

University of Ceylon Review

Vol. IX, No. 2

April, 1951

*Sanskrit in the University**

A PROFESSOR of Sanskrit delivering his inaugural lecture in a modern university may well be pardoned if he feels somewhat like the keeper of an antique-shop trying to advertize his old-world wares! The idea is sometimes entertained, explicitly or implicitly, that the study of the past and the so-called 'dead' languages, particularly those of the Orient, should have no place in the new scheme of things; that only livelier subjects like law and medicine, economics and statistics and the various sciences are the only forms of knowledge worth acquiring, for they could be readily turned to practical account in life. I do not wish to go into the deeper philosophical issues involved in such an attitude nor enter upon an analysis of the ethical situation that springs from such a sense of values. The problem of the present-day significance of the *humanities* has received ample treatment at the hands of more competent authorities than myself.¹ I would rather take my stand on the conviction that the University of Ceylon is sufficiently satisfied of the value of Sanskrit studies to have established a Chair of Sanskrit in the first few years of its existence.

There are a few considerations, however, which I would urge before I deal with the subject proper. The contention that the ancient languages and literatures have no meaning for us rests on a fallacy born of a too revolutionary view of human progress. If civilization is what it is today, it is largely, if not solely, due to what it was yesterday and the day before. Every step in human progress has been made possible only on account of the social tradition handed down by past generations and this tradition, of which language is perhaps the most important element, lives even today in each of us. As a leading anthropologist says 'The culture that exists at any given time and place has come from the past. It is the result of accumulation of things, attitudes, ideas, knowledge, error, prejudice . . . From this angle, the major role of language

*Inaugural Address delivered on 25th January, 1951, at King George's Hall, University of Ceylon.

1. See *Synthesis in Education*—Addresses given at the Summer Conference organized by the Institute of Sociology at Newnham College, Cambridge, August, 1944: edited by Miss D. M. E. Dymes, M.A.

is that of a culture-carrier . . . Next to the prolonged infancy of man, the culture-bearing function of language is the most important fact in the making of humanity'.² The past is never *dead*, in the sense of being annihilated, it continues to live in its products. There is a true sense in which Sanskrit, like classical Latin and Greek and other tongues no longer spoken by whole communities, never died. They were in course of time transformed by the processes of linguistic change, and the modern dialects derived from them are the *living continuation* of these dead languages. In the same sense as Latin is considered³ to survive in its derivative languages and dialects such as Spanish, Portuguese, French, Italian, so Sanskrit can be said to live today in its derivatives such as Bengali, Hindi, Marathi, Gujarati, Sinhalese and a host of other dialects. In a different way it may be held that Sanskrit survives also in the Brahmin schools of Vedic learning, in the various institutions of Pandits and Sastries, such as the Navadvīpa school of logicians in Bengal, and also in the technical subjects and professions like medicine and music, just as Latin has been declared to survive in the Catholic Church and in the various church libraries and schools.

Apart from these purely linguistic considerations, the civilization of which Sanskrit has been the main vehicle permeates the life of nearly everyone in a large part of Asia today, including the Sinhalese and Tamils of Ceylon. I may add that the comparatively lower estimate of Oriental literatures and the civilizations they represent that has been the fashion of several writers in the past, is hardly possible today in view of the importance of scientific discoveries in the ancient cultures of the East in general and of India in particular, and the more accurate knowledge we have now of prehistoric and ancient cultural contacts between the East and the West. I shall have occasion in the course of this discussion to offer you a few facts to support this statement.

As my immediate duty, however, I am going to ask your patience while I attempt to give you a brief description of the modern significance of Sanskrit studies, or as the Germans are (or rather, were!) accustomed to call it, of *Indology*. Although the term 'Indology' may not seem so apt when used in a University like that of ours where the study of the literatures and civilizations contained in other Indian languages like Pali have separate Chairs, yet it does seem relevant in so far as a teacher of Sanskrit in a modern University must concern himself not only with the Sanskrit language, its literature and philosophy, but also with the rise and growth of the civilization that is reflected in it. It is only then that the concept of Sanskrit as one of the *humanities* comes to be fully justified. With this in view, I shall first deal with the methods of teaching and research, as I humbly believe should prevail in the

Sanskrit department of a modern university, and then endeavour to offer you an analysis, however brief, of the *motives* of such scholarship.

It is no secret that even in Ceylon there is at present considerable confusion, although not so patent as in India, as regards the correct method of approach to the study of Sanskrit. On the one hand, those of the 'old school' would have even the university propagate the traditional and conventional methods of teaching and studying Sanskrit as followed by the Pandits and the Sastries. On the other hand, we have the modern students of Sanskrit who, having received their training in the universities of the West or under teachers trained there, have developed a 'scientific' attitude towards their subject. They have regard for what Prof. Radhakrishnan has so aptly called 'the University spirit of self-criticism and broad-minded reasonableness'.⁴ The university student, even of the arts or humanities, has today to conform to that self-same principle of self-elimination in his judgements which Prof. Karl Pearson in his *Grammar of Science* recommends to the pure scientist. There can be no blind acceptance of ideas, however hallowed by tradition or surrounded by the halo of antiquity. While he must respect the true achievements of the past, the University student must ever be ready to reject whatever does not stand the test of rational and intelligent scrutiny. In short, he must develop the spirit of objectivity, or the scientific attitude.

