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POSSIBILITIES OF RELATING MODERN VETERINARY SCIENCE LITERATURE TO THE GROWTH OF RELEVANT KNOWLEDGE IN ANCIENT INDIA

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India, as the history records, has preserved her system of medicine, in the face of foreign competition under adverse circumstances,[1] be it because we, the executives of modern medicine, have failed to infuse modern veterinary knowledge into our people to build in them the required confidence, or because the modern treatment has been beyond the reach of our masses, or because the Indian system really has something positive in certain areas so far not revealed to modern system, or because of any other reason. Notwithstanding much quackery in traditional veterinary practices, they have retained the grip over the masses unabated.

But what we really mean when we talk of Ancient system termed *Āyurveda* (*Gavya Āyurveda* for cattle, *Hastī Āyurveda* for elephants, *etc*) in relation to modern system termed Allopathy ? As a matter of fact, we differentiate *Āyurveda* by confining it within the *tridoṣa* theory of physio-pathology (*vāta, pitta* and *kapha*), and *pañcaśīla* theory of pharmacy (5 principles of matter/drugs *viz., rasa, guṇa, vīrya, vipāka*, and *prabhāva*) precisely because little attempt has been made to update these concepts in the current time frame, especially in relation to veterinary science.[2] Because of the stagnation for several reasons,[3] a gap developed, and we have come to characterize the ancient system as a distinct system of medicine.

It goes without saying that the modern medical system did not develop in a vacuum. Surprising it may look, but the fact remains that the Greek Medicine (*Unānī*), which was contemporary of *Āyurveda* and was as much empirical in content, was revised by the Arabs, and both of them provided the basis for Allopathy in the renaissance period. In other words, Allopathy evolved when Greco-Arabic medicine was assessed by the scientific method, logic and experimentation so as to discard the dead weight and update the rest.[4] But *Āyurveda* remained outside the influence of renaissance ; the scientific content in Indian veterinary science books remained hidden, and naturally, several exclusive features contained therein found no mention in our modern textbooks, compared to those in Greco-Arabic literature, which forms part of history of veterinary science.

In this article, an attempt has been made to unearth the dimensions of scientific content in ancient veterinary science literature, in whatever form and extent it could be available. The literature screened in this context is as under :

1. *Aśvavaidyakam* by Jayadatta.[5]

2. *Aśvaśāstra* by Śālihotra.[6] Seventeen *ślokas* brought out by Capt. M. S. Apte from the literature deal with disease prognosis from eye symptoms and two *ślokas* relate to judging the age of horses. Capt. Apte, ex-Director, Civil Veterinary Department, Gwalior, claims to possess considerable literature pertaining to horses and elephants, inherited from his ancestors.

3. *Jātakapārijātaka.*[7]

4. *Śukranīti,*[8] a recognised book on polity, containing advice on administrative matters to kings and nobles. Section VII, Chapter IV of the book deals with armies and their maintenance.

Scope of the Information Content :

Amongst the species of animals covered in the literature screened, the maximum amount of information pertains to equines. Other species covered are elephants, bovines, and camels.

Owing to several qualities, elephants were used in wars like modern tanks by the kings in ancient India.[9] Perhaps nowhere else in the world so rich information is available on elephants as in India. Krishnaswami[10] refers to a book *Hastyāyurveda,* claimed to be dating back to the period of the epic *Rāmāyaṇa,* which can serve as a foundation book for further build-up. It is supposed to contain very well classified, varied and interesting information. Under the heading of 'fevers' in Chapter 9 of part 1, and 'wasting diseases' in Chapter 40 of part 2, it is supposed to contain information on Tuberculosis in elephants, the first-ever record of the disease.

Information on camels,[8] whatsoever available, should also be exclusive, because this species was domesticated in India.

Study of the book *Aśvavaidyakam* reveals that not only the distribution of its contents into chapters compared well with modern veterinary science books in being scientific, the practice of reviewing the literature was also followed. Predecessor sages/Gods, *etc.* reviewed are Śankara, Brahmā, Śālihotra, Nakula, Suśruta.

Besides the information on nutritional and managemental aspects, breeding practices, and disease and treatment aspects[11,12] already dealt with, the aforesaid books reveal information on the following aspects also.

