

History of Science, Philosophy and Culture in Indian Civilization

General Editor D.P. Chattopadhyaya

Volume X Part I

Developments in Indian Philosophy from Eighteenth Century Onwards: Classical and Western

DAYA KRISHNA

Project of History of Indian Science, Philosophy and Culture

CENTRE FOR STUDIES IN CIVILIZATIONS

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In Memoriam

FRANCINE ELLISON KRISHNA

(December 22, 1931–February 8, 1999)

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Table of Transliteration

अ	a	आ	ā	इ	i	ई	ī		
उ	u	ऊ	ū	ऋ	r̥	ॠ	r̄		
ऌ	l̥	ए	e	ऐ	ai	ओ	o		
औ	au	अं	am̐	अः	aḥ				
क्	k	ख्	kh	ग्	g	घ्	gh	ङ्	ṅ
च्	c	छ्	ch	ज्	j	झ्	jh	ञ्	ñ
ट्	ṭ	ठ्	ṭh	ड्	ḍ	ढ्	ḍh	ण	ṇ
त्	t	थ्	ṭh	द्	d	ध्	dh	न्	n
प्	p	फ्	ph	ब्	b	भ्	bh	म्	m
य्	y	र्	r	ल्	l	व्	v		
श्	ś	ष्	ṣ	स्	s	ह्	h		
ळ्	ḷ	क्ष्	kṣ	त्र्	tr	ज्ञ्	jñ		

General Introduction

I

It is understandable that man, shaped by Nature, would like to know Nature. The human ways of knowing Nature are evidently diverse, theoretical and practical, scientific and technological, artistic and spiritual. This diversity has, on scrutiny, been found to be neither exhaustive nor exclusive. The complexity of physical nature, life-world and, particularly, human mind is so enormous that it is futile to follow a single method for comprehending all the aspects of the world in which we are situated.

One need not feel bewildered by the variety and complexity of the worldly phenomena. After all, both from traditional wisdom and our daily experience, we know that our own nature is not quite alien to the structure of the world. Positively speaking, the elements and forces that are out there in the world are also present in our body-mind complex, enabling us to adjust ourselves to our environment. Not only the natural conditions but also the social conditions of life have instructive similarities between them. This is not to underrate in any way the difference between the human ways of life all over the world. It is partly due to the variation in climatic conditions and partly due to the distinctness of production-related tradition, history and culture.

Three broad approaches are discernible in the works on historiography of civilization, comprising science and technology, art and architecture, social sciences and institutions. Firstly, some writers are primarily interested in discovering the general laws which govern all civilizations spread over different continents. They tend to underplay what they call the noisy local events of the external world and peculiarities of different languages, literatures and histories. Their accent is on the unity of Nature, the unity of science and the unity of mankind. The second group of writers, unlike the generalists or transcendentalists, attach primary importance to the distinctiveness of every culture. To these writers human freedom and creativity are extremely important and basic in character. Social institutions and the cultural articulations of human consciousness, they argue, are bound to be expressive of the concerned people's consciousness. By implication they tend to reject concepts like archetypal consciousness, universal mind and providential

history. There is a third group of writers who offer a composite picture of civilizations, drawing elements both from their local as well as common characteristics. Every culture has its local roots and peculiarities. At the same time, it is pointed out that due to demographic migration and immigration over the centuries an element of compositeness emerges almost in every culture. When due to a natural calamity or political exigencies people move from one part of the world to another, they carry with them, among other things, their language, cultural inheritance and their ways of living.

In the light of the above facts, it is not at all surprising that comparative anthropologists and philologists are intrigued by the striking similarity between different language families and the rites, rituals and myths of different peoples. Speculative philosophers of history, heavily relying on the findings of epigraphy, ethnography, archaeology and theology, try to show in very general terms that the particulars and universals of culture are 'essentially' or 'secretly' interrelated. The spiritual aspects of culture like dance and music, beliefs pertaining to life, death and duties, on analysis, are found to be mediated by the material forms of life like weather forecasting, food production, urbanization and invention of script. The transition from the oral culture to the written one was made possible because of the mastery of symbols and rules of measurement. Speech precedes grammar, poetry prosody. All these show how the 'matters' and 'forms' of life are so subtly interwoven.

