envisaged that the scholar and scientist may not only have at his desk mini computer, but may be linked directly to world wide information systems.³⁹ His preliminary research of previous studies may in fact be completed for him by experts, who know the literature sources of his subject and the 'research front' much better than he does. He may have to rely on the packaged store of literature pre-analysed and processed for him.

CONCLUSION

Vice-Chancellor, Sir,

If the nature of records of civilization and its processing will undergo radical changes, then the training and education of future librarians and information scientists must be reviewed accordingly. Librarians of the future will be required to be subject specialists in special areas of the records of civilization that they handle. The content of their education will have a more rigorous theoretical base for its practice. Librarians of the future will require statistical analytical methods, operations research methods and systems analysis to determine the nature and characteristics of services they offer, and the operations and processes they apply.

We have taken account of these new developments in the Department of Library Studies. Since the inception of the Department as the Institute of Librarianship fifteen years ago, my predecessors made sure that the candidates for the full professional

³⁹ J. C. R. Licklider, *Libraries of the future*. Cambridge, MIT Press, 1965.

course were mainly graduates with good first degrees, usually honours degrees, and therefore had some specialization in a particular subject area. We have since given a broad core course to encompass as wide an area as possible of professional education for the Postgraduate Diploma award and the Diploma for non-graduates. Over 257 librarians and paraprofessionals have since qualified from our library school. In 1969 we introduced Higher Degree by research to encourage investigation into special problems of librarianship in Nigeria and its accumulating literature. We have therefore had our students pursuing research on Nigeria's geographical literature, on the literature of agriculture and children's literature for bibliographic investigations. Other areas of research have been concerned with copyright laws, the library's clientele in Nigeria, acquisition and book selection processes in University libraries. In order to train high level specialist we have put forward proposals for a two-year Master's Degree in Library Science, the first year of which will be the current postgraduate diploma programme. This will enable us to educate librarians, information scientists, high level management personnel and media technologists, who will be capable of handling the complex records of civilization that is emerging. We plan at the Master's level to give the analytical, statistical and bibliographical research methods required to pursue the type of research and investigation that I described earlier. It is my hope that when these courses are fully operating, Nigeria will have the specialists to give it modern library and information service. We also envisage that skill in the use of books and libraries or library science will have to become a subject on schools curricula. We are, in the department, developing curricula for primary, secondary and teacher training colleges. We have also established a media resource centre as a pilot project to train teacher-librarians and demonstrate the importance of school libraries and media resources centres in the whole education process. We also plan to conduct research into children's reading habits. It is our hope that only by so doing can we ensure that future Nigerian scholars and scientists appreciate and are able to use the complex and sophisticated services, which I mentioned earlier, will emerge before the end of this century.

The Third National Development Plan has recently been launched. Every component of that plan, Agriculture, Education, Industry

Power, Social Services, require supporting knowledge and information services for the various level of manpower, for the plans to be realized. The education budget for the plan has been given as 2.5 billion naira. This estimate no doubt include capital and recurrent expenditure. When the details of the budget are known, I hope at least 4.9⁴⁰ per cent of the education recurrent vote will be allocated to Library provisions of all types and for all educational levels, schools, college, public, university and special libraries, We need this for a complete and accurate record of our unique African civilization of the twentieth century to be made. We also need the services in support of accelerated future development of the powerful African civilizations that we hope will emerge within the next millenium.

Vice-Chancellor, Deans, Ladies and Gentlemen, thank you for listening to me.

⁴⁰ 4.9% of education recurrent expenditure is the UN estimate and recommendation for African countries for development of library services for moderate target development by 1980.
Unesco. Expert meeting on national planning documentation and library services in Africa. Kampala, Uganda 7-15 Dec. 1970. Paris, 1971, p. 17.



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