I. Parts of body (*pradeśa*) and their measurements.

II. Control of animals, including training, comparable to modern Animal Husbandry.

III. Index to longevity of various animals.

IV. Criteria for judging age of animals.

V. Miscellaneous.

I. *Parts of Body and their Measurements :*

Importance of the knowledge of parts of the body is given in the opening *śloka* in Chapter 2 of *Aśvavaidyakam* which reads 'The fool, who does not know different parts of horses' body in detail, does not know the signs of horse nor the treatment of their diseases'. As a matter of fact, this fundamental aspect is given in the very second Chapter, after devoting Chapter 1 to the scope and purpose (*uddeśya*) of the book. Different parts of the body have been described in precise topological sequence, starting from the mouth to the back dorsally, downwards upto the sole, and then ventrally. In Table 1 is given the list of terms used in the text alongwith the corresponding english terms. This information has the potential of use for producing veterinary science literature in Hindi. The word *Marma* or *Vidu* (Term no 29 in the Table), which is a vital point used to shoot horses for instant killing, has no parallel in English, and may be adopted right in English vocabulary too.

Our ancients were equally concerned with the measurements of body parts in the normal state of health. For this important parameter they had evolved a methodology, suited to the time-frame when education was imparted only through recitation of *ślokas*. *Ślokas* 145-147 of *Śukranīti* state 'if an image (three dimensional) is to be made, the appropriate pattern should always be placed in front. No image can be made without a model. So the artist should frame the limbs after meditating on the horse and finding out the measurements and attributes of horses in the manner indicated'.

In *ślokas* 85-144 of *Śukranīti,* comparative dimensions of body parts of horse are given, as compiled in Table 2. Units of measurements are finger's width, *A*, (*Aṅgula*), length of face, *F*, (28 *Aṅgulas*). Details of measurements cover lengths, widths, heights, circumferences and spaces and they correspond well to what is given in modern Anatomy books.

In ślokas 79-82 of the *Śukranīti* are given measurements for elephant. Elephants have been primarily classified in three classes on the basis of stature, besides other parameters of body appearances. Classes are *bhadra*, *mandra*, and *mṛga*, though another class of mixed characters of these three, termed *miśra* is also

TABLE 1

Terms used in Aśvavaidyakam

		Parts of Body (pradeśa)
1.	Tongue	जिह्वा (*Jihvā*)
2.	Soft palate	सुन (*Suna*)
3.	Hard palate	तालु (*Tālu*)
4.	Gums	दन्त पिथकम (*Danta pithakam*)
5.	Teeth	दन्त (*Danta*)
6.	Chin	चिबुकम् (*Cibukam*)
7.	Lower lip	अधर ओष्ट (*Adhara oṣṭha*)
8.	Lower jaw	हणु (*Haṇu*)
9.	Angles of mouth	श्रक्क (*Śrakka*)
10.	Upper lip	प्रपान (*Prapāna*)
11.	Tip of nose	प्रोठ (*Proṭha*)
12.	Nostril	नासाछिद्र (*Nāsāchidra*)
13.	Portion between nostrils and eyes or face	घोना (*Ghonā*) From it evolved the popular name *ghorā*, hindi term for horse.
14.	Cheeks	गण्ड (*Gaṇḍa*)
15.	Portion inside cheeks, where pulse is felt	क्षिरिक (*Kṣirika*)
16.	Location of angular vein, below the eye, puncturing of which is recommended as treatment of certain diseases.	अश्रुपात (*Aśrupāta*)
17.	Eyeball	नेत्रमण्डल (*Netramaṇḍala*)
18.	Eyelids	वार्तम (*Vārtma*)
19.	Orbit	अक्षिकुट (*Akṣikuta*)
20.	Inner canthus	कनिनिका (*Kaninikā*)
21.	Outer canthus	अपागं (*Apāṅga*)
22.	Eyebrows	भ्रुवर लेख (*Bhrūvar lekha*)
23.	Forehead	ललाट (*Lalāta*)
24.	Head, where hair end	केशान्तम् (*Keśāntam*)
25.	Where forelock grows	श्रुव (*Śruva*)
26.	Poll	सिर (*Sira*)

TABLE 1 (*Continued.*)