II

The PHISPC publications on History of Science, Philosophy and Culture in Indian Civilization, in spite of its unitary look, do recognize the differences between the areas of material civilization and those of ideational culture. It is not a work of a single author. Nor is it being executed by a group of thinkers and writers who are methodologically uniform or ideologically identical in their commitments. In conceiving the Project we have interacted with, and been influenced by, the writings and views of many Indian and non-Indian thinkers.

The attempted unity of this Project lies in its aim and inspiration. We have in India many scholarly works written by Indians on different aspects of our civilization and culture. Right from the pre-Christian era to our own time, India has drawn the attention of various countries of Asia, Europe and Africa. Some of these writings are objective and informative and many others are based on insufficient information and hearsay, and therefore not quite reliable, but they have their own value. Quality and view-points keep on changing not only because of the adequacy and inadequacy of evidence but also, and perhaps more so, because of the bias and prejudice, religious and political conviction, of the writers.

Besides, it is to be remembered that history, like Nature, is not an open book to be read alike by all. The past is mainly enclosed and only partially

disclosed. History is, therefore, partly objective or 'real' and largely a matter of construction. This is one of the reasons why some historians themselves think that it is a form of literature or art. However, it does not mean that historical construction is 'anarchic' and arbitrary. Certainly, imagination plays an important role in it.

But its character is basically dependent upon the *questions* which the historian raises and wants to understand or answer in terms of the ideas and actions of human beings in the past ages. In a way, history, somewhat like the natural sciences, is engaged in answering questions and in exploring relationships of cause and effect between events and developments across time. While in the natural sciences, the scientist poses questions about nature in the form of hypotheses, expecting to elicit authoritative answers to such questions, the historian studies the past, partly for the sake of understanding it for its own sake and partly also for the light which the past throws upon the present, and the possibilities which it opens up for moulding the future. But the difference between the two approaches must not be lost sight of. The scientist is primarily interested in discovering laws and framing theories, in terms of which different events and processes can be connected and anticipated. His interest in the conditions or circumstances attending the concerned events is secondary. Therefore, scientific laws turn out to be basically abstract and easily expressible in terms of mathematical language. In contrast, the historian's main interest centres round the *specific* events, human ideas and actions, not *general* laws. So, the historian, unlike the scientist, is obliged to pay primary attention to the circumstances of the events he wants to study. Consequently, history, like most other humanistic disciplines, is concrete and particularist. This is not to deny the obvious truth that historical events and processes consisting of human ideas and actions show some trend or other and weave some pattern or other. If these trends and patterns were not there at all in history, the study of history as a branch of knowledge would not have been profitable or instructive. But one must recognize that historical trends and patterns, unlike scientific laws and theories, are not general or purported to be universal in their scope.

III

The aim of this Project is to discover the main aspects of Indian culture and present them in an interrelated way. Since our culture has influenced, and has been influenced by, the neighbouring cultures of West Asia, Central Asia, East Asia and South-East Asia, attempts have been made here to trace and study these influences in their mutuality. It is well known that during the last three centuries, European presence, both political and cultural, in India has been very widespread. In many volumes of the Project considerable attention has been paid to Europe and, through Europe, to other parts of the world. For the purpose of a comprehensive cultural study of India, the existing political boundaries of the

South Asia of today are more of a hindrance than help. Cultures, like languages, often transcend the bounds of changing political territories.