No less shrewd a judge of the contemporary situation in India, the home of orthodox Sanskrit scholarship, than Prof. Radhakrishnan, himself a proud admirer of things Indian, is compelled to exclaim: 'I am afraid that the Sastries and the Pandits, the Moulvies and the Moulanas . . . of the conventional type are not likely to be of much help to us in our present condition'.⁵ In spite of this, however, attempts are made⁶ even today to emphasize the need of adhering to the older and traditional methods of learning and teaching Sanskrit, as it is claimed that since there is much that is logical and intelligent in those methods we should somehow adopt them in the University. The immediate problem, so far as I see it, in relation to the University, does not so much pertain to the correctness or otherwise of this claim, but simply to the appropriateness of having recourse to those ancient methods *in the modern social context*. It is well known, for instance, that to gain sufficient mastery of Sanskrit grammar, according to the older aphoristic or *sūtra* method, to be able to make any practical use of such knowledge, it usually involves far more time and labour than is possible for a university undergraduate to devote. And, even if he were to gain such mastery, it is extremely doubtful whether he will be able to tackle his subject in the critical and historical manner required by university studies. The Pandit's microscopic knowledge of grammar often

2. Goldenweiser, *Anthropology* (New York, 1946), p. 41.

3. Highet, *The Classical Tradition* (Oxford, 1949), pp. 6-8.

4. *Freedom and Culture* (Madras, 1936), p. 2.

5. *Loc. cit.*

6. Huparikal, G. S., *The Problem of Sanskrit Teaching* (Kolhapur, 1949).

becomes an ideal by itself, and, whatever advantages it may have, it certainly imposes severe restrictions on his appreciation and interpretation of the literature. The University cannot resign itself to such drastic limitation of outlook which is the defect of the virtue of the microscopic, intensive study of a sacred book or classic. It is the function of the university to broaden the mental vision of its students, but not to confine it to any one particular groove. The comparative philological approach to the Sanskrit language has met with such outstanding success at the hands of western scholars that it is hardly necessary to dilate upon it. The grammatical works of Whitney and Macdonell, Wackernagel and Renou amply demonstrate the superiority of the modern method, although, I hasten to add, these experts themselves have always been ready not only to acknowledge the great scientific value of Pāṇini's ideas but also their own indebtedness to some of them. It seems singularly appropriate in this connexion to adapt the words recently used by Mr. Nehru in a slightly different context: the achievements of ancient Indian grammatical science are patent to everybody as also the fact of its having become stagnant. To follow Pāṇini and do nothing else to develop Sanskrit grammatical knowledge would be most unprogressive.

As for the other branches of Sanskrit learning, the value of the modern critical, comparative and historical approach is far greater and obviously it is the only logical course for a university to follow under modern conditions. The Sanskritist who wishes to understand the R̥gveda, or, for a matter of that, any Vedic text, without the aid of the modern sciences of comparative philology, comparative religion and mythology, archaeology and anthropology, is indeed attempting a hopeless task. This does not mean that the indigenous tradition with its commentaries and glossaries is useless and is to be completely ignored. The University must and will use all available avenues for the acquisition of knowledge and the progress of research. For an illustration, I may refer you to the story of the Great Flood as found in a Vedic text, the *Śatapatha Brāhmaṇa* (I. 8. 1) where it is related how Manu, the primeval progenitor of the human race, was saved from the great Deluge by a fish with the help of a ship and how the human race came to be renewed through him, the sole survivor. The university scholar who attempts to understand this legend will not only refer to the Indian exegetical tradition and the other versions of it as found in the *Mahābhārata* and the *Purāṇas*, but as a student of comparative mythology and folklore he will soon come to recognize this same legend in the various Flood stories of other nations and cultures. For, anyone who reads the Huxley Lecture⁷ delivered by Sir J. G. Frazer in 1916 can hardly fail to see that the roots of this Brāhmaṇa legend are far more widespread than may be implied by the extant Indian tradition. In fact, it

7. Enlarged and republished in his *Folk-lore in the Old Testament*, Vol. I, pp. 104, et. seq.

is only the wider view thus provided by modern research that can make this legend at all intelligible. And so it is, I may add, with the whole field of Vedic antiquities. Those who resort to the self-contained technique of explaining this ancient literature on the sole basis of the indigenous tradition are apt to find themselves involved in the web of their own speculation. A modern university guided by a spirit of criticism and broadmindedness can ill-afford to spend its time in such pursuits.

So far I have spoken about the advantages that the Sanskritist may derive by paying due attention to the comparative, critical and historical methods of modern scholarship. It is now time to take up the more important part of my thesis, and to discuss the place of Sanskrit studies in the academic scheme of a modern university. Why should Sanskrit be taught at all? And, why should so much time and labour be devoted to research into the various aspects and phases of that language and civilization? These questions necessitate an analysis, however incomplete, of the motives of Sanskrit scholarship as pertinent to the modern University.

I do not consider it so necessary in this lecture to emphasize to you the great cultural and aesthetic value of Sanskrit literature. Every student of world literature is acquainted with the works of Kālidāsa, and, however great this dramatist-poet was, he was certainly not a lone star in the firmament of Sanskrit literature. Other equally great names are abundant although their possessors did not have that all-round excellence generally attributed to the master. 'In the great writers of Sanskrit *kāvya*, headed by Kālidāsa', writes Prof. Berriedale Keith, 'we find depth of feeling for life and nature matched with perfection of expression and rhythm'.⁸ Nor does this mean that Sanskrit poetical literature only begins with Kālidāsa. The great epic, *Rāmāyaṇa*, which preceded Kālidāsa by several centuries, has been hailed by competent literary critics as 'a conscious work of art'.⁹ In gnomic poetry too the Sanskrit writers 'attained a mastery which has never been gained by any other nation'.¹⁰ This classical Sanskrit literature dates from about the beginning of the Christian era, as the remarkable discovery of Aśvaghoṣa's poems and dramas showed. It is dominated not only by aesthetic aim but by a complex aesthetic theory as well. This literary aesthetic is popularly held to be the cause of the 'artificiality' of later poets, leading to an erroneous comparison of Sanskrit poetry with the Alexandrine literature of Greece, although it must be understood that it developed in intimate relation to the Indians' mode of life and their dominant philosophical tendencies. But, even this technical movement, as the late Prof. F. W. Thomas insisted, is not

8. *A History of Sanskrit Literature* (Preface, 1928), p. vii.

9. *Ancient India and Indian Civilization*, edited by Masson-Oursel, p. 226.

10. Winternitz, *A History of Indian Literature*, p. 2.

to be underrated. In the best of the classical poets such as Bhāravi and Kālidāsa even such convention could 'evoke a strong aesthetic response'.¹¹ The Indians' cultivation and the appreciation of beauty—taste, *rasa*—was conscious and deliberate, and led to their elaboration of a remarkable aesthetic theory, whose psychological value is only now beginning to be appreciated in the West.¹² I do not wish to dilate any further upon the high aesthetic value of this literary legacy, as it will be readily conceded that the teaching of such a rich and varied literature must immeasurably add to the cultural content of any university education. For, it is my main intention in this lecture to draw your attention more to the *scientific* value of the ancient literary documents found in Sanskrit. This is an aspect which needs particularly to be stressed in the present context inasmuch as it has not been sufficiently appreciated in its important bearing on the problem of the modern concept of *synthesis* in university education and its professed ideal of *humanism*.

By the term 'scientific value' as used here one may understand the historical significance of the data afforded by the vast Sanskrit literature, for example, to the linguistic and the anthropological sciences, or, one may mean by it the direct scientific value of whatever conclusions the ancient thinkers and scientists of India had reached with regard to the problems of life and the world. The former approach may be said to consider Sanskrit literature as a museum in which the modern student of the Sciences of Man may find valuable material for his studies. 'Whoever likes to labour in these the most ancient of historical archives', says Max Müller with reference to the R̥gveda, 'will find plenty of discoveries to make—and, yet people ask, what is the use of learning Sanskrit?'¹³ It would have given intense satisfaction, if he lived today, to this illustrious pioneer of Sanskrit scholarship to know that every modern student of language, of prehistory and antiquities, of comparative religion and of various other branches of academic learning, has begun to realize the great scientific value of Sanskrit literature.

It is undoubtedly in the Science of Language that the influence of Sanskrit has been most pronounced and universally accepted. I need not dwell at length on the momentous significance that the Western discovery of Sanskrit had for the development of Comparative Philology. It was in his third address before the Royal Asiatic Society of Bengal, on 27th September, 1786, that Sir William Jones made that memorable statement which became the starting point for the modern science of Comparative Philology in Europe. 'The Sanskrit language [he declared], whatever be its antiquity, is of a wonderful

11. *The Legacy of India*, edited by G. T. Garratt, p. 196.

12. Masson-Oursel, *Comparative Philosophy* (The International Library of Psychology, Philosophy and Scientific Method, edited by C. K. Ogden, 1926), p. 191.

13. *India—What Can It Teach Us*, p. 27.

structure; more perfect than the Greek, more copious than the Latin, and more exquisitely refined than either; yet bearing to both of them a stronger affinity, both in the roots of verbs, and in the forms of grammar, than could possibly have been produced by accident; so strong indeed that no philologist could examine them all three without believing them to have sprung from *some common source*, which perhaps no longer exists. . . .¹⁴ This is how a recent writer on linguistics, Dr. Goldberg, characterizes this epoch-making discovery: 'In the history of languages this discovery of Sanskrit is comparable to the discovery of America in the history of the continents. It altered, at one stroke, the whole map of linguistic research'. Previous to this, even such able thinkers like Leibnitz, Trombetti and others in their speculations on the history of language were merely groping in the dark. 'This groping, however informed and intelligent', adds Dr. Goldberg, 'might have continued thus blindly for ages, were it not for the "discovery" of Sanskrit. The sacred language of the Hindus comes upon the scene like a *deus ex machina*, in one of the central moments of all linguistic investigation'.¹⁵ I have neither the time nor the inclination here to follow up the subsequent contributions of Sanskritists like Bopp and Brugmann, Max Müller and Whitney to the advancement of linguistics. It will suffice to observe that Comparative Philology is now recognized by most universities as an aspect of Sanskrit studies and is regarded as one of the academic disciplines. In fact most Chairs of Sanskrit in the world are designated as Professorships of Sanskrit and Comparative Philology. The erroneous impression that its value is only for the study of language, that ethnic and cultural deductions based on linguistic data as attempted in linguistic palaeontology are nearly always deceptive, can now be dismissed as an unduly alarmist preconception. No less a scientific student of culture than Prof. V. Gordon Childe who does not hesitate to accept whatever linguistic palaeontology has to offer in his search for the prehistory of 'the Aryans' says: 'Philology may therefore claim a place among the historical disciplines, the functions of which are to reanimate and interpret the process whereby man has raised himself from animalism to savagery, from savagery to barbarism, from barbarism to civilization'.¹⁶ He has no doubt that common language does imply a common outlook in its speakers and that phonetic changes may indicate an *ethnic* basis. And this 'key to lost civilizations' was certainly furnished by the discovery of Sanskrit.