If the inconstant political geography is not a reliable help to the understanding of the layered structure and spread of culture, a somewhat comparable problem is encountered in the area of historical periodization. Periodization or segmenting time is a very tricky affair. When exactly one period ends and another begins is not precisely ascertainable. The periods of history designated as ancient, medieval and modern are purely conventional and merely heuristic in character. The varying scopes of history, local, national and continental or universal, somewhat like the periods of history, are unavoidably fuzzy and shifting. Amidst all these difficulties, the volume-wise details have been planned and worked out by the editors in consultation with the Project Director and the General Editor. I believe that the editors of different volumes have also profited from the reactions and suggestions of the contributors of individual chapters in planning the volumes.

Another aspect of Indian history which the volume editors and contributors of the Project have carefully dealt with is the distinction and relation between civilization and culture. The material conditions which substantially shaped Indian civilization have been discussed in detail. From agriculture and industry to metallurgy and technology, from physics and chemical practices to the life sciences and different systems of medicines—all the branches of knowledge and skill which directly affect human life—form the heart of this Project. Since the periods covered by the PHISPC are extensive—prehistory, proto-history, early history, medieval history and modern history of India—we do not claim to have gone into all the relevant material conditions of human life. We had to be selective. Therefore, one should not be surprised if one finds that only some material aspects of Indian civilization have received our pointed attention, while the rest have been dealt with in principle or only alluded to.

One of the main aims of the Project has been to spell out the first principles of the philosophy of different schools, both pro-Vedic and anti-Vedic. The basic ideas of Buddhism, Jainism and Islam have been given their due importance. The special position accorded to philosophy is to be understood partly in terms of its proclaimed unifying character and partly it is to be explained in terms of the fact that different philosophical systems represent alternative world-views, cultural perspectives, their conflict and mutual assimilation.

Most of the volume editors and at their instance the concerned contributors have followed a middle path between the extremes of narrativism and theoreticism. The underlying idea has been this: If in the process of working out a comprehensive Project like this every contributor attempts to narrate all those interesting things that he has in the back of his mind, the enterprise is likely to prove unmanageable. If, on the other hand, particular details are consciously forced into a fixed mould or pre-supposed theoretical structure, the details lose their particularity and interesting character. Therefore, depending on the nature of the problem of discourse, most of the writers have tried to reconcile in their

writer is bound to discuss the concept of value. The same concept also figures in economic discourse and also occurs in a discussion on fine arts. The conscious editorial decision has been that, while duplication should be kept to its minimum, for the sake of intended clarity of the themes under discussion, their reiteration must not be avoided at high intellectual cost.

Fifthly, the scholars working on the Project are drawn from widely different disciplines. They have brought to our notice an important fact that has clear relevance to our work. Many of our contemporary disciplines like economics and sociology did not exist, at least not in their present form, just two centuries ago or so. For example, before the middle of nineteenth century, sociology as a distinct branch of knowledge was unknown. The term is said to have been coined first by the French philosopher Auguste Comte in 1838s. Obviously, this does not mean that the issues discussed in sociology were not there. Similarly, Adam Smith's (1723-90) famous work *The Wealth of Nations* is often referred to as the first authoritative statement of the principles of (what we now call) economics. Interestingly enough, the author was equally interested in ethics and jurisprudence. It is clear from history that the nature and scope of different disciplines undergo change, at times very radically, over time. For example, in India by *arthaśāstra* does not mean the science of economics as understood today. Besides the principles of economics the *arthaśāstra* of ancient India discusses at length those of governance, diplomacy and military science.

Sixthly, this brings us to the next editorial policy followed in the Project. We have tried to remain very conscious of what may be called indeterminacy or inexactness of translation. When a word or expression of one language is translated into another, some loss of meaning or exactitude seems to be unavoidable. This is true not only in the bilingual relations like Sanskrit-English and Sanskrit-Arabic, but also in those of Hindi-Tamil and Hindi-Bengali. In recognition of the importance of language-bound and context-relative character of meaning we have solicited from many learned scholars, contributions, written in vernacular languages. In order to minimize the miseffect of semantic inexactitude we have solicited translational help of that type of bilingual scholars who know both English and the concerned vernacular language, Hindi, Tamil, Telegu, Bengali or Marathi.