The scientific data provided by Sanskrit language and literature do not stop with the materials it offers to linguistics. The Vedic literature, going back to the middle of the second millennium before Christ, possesses, in the

14. *Works of Sir William Jones*, edited by Lord Teignmouth, Vol. II, p. 268.

15. *The Wonder of Words* (New York and London, 1938), p. 218.

16. *The Aryans* (History of Civilization Series), pp. 3, 7, 78-79.

words of Prof. Winternitz, who was both Sanskritist and ethnologist, 'absolutely priceless material, which no investigator of Religion can afford to pass by'. Not only for the study of Comparative Religion, but also for the study of comparative mythology and prehistory and the history of civilizations the value of this oldest of Sanskrit texts is nowadays admitted without reserve. 'This priceless document', says Childe, 'also furnishes precious historical data'.¹⁷ Prof. Piggott in his recently published book on *Prehistoric India* admits the great value of the *R̥gveda* for the modern archaeologist. This is what he says: 'We shall see that an examination of the material culture of the composers of the *R̥gveda*, as extracted from the allusions in the text, is entirely compatible with what we know of conditions at this time [i.e. middle of the second millennium B.C.] from archaeological evidence from other regions of early Indo-European colonization around the edges of the old city civilizations in Asia and in the Aegean. I think we are justified in accepting the *R̥gveda*, on archaeological grounds, as a genuine document of the period . . .'¹⁸ Till recently archaeologists and historians practically ignored this great document. The archaeological discovery of the Indus Valley (or Harappan) civilization, although hailed as an important step in establishing the Indian as one of the great civilizations of the ancient world rivalling those of Egypt, Mesopotamia and China, presented an enigma to the students of the *R̥gveda*, inasmuch as there was the tacit assumption that this Aryan document showed hardly any traces of such an anterior culture in the Punjab Valley. It was only in 1947 that Dr. Mortimer Wheeler, the Director of Archaeology in India, put forward on archaeological grounds his tentative theory of the probable chronological relationship between the two cultures.¹⁹ The yawning gulf that once separated the *R̥gveda* from the Indus Valley civilization thus appears at last to have been bridged and the two cultures seem chronologically connected—a connexion which, I may add, I was fortunate to have anticipated, however dimly, by a study of different data from these two sources.²⁰ This hypothesis certainly opens up fresh avenues for investigating the culture of the *R̥gveda* and establishes the continuity of Indian civilization for over four or five millennia. The value of all these discoveries for the history of civilization should be patent to all unbiassed students.

It must be emphasized that it is not only in the *R̥gveda* and the other Vedic texts that data for scientific studies are available. The bulk of Sanskrit literature is not religious in import but secular. The great value of the fable literature of Sanskrit is accepted by all western authorities. In fact fairy-tale

17. *Op. cit.*, p. 30.

18. *Prehistoric India* (Pelican Books A 205), p. 256.

19. *Ancient India* (Bulletin of the Archaeological Survey of India), No. 3, pp. 78-83.

20. *Dr. C. Kunhan Raja Presentation Volume* (Madras, 1946), pp. 429, *et. seq.*

research became an independent branch of knowledge only through Benfey's fundamental work on the famous Indian book of fables, the *Pañcatantra*. The sociological value of the encyclopaedic contents of the two Great Epics of India, the *Mahābhārata* and the *Rāmāyaṇa*, is clearly seen from the researches of E. W. Hopkins, J. J. Meyer and others.

The study of the vast amount of data presented by this immense literature has been the main task of Indology since the first Chair of Sanskrit in the world was established at Paris at the beginning of the last century. It did not take long to realize that this priceless material was a veritable boon to the students of the 'Sciences of Man', among which, according to Joseph McCabe, the majority of present-day sciences are to be counted, such as psychology, archaeology (as the Science of Prehistoric Man), anthropology, ethnology, philology, ethics, aesthetics, comparative religion, sociology and economics.²¹ For such studies as these, the 'discovery' of Sanskrit by European erudition opened up a vast field of investigation and Indology became, in the words of Prof. Louis Renou of Paris, 'a veritable science, more fertile and richer on the human plane than the other fields of research in connection with Egypt, Assyria or China'. 'The great works of Indology', he continues, 'are models of science, even if the results have been rendered uncertain in some cases by further progress in research. Human science counts no greater names than those of Burnouf or Bergaigne in France, Colebrooke or Wilson in England, Lassen, Benfey, Weber, Max Müller in Germany, to mention only the pioneers'.²²