Seventhly and finally, perhaps the place of technology as a branch of knowledge in the composite universe of science and art merits some elucidation. Technology has been conceived in very many ways, e.g. as autonomous, as 'standing reserve', as liberating or enlargemental, and alienative or estrangemental force. The studies undertaken by the Project show that, in spite of its much emphasized mechanical and alienative characteristics, technology embodies a very useful mode of knowledge that is peculiar to man. The Greek root words of technology are *techne* (art) and *logos* (science). This is the basic justification of recognizing technology as closely related to both epistemology, the discipline of valid knowledge, and axiology, the discipline of freedom and values. It is in this context that we are reminded of the definition of man as *homo technikos*. In

Sanskrit, the word closest to *techne* is *kalā* which means any practical art, any mechanical or fine art. In the Indian tradition, in *Śaivatantra*, for example, among the arts (*kalā*) are counted dance, drama, music, architecture, metallurgy, knowledge of dictionary, encyclopaedia and prosody. The closeness of the relation between arts and sciences, technology and other forms of knowledge are evident from these examples and was known to the ancient people. The human quest for knowledge involves the use of both head and hand. Without mind, the body is a corpse and the disembodied mind is a bare abstraction. Even for our appreciation of what is beautiful and the creation of what is valuable, we are required to exercise both our intellectual competence and physical capacity. In a manner of speaking, one might rightly affirm that our psychosomatic structure is a functional connector between what we are and what we could be, between the physical and the beyond. To suppose that there is a clear-cut distinction between the physical world and the psychosomatic one amounts to denial of the possible emergence of higher logico-mathematical, musical and other capacities. The very availability of aesthetic experience and creation proves that the supposed distinction is somehow overcome by what may be called the bodily self or embodied mind.

V

The ways of classification of arts and sciences are neither universal nor permanent. In the Indian tradition, in the *R̥gveda*, for example, *vidyās* (or sciences) are said to be four in number: (i) *Trayī*, the triple Veda; (ii) *Ānvīkṣikī*, logic and metaphysics; (iii) *Danḍa-nīti*, science of governance; (iv) *Vārta*, practical arts such as agriculture, commerce, medicine, etc. Manu speaks of a fifth *vidyā*, viz. *Ātma-vidyā*, knowledge of self or of spiritual truth. According to many others, *vidyā* has fourteen divisions, viz. the four Vedas, the six *Vedāngas*, the *Purāṇas*, the *Mīmāṃsā*, *Nyāya*, and *Dharma* or law. At times, the four *Upa-vedas* are also recognized by some as *vidyā*. *Kalās* are said to be 33 or even 64.

In the classical tradition of India, the word *śāstra* has at times been used as synonym of *vidyā*. *Vidyā* denotes instrument of teaching, manual or compendium of rules, religious or scientific treatise. The word *śāstra* is usually found after the word referring to the subject of the book, e.g. *Dharma-śāstra*, *Artha-śāstra*, *Alaṅkāra-śāstra* and *Mokṣa-śāstra*. Two other words which have been frequently used to denote different branches of knowledge are *jñāna* and *vijñāna*. While *jñāna* means knowing, knowledge, especially the higher form of it; *vijñāna* stands for the act of distinguishing or discerning, understanding, comprehending and recognizing. It means worldly or profane knowledge as distinguished from *jñāna*, knowledge of the divine.

It must be said here that the division of knowledge is partly conventional and partly administrative or practical. It keeps on changing from culture to culture, from age to age. It is difficult to claim that the distinction between *jñāna* and *vijñāna* or that between science and art is universal. It is true that even

before the advent of modern age, both in the East and the West, two basic aspects of sciences started gaining recognition. One is the *specialized character* of what we call scientific knowledge. The other is the concept of *trained skill* which was brought close to scientific knowledge. In the medieval Europe, the expression 'the seven liberal sciences' has so often been used simultaneously with 'the seven liberal arts', meaning thereby, the group of studies by the *Trivium* (Grammar, Logic and Rhetoric) and *Quadrivium* (Arithmetic, Music, Geometry and Astronomy).