The emphasis I have here placed on the value of the raw facts contained in Sanskrit literature for the investigations of scientific students should in no way be taken as indicating that this great literature is only a museum or a collection of antiquated specimens. The actual contributions of Indians to the development of scientific thought among the nations of antiquity are only now beginning to be appreciated. I have already referred to the untenable view of some critics of Indian civilization that the ancient Indians were only a set of dreamy philosophers. 'It would be utterly misleading', says Prof. Berriedale Keith, 'to picture India as a land of philosophers, of men of thought, not of action. India did not, as Mathew Arnold's poetic vision held, bow deep before the onslaught of Alexander the Great. It desperately resisted it . . .'²³ Similarly, Prof. W. E. Hocking of Harvard ridicules the idea that it is only the West that has been 'realistic' and that the East has ever slumbered in an 'unreal' world.²⁴ Every student of Sanskrit now knows that there was

21. *Encyclopaedia of Modern Knowledge* (ed. J. Hammerton), p. 2108.

22. *The Future Role of Sanskrit* (Article in The Adyar Library Pamphlet Series, No. 17), p. 21.

23. *Encyclopaedia of Modern Knowledge*, p. 1797.

24. *Philosophy East and West* (ed. C. A. Moore, Princeton University, 1946), p. 4.

in ancient India a large amount of literature dealing with the practical affairs of life, with technical arts and crafts, and with specific sciences. Much of this has been lost; a large part of what has been preserved is still unedited; and most of the edited texts have not been studied critically. The available texts show not only an abundant literature on politics and economics, law and medicine, astronomy and mathematics but also on music and dancing, dramatic art and poetics including literary criticism, erotics, architecture, sculpture and other subjects. All these subjects were arranged in scientific systems, and treated in special manuals of instruction. It was an exaggerated idea of the part played by religion and philosophy in the life of ancient India that led to this neglect of Indian *Realien*, as so pointedly stated by Prof. W. E. Clark.²⁵

I have previously referred to the scientific value of India's great work on grammar, the *Aṣṭādhyāya* of Pāṇini. This grammar, which dates from somewhere round 350 to 250 B.C. has been called by Prof. L. Bloomfield 'one of the greatest monuments of human intelligence'. 'This Indian grammar', says this famous authority on linguistics, 'presented to European eyes, for the first time, a complete and accurate description of a language, based not upon theory but upon observation'.²⁶ There is evidence that the scientific analysis on speech-sounds had been undertaken even before the time of Pāṇini.²⁷ The Upaniṣads about the eighth century B.C. show a remarkable classification of phonetic elements and there are Vedic manuals or Vedāṅgas on *śikṣā* or pronunciation. These achievements of Indian grammarians and phoneticians stand out in clear perspective when we remember that until the late eighteenth century Europe was, in the words of a recent western writer, 'in the position of the polyglot, who knew many tongues but was still in any deeper sense, linguistically ignorant'.²⁸ Prof. Clark is therefore justified in saying 'that the study of language in India was much more objective and scientific than in Greece or Rome. The interest was in empirical investigation of language rather than in philosophical theories about it . . . Indian study of language was as objective as the dissection of the body by an anatomist'.²⁹ It is now well recognized that lexicography too attained a high age in India, but it is not so well known that the ancient Indian lexicographer's methods of semantic analysis have been a source of inspiration even to Dr. Roget, the celebrated author of the first *Thesaurus of English Words and Phrases*. In his Introduction to that work he refers (pp. xxiii-xxiv) enthusiastically to

25. *The Legacy of India* (ed. Garratt), p. 335.

26. *Language* (London, 1935), p. 11.

27. Max Müller, *Lectures on the Origin and Growth of Religion*, p. 146.

28. Goldberg, *op. cit.*, p. 217.

29. *Legacy of India*, pp. 339-340.

the famous vocabulary of the Sanskrit language, the *Amara-Koṣa* as translated by Colebrooke, which he regards as at least 900 years old. Referring to the section of that work relating to natural objects classified into separate classes, Dr. Roget remarks that it exhibits 'a remarkable effort at analysis at so remote a period of Indian literature'.³⁰