It may be observed here, as has already been alluded to earlier, that the division between different branches of knowledge, between theory and practice, was not pushed to an extreme extent in the early ages. *Praxis*, for example, was recognized as the prime *techne*. The Greek word, *technologia* stood for systematic treatment, for example, of Grammar. *Praxis* is not the mere application of *theoria*, unified vision or integral outlook, but it also stands for the active impetus and base of knowledge. In India, one often uses the terms *Prayukti-vidyā* and *Prayogyika-vidyā* to emphasize the practical or applicative character of knowledge. *Prayoga* or application is both the test and base of knowledge. Doing is the best way of knowing and learning.

That one and the same word may mean different 'things' or concepts in different cultures and thus create confusion has already been stated before. Two such words which in the context of this Project under discussion deserve special mention are *dharma* and *itihāsa*. Ordinarily, *dharma* in Sanskrit-rooted languages is taken to be conceptual equivalent of the English word *religion*. But, while the meaning of religion is primarily theological, that of *dharma* seems to be manifold. Literally, *dharma* stands for that which is established or that which holds people steadfastly together. Its other meanings are law, rule, usage, practice, custom, ordinance and statute. Spiritual or moral merit, virtue, righteousness and good works are also denoted by it. Further, *dharma* stands for natural qualities like burning (of fire), liquidity (of water) and fragility (of glass). Thus one finds that meanings of *dharma* are of many types—legal, social, moral, religious or spiritual, and even ontological or physical. All these meanings of *dharma* have received due attention of the writers in the relevant contexts of different volumes.

This Project, being primarily historical as it is, has naturally paid serious attention to the different concepts of history—epic-mythic, artistic-narrative, scientific-causal, theoretical and ideological. Perhaps the point that must be mentioned first about history is that it is not a correct translation of the Sanskrit word *itihāsa*. Etymologically, it means what really happened (*iti-ha-āsa*). But, as we know, in the Indian tradition *purāṇa* (legend, myth, tale, etc.), *gāthā* (ballad), *itivr̥tta* (description of past occurrence, event, etc.), *ākhyāyikā* (short narrative) and *vaṃśa-carita* (genealogy) have been consciously accorded a very important place. Things started changing with the passage of time and particularly after the effective presence of Islamic culture in India. Islamic historians, because of their own cultural moorings and the influence of the Semitic and Graeco-Roman

cultures on them, were more particular about their facts, figures and dates than their Indian predecessors. Their aim to bring history close to statecraft, social conditions and the lives and teachings of the religious leaders imparted a mundane character to this branch of learning. The Europeans whose political appearance on the Indian scene became quite perceptible only towards the end of the eighteenth century brought in with them their own view of historiography in their cultural baggage. The impact of the Newtonian Revolution in the field of history was very faithfully worked out, among others, by David Hume (1711–76) in *History of Great Britain from the Invasion of Julius Caesar to the Revolution of 1688* (6 Vol. 1754–62) and Edward Gibbon (1737–94) in *The History of the Decline and Fall of the Roman Empire* (6 Vol., 1776–88). Their emphasis on the principles of causality, datability and continuity/linearity of historical events introduced the spirit of scientific revolution in European historiography. The introduction of English education in India and the exposure of the elites of the country to it largely account for the decline of the traditional concept of *itihāsa* and the rise of the post-Newtonian scientific historiography. Gradually, Indian writers of our own history and cultural heritage started using more and more European concepts and categories. This is not to suggest that the impact of the European historiography on Indian historians was entirely negative. On the contrary, it imparted an analytical and critical temper which motivated many Indian historians of the nineteenth century to try to discover and represent our heritage in a new way.