For another illustration of the achievements of ancient India in positive scientific thought let me refer you to a discovery in mathematics, which modern research has definitely shown to be the work of the Hindus. I mean the conception of the zero and its symbol and of numerical notation. Prof. Whitehead the mathematical philosopher referring to the fact that the Roman notation for numbers had no symbol for zero regarded it as having developed among the Arabs in connection with their notation for numbers.³¹ But it is now generally conceded that the Arabs got this knowledge from India along with their use of the numerals with place value. Even the late Prof. Berriedale Keith who was at first most reluctant to accord originality in these matters to the Indians was compelled to admit in 1928 that 'the use of *śūnya* (zero) in the *Chandassūtra* of Piṅgala must be accorded due weight and the Indian hypothesis has gained strength from the new investigations accorded to it'.³² This *Vedāṅga* text on metrics was composed at least two centuries before Christ and even Keith calls it 'a work of considerable age'.³³ Since then much more historical research has been done, and in 1937 Prof. W. E. Clark in what may be regarded as the latest and the most authentic pronouncement on the subject reaffirmed his original opinion that both the zero and its symbol along with the method of reckoning by means of nine signs and zero must be considered as Indian inventions. He successfully disposes of every argument to the contrary brought forward by Kaye and others and shows that the inscriptional evidence in India and Indo-China (which obviously borrowed these ideas from India), coupled with the data from Sanskrit and Arabic literary sources, demonstrates that the use of the nine numerals and zero with place value is purely an Indian invention, anticipating their use by the Arabs by several centuries.³⁴ He further goes on to show that the Arabs borrowed the greater portion of their mathematical knowledge also from India. This is important for the history of modern western mathematics as Europe has always admitted their indebtedness to the Arabs in these respects. A well-known authority on Arabic civilization Prof. S. Lane Poole says, 'In mathematics especially the Arabic masters made an invaluable advance by employing the

30. *Thesaurus of English Words and Phrases* (London, 1857), p. xxiv (f.n.). I am indebted to my colleague Mr. Julius de Lanerolle for this reference.

31. *Introduction to Mathematics* (Home University Library), pp. 62-63.

32. Preface to his *History of Sanskrit Literature*, p. xxiv, (1928).

33. *Ibid.*, pp. 48, 416 (f.n. 3).

34. *The Legacy of India*, pp. 357 et. seq.

Indian ciphers for notation . . .³⁵ The great value of India's contribution to mathematics is now admitted even by leading western scientists. This is what Prof. L. Hogben, F.R.S., writes: 'The Hindu numerals were devised by people who had already used the abacus and adapted them accordingly with a dot or circle for the emptied column. Their word for zero "sunya" means empty . . . The intellectual revolution which is signalized by the "Lilavati" of Aryabhata, a Hindu mathematician who flourished about 400 A.D., was made possible by an invention which was no product of mathematical sophistication. It had its roots in the common social heritage. Hindu number-lore was assimilated by the Arab conquerors of the East and the great Moslem eruption transmitted the fruits of the discovery to the western world'.³⁶

It may be added that with the discovery of the Indus Valley civilization of the Punjab the antiquity of the Hindu social heritage has been taken back by a thousand or more years. Says Prof. V. G. Childe, 'The decorative art of the Indus cities, with its compass-drawn circles, circumscribing triangles, and squares, would illustrate "geometrical propositions" by 2,500 B.C. Two thousand years later Sanskrit ritual manuals bear witness to extensive applications of geometry. In the interval it is quite possible that India was contributing to the development of Babylonian mathematics . . .'³⁷ This last remark assumes special significance when it is considered that writers on Greek science trace its origins in antiquity mainly to Babylonia.³⁸

It is not only in the fields of grammar and mathematics that Sanskrit literature reflects valuable scientific conceptions. In a more technical subject, the theory of music, Sanskrit texts contain a wealth of scientific information. I shall only refer you to the important researches into the theory of Indian music that have been done in the last quarter century by such authorities as Clements, Fox Strangways, Galpin, Bake and Daniélou. The last mentioned writer remarks: 'The Hindu classification [of musical sounds] deals once and for all with the subject of musical relations. It is the necessary basis of any serious study. All other classifications are beside it child's play'.³⁹ Commenting on the existence of a scientific notion of the scale already in the *Rkprātiśākhya* (13. 17) datable at the latest fourth century B.C., Fox Strangways says: 'The Indian scale, then, existed in principle twenty-four centuries ago, and that principle included, as we have seen, the recognition of a major third as a consonance. Of that recognition we have no documentary evidence in

35. *Encyclopaedia of Modern Knowledge*, p. 643.

36. *Ibid.*, p. 1459; cp. V. G. Childe, *Man Makes Himself*, p. 225; B. Farrington, *Science in Antiquity*, p. 23.

37. *Man Makes Himself* (TL, revised, ed. 1941), p. 225.

38. See, for instance, Farrington, *Science in Antiquity*, pp. 10 *et. seq.*

39. Alain Daniélou, *Introduction to the Study of Musical Scales* (India Society, 1943), p. 99.

Europe till a treatise by Ptolemy in the second century A.D. But this Indian treatise is quite different. Not only is it contemporary, but it offers this same major third not as a theoretical solution but as a substantive element of a scale already in being. That opens a vista'.⁴⁰ In the Vedic *Vedāṅga* on metrics, the *Chandassūtra* of Piṅgala, already referred to, dating several centuries before Christ, the seven notes of the octave (*grāma*) are referred to by the seven initial syllables of the Sanskrit names of the notes, *sa, ri, ga, ma, pa, dha, ni*. This device is typical, as has been observed, of the Indian *sūtra* style. The same method of naming notes but with differences in particular names, is found in Persia. Was it borrowed by the Arabs from Persia and transmitted to Europe? asks Prof. Clark,⁴¹ for, as Lévi argued before him, the syllables of the *sofeggio*, demonstrably neither Greek nor Latin nor Arabic, shows a strong resemblance to the Indian *sarigam*.⁴² These considerations should be sufficient to invite the attention of students of the origin and development of musical theory to the great field of study awaiting them in Sanskrit literature.

The time at my disposal is not adequate to deal at length with other sections of Sanskrit technical literature and the scientific ideas they contain. I shall content myself with a passing reference to India's contribution to medicine. It is recognized that Sanskrit literature possesses voluminous ancient texts on medicine such as the works of Caraka and Suśruta. These through their Arabic translations, made about 800 A.D., are known to have considerably influenced the development of western medicine, for Arabian methods of treatment provided the guiding principles for European physicians down to the seventeenth century. Medical practice has a continuity of at least three thousand years in India, for the first glimpses of the attempts of physicians to use herbs and other materials for the curing of disease goes back to the *Atharva Veda* and may even antedate it, if the indications from the Indus Valley finds are given their due weight. That at such a remote period as 2,500 B.C. the Indians thought of sanitation and hygienic town-planning⁴³ seems incredible but for the certainty of archaeological discoveries. Further, we know that surgery and anatomy were considerably developed by the sixth century B.C. and it appears that by that time there was also specialism in the various branches of medicine such as paediatrics.⁴⁴ I may refer you for further evidence to the recently published work on *Hindu Medicine* by Prof. H. Zimmer. It is certainly significant that the Johns Hopkins Institute of the History of Medicine thought this subject sufficiently important in 1940 to

40. *Legacy of India*, pp. 313-314.

41. *Ibid.*, p. 357.

42. Lévi, *La Grande Encyclopedie*, xx, p. 710, cited by Clark, *op. cit.*

43. Mackay, *Early Indus Civilization*, p. 18 (xii).

44. Cp. *Legacy of India*, pp. 351 *et. seq.*

have invited this eminent German Sanskritist to deliver a course of lectures on Hindu Medicine.⁴⁵ It had been the custom, as a competent English medical writer points out,⁴⁶ during the past for historians of medicine to trace in approved fashion the development of medicine as a science from Graecian, Cretan or possibly Egyptian origins, through Roman and Alexandrian channels, with a by-pass to Arabian fields of barren culture, and so on again by way of the Renaissance to modern times. Such 'historical' tracing of development avoided any but the most perfunctory allusion to Hindu medicine. I hope I have managed in these few remarks to indicate that such neglect of the data supplied by Hindu medical literature is neither fair nor historically justifiable.

From what I have said so far on the value of the scientific literature in Sanskrit it would appear reasonable to draw the conclusion that there must have been in ancient India a long continued tradition of rational thought and scientific experimentation. This should be important for the history of science in the ancient world. Western writers have so far traced the origin of the impulse to rational and scientific thinking to the Ionian Greek thinker, Thales of Miletus, in the sixth century B.C. He is credited with being 'the Father of Science'⁴⁷ chiefly because he was the first in Greece to have broken away from the confused mythicism of previous writers and postulate a physical element, water, as the ultimate cause of everything, thus giving 'a scientific and mechanical explanation'.⁴⁸ If so, the credit of being 'the grandfather of science' may well go to the author of the R̥gveda hymn X, 129, who preceded Thales by a good half millennium, and wrote a hymn celebrating water as the source of the world. Nor does this ancestry seem so illegitimate when it is remembered that Thales derived his inspiration for scientific thought from Babylonia⁴⁹ and Babylonia probably owed much to India in respect of science, as historians of civilization point out.⁵⁰ In fact, archaeologists like Sir Flinders Petrie clearly have admitted direct Indian influence on Greece⁵¹ and particularly on the Ionian thinkers of Asiatic Greece, who were the most intellectual. That scientific conceptions are throughout independent works

45. Henry R. Zimmer, Ph.D., *Hindu Medicine* (The Johns Hopkins Press, 1948).

46. F. G. Crookshank, M.D., F.R.C.P., in his Introduction to Masson-Oursel's *Comparative Philosophy* (1926), p. 10.

47. See Singer, *Encyclopaedia of Modern Knowledge*, p. 1416.

48. See Bevan, *Ibid*, p. 574; Farrington, *Science in Antiquity*, p. 40. But Prof. A. Wolf regards this explanation as 'crude', *An Outline of Modern Knowledge*, p. 6.

49. See Farrington, *Science in Antiquity*, Chapters I and II.

50. Childe, *What Happened in History* (Pelican Books, A 108), p. 115 (cp. 114). cp. Hearnshaw, *Outline of Modern Knowledge*, p. 780.

51. *Egypt and Israel*, p. 134 (ed. 1923).

of Greek thought⁵² seems, therefore, untenable in the light of modern discoveries. Empirical methods of observation and measurement were employed in India even at the time of the rise of Buddhism, about the sixth century B.C., as seen from an allusion⁵³ in the earliest of Pali Nikāyas which refers to the physical experiment of weighing an iron ball before and after being heated in order to detect any possible change in its weight. As Prof. Clark points out, a people which was capable of making the Iron Pillar of Delhi [A.D. 400] measuring 23 feet 8 inches, in pure, rustless, malleable metal weighing six tons, giving it a wonderful polish which cannot be duplicated even today, and transporting it over distances of several hundred miles, surely must have had a sufficiently long tradition in physical scientific experiment and technique. V. Ball in his *Economic Geology of India* (p. 338, 1st edn. 1881) remarked: 'It is not many years since the production of such a pillar would have been an impossibility in the largest foundries of the world, and even now there are comparatively few where a similar mass of metal could be turned out'. If, as a recently published work on the Classical Tradition asserts, 'the Greeks were civilized because they *thought*',⁵⁴ i.e. engaged in rational speculation, surely then the Hindus by virtue of their positive scientific achievements may also lay claim to that attribute.