VI

The principles which have been followed for organizing the subjects of different volumes under this Project may be stated in this way. We have kept in view the main structures which are discernible in the decomposable composition of the world. The first structure may be described as physical and chemical. The second structure consists, broadly speaking, of biology, psychology and epistemology. The highest and the most abstract structure nests many substructures within it, for example, logic, mathematics and musical notes. It is well known that the substructures within each structure are interactive, i.e. not isolable. The more important point to be noted in this connection is that the basic three structures of the world, viz., (a) physico-chemical, (b) bio-psychological, and (c) logico-mathematical are all simultaneously open to upward and downward causation. In other words, while the physico-chemical structure can causally influence the bio-psychological one and the latter can causally influence the most abstract logico-mathematical, the reverse process of causation is also operative in the world. In spite of its relative abstractness and durability, the logico-mathematical world has its downward causal impact on our bio-psychological and epistemological processes and products. And the latter can also bring about change in the structures of the

physical world and its chemical composition. Applied physics and bio-technology make the last point abundantly clear.

Many philosophers, life-scientists, and social scientists highlight the point that nature loves hierarchies. Herbert Simon, the economist and the management scientist, speaks of four steps of partial ordering of our world, namely; (i) chemical substances, (ii) living organisms, tissues and organs, (iii) genes, chromosomes and DNA, and (iv) human beings, the social organizations, programmes and information process. All these views are in accord with the anti-reductionist character of our Project. Many biologists defend this approach by pointing out that certain characteristics of biological phenomena and process like unpredictability, randomness, uniqueness, magnitude of stochastic perturbations, complexity and emergence cannot be reduced without recourse to physical laws.

The main subjects dealt with in different volumes of the Project are connected not only conceptually and synchronically but also historically or diachronically. For pressing practical reasons, however, we did not aim at presenting the prehistorical, proto-historical and historical past of India in a continuous or chronological manner. Besides, it has been shown in the presentation of the PHISPC that the process of history is non-linear. And this process is to be understood in terms of human praxis and an absence of general laws in history. Another point which deserves special mention is that the editorial advisors have taken a conscious decision not to make this historical Project primarily political. We felt that this area of history has always been receiving extensive attention. Therefore, the customary discussion of dynastic rule and succession will not be found in a prominent way in this series. Instead, as said before, most of the available space has been given to social, scientific, philosophical and other cultural aspects of Indian civilization.

Having stated this, it must be admitted that our departure from conventional style of writing Indian history is not total. We have followed an inarticulate framework of time in organizing and presenting the results of our studies. The first volume, together with its parts, deals with the prehistorical period to AD 300. The next two volumes, together with their parts, deal with, among other things, the development of social and political institutions and philosophical and scientific ideas from AD 300 to the beginning of the eleventh century AD. The next period with which this Project is concerned spans from the twelfth century to the early part of the eighteenth century. The last three centuries constitute the fourth period covered by this Project. But, as said before, the definition of all these periods by their very nature are inexact and merely indicative.

Two other points must be mentioned before I conclude this General Introduction to the series. The history of some of the subjects like religion, language and literature, philosophy, science and technology cannot for obvious reason be squeezed within the cramped space of the periodic moulds. Attempts to do so result in thematic distortion. Therefore, the reader will often see the overflow of some ideas from one period to another. I have already drawn attention to this

tricky and fuzzy and also the misleading aspects of the periodization of history, if pressed beyond a point.

Secondly, strictly speaking, history knows no end. Every age rewrites its history. Every generation, beset with new issues, problems and questions, looks back to its history and reinterprets and renews its past. This shows why history is not only contemporaneous but also futural. Human life actually knows no separative wall between its past, present and future. Its cognitive enterprises, moral endeavours and practical activities are informed of the past, oriented by the present and addressed to the future. This process persists, consciously or unconsciously, wittingly or unwittingly. In the narrative of this Project, we have tried to represent this complex and fascinating story of Indian civilization.

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