In this discussion I have not so far mentioned the extensive philosophical literature that Sanskrit possesses, reflecting various stages in the development of human thought. Both the humanistic importance of such literary treasures as the Upaniṣads and their influence on western thinkers from the time of Schopenhauer are more or less common knowledge. But as their surviving value⁵⁵ to the philosophers of the modern world has not been so obvious I consider it necessary to make even a passing reference to the subject. Even at the beginning of this century a western philosopher, Prof. Royce of Harvard University, deemed the philosophy of the Upaniṣads sufficiently important to expound it in his Gifford Lectures before the University of Aberdeen. Since then, due mainly to the efforts of Indologists, the subject has been admitted, though somewhat surreptitiously, into the curricula of most western universities and the agenda of international philosophical conferences. The University of Oxford during the early thirties thought it important to establish the now famous Spalding Chair and invite the greatest living exponent of Indian philosophy to occupy it, though for some obscure reason it was thought necessary to evade the word 'philosophy' in its designation! But the great *spiritual*

52. See Windelband, *A History of Philosophy*, p. 27 (f.n. 1); but contrast Farrington, *Science in Antiquity*, p. 33.

53. Pāyāsi Suttanta (xxiii. § 15), *Dīgha Nikāya*, Vol. II, p. 334.

54. Hight, *The Classical Tradition* (1949), p. 548.

55. See particularly Masson-Oursel, *Comparative Philosophy*, and *Philosophy East and West*, edited by Moore.

value of Indian culture seems to have received sufficient prominence in it, and on this aspect of Indian civilization it remains for me to say a word. There are writers on the Graeco-Roman tradition who insist on its superior 'spirituality' and try to discover even the origins of the *religious spirit* in Greece.⁵⁶ It may be of scientific value to students of religion and culture to emphasize that while this attribution of spirituality to Graecian civilization is not shared by writers like Toynbee, who finds 'a spiritual vacuum at the heart of Hellenic culture',⁵⁷ not even the most casual student of Indian literature could miss its great spiritual content. Indian religions like Buddhism which in Keith's words 'fertilized the fine flower of Indian culture'⁵⁸ have a spiritual tradition of their own too great to be missed by any one.

I hope I have given a fair indication of what importance Sanskrit scholarship conducted on modern lines may have for any university, and what the main motive should be for the teaching and study of Sanskrit. Let me refer you to the recent Bulletin of a western university which, in announcing its programme of courses, says: 'In the contemporary world Indian civilization shares importance with the descendants of the others—the Sino-Japanese civilization, the Western European and American, the Islamic, and the Russian. Like them it is a frame of human thought and activity, defining the character of living in the present and destined to shape its form in the future'.⁵⁹ No such institution today would think of instituting a Chair of Sanskrit for such a limited purpose as the mere translation into Sanskrit of the scriptures of a foreign religion, as the founder of the Boden Chair at Oxford envisaged⁶⁰ in 1811.

Any student of the history of the languages and the civilizations of the Sinhalese and the Tamils will admit that the roots of all these go back to India, and, in particular, to that civilization preserved in Sanskrit. While it is a praiseworthy effort to try to discover whatever original contributions this land can claim in matters cultural, it would seem unscientific, to say the least, to deny their Indian origins. Investigations into the development of our social institutions and spiritual heritage would, I believe, confirm the idea that not only the Tamils but also the Sinhalese are partakers of that civilization of which Sanskrit has been the principal medium. It belongs to us and we are part of it. Ancient Ceylon seems only to have continued the Sanskrit

56. Hight, *op. cit.*, p. 2 (cp. 548); Edith Hamilton, *The Greek Way*, p. 239.

57. *Civilization on Trial*, p. 84.

58. *Encyclopaedia of Modern Knowledge*, p. 1089.

59. *University of Pennsylvania Bulletin*—South Asia Regional Studies—March 15, 1950, p. 9.

60. See Monier-Williams, *A Sanskrit-English Dictionary*, Preface (1899), p. ix.

tradition, not only in such subjects as grammar and poetics, but also in medicine, astronomy, irrigation-engineering, legal institutions and methods of civil administration. Moreover, I cannot fail to emphasize what should be regarded as another very valid motive for the development of Sanskrit studies in our University. I refer to the fact that the enlightenment that must result from such an academic pursuit will be of immense help to the two majority communities of this island in understanding each other.

In conclusion, I hope I shall not be considered a victim to maximization, if I humbly express the hope that, when the present confusion of values gives way to a truer and more sober perspective, our nascent university will develop a keener appreciation of the legitimate place, in its academic life, of Sanskrit as the 'matrix' from which must ultimately arise our understanding of the evolution of the languages and the social tradition of the large majority of our peoples, which alone can lead to a scientific estimate of their value to Humanity.

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