27.	Ears	कर्ण (*Karṇa*)
28.	Root of ear	सस्कुलि (*Saskuli*)
29.	Vital point, 4.5″ downwards from root of ear, where animals are shot for instant killing.	मर्म/विदु (*Marma/Vidu*)
30.	Temple—1.5″ from outer canthus	शंख (*Śaṅkha*)
31.	Area between temple and root of ear	कतक्ष (*Katakṣa*)
32.	Neck where bells are tied	निगाला/ग्रीवा (*Nigālā/Grivā*)
33.	Throat	गला (*Galā*)
34.	Tracheal portion	कंठ (*Kaṇṭha*)
35.	Breast	वक्ष (*Vakṣa*)
36.	Sternum	क्रोल (*Krola*)
37.	Heart or chest portion	हृदय (*Hṛdaya*)
38.	Belly or abdomen	कुक्षि (*Kukṣi*)
39.	Mane	केसर (*Kesara*)
40.	Portion between neck and shoulders where collar rests	वाह (*Vāha*)
41.	Withers	काकसम्/काकुदम् (*Kākasam/Kākudam*)
42.	Back	प्रस्थाम् (*Prasthām*)
43.	Seat—middle portion of back	आसनम् (*Āsanam*)
44.	Arm including forearm	वाहु (*Vāhu*)
45.	Chestnuts	किना (*Kinā*)
46.	Knee	जानु (*Jānu*)
47.	Knee cap	कलसी (*Kalasī*)
48.	Bend of knee (back)	मंदिरम् (*Mandiram*)
49.	Shank	जंघा (*Jaṅghā*)
50.	Splint bones—6 *aṅgula* above the fetlock and on the sides	काल (*Kāla*)
51.	Fetlock joint	एसिका सन्धि (*Esikā Sandhi*)
52.	Front of fetlock	पलिहा/पलिहस्त (*Palihā/Palihasta*)
53.	Back of fetlock	कुरचा (*Kurcā*)

TABLE 1 (*Continued*)

54.	Ergot	कुस्तिकम् (*Kustikam*)
55.	Coronet	खुरसन्धि (*Khurasandhi*)
56.	Hoof	खुरम् (*Khuram*)
57.	Heel	परसनी (*Parsnī*)
58.	Toe	नख (*Nakha*)
59.	Sole	तल (*Tala*)
60.	Middle of sole, called frog; could have been a translation of Indian word	मण्डूक (*Maṇḍūka*)
61.	Horny portion	क्षिरिका (*Kṣirikā*)
62.	Flank	कुक्षी (*Kukṣi*)
63.	Abdominal cavity	रंध्रम् (*Randhram*)
64.	Thoracic cavity	उपरंध्रम् (*Uparandhram*)
65.	Abdomen	जाठरा (*Jātharā*)
66.	Navel	नावि (*Nāvi*)
67.	Row of hair behind navel	रोमाराजी (*Romāraji*)
68.	Sheath	मूत्र कोषम (*Mutrakoṣam*)
69.	Loin	कटि (*Kaṭi*)
70.	Quarters	पूत/स्फीका (*Puta/Sphīkā*)
71.	Root of tail	पुच्छमूलम् (*Pucchamūlam*)
72.	Anus	पायु (*Pāyu*)
73.	Perinaeum	सिबनी (*Sibanī*)
74.	Scrotum	मस्क (*Maska*)
75.	Hip joint	कटिसन्धि (*Kaṭisandhi*)
76.	Stifle joint	उरुसन्धि (*Urusandhi*)
77.	Hock joint	फलसन्धि (*Phalasandhi*)
78.	Thigh	उरुपन्त (*Urupanta*)
79.	Point of hock	स्थूर (*Sthūra*)
80.	Bend of hock	मन्दिरा (*Mandirā*)
81.	Castor	किना (*Kinā*)
82.	Region of head, face, neck breast and forelegs—Forepart	पूर्वकाया (*Pūrvakāyā*)
83.	Near the barrel or back—middle part	मध्यकाया (*Madhyakāyā*)
84.	Loins upto end of hoof—hind part	अपार/पश्चिम भाग (*Apāra/Paścima Bhāga*)

TABLE 2

Comparative Dimensions of Parts of Horse

[Unit is the length of face of horse (*F*), equal to 28 fingers widths (*A*).]

Height		
Total height	..	3 *F*
Heel	..	3 *A*
Fetlock joint	..	4 *A*
Leg	..	24 *A*
Knee	..	3 *A*
Thigh to end of elbow	..	24 *A*
Elbow joint to neck	..	38 *A*
Back thigh	..	28 *A*
Back leg	..	21 A
Length		
Total length	..	$4\frac{1}{3}$ *F*
Neck to origin of genital organs	..	1 *F*
Genital organs to end of vertebral column	..	5/12 *F*
Genital organs and tail	..	1/2 *F*
Testicles	..	1/4 *F*
Upper lip	..	1/3 *F*
Lower lip	..	1½ *A*
Circumference		
Belly	..	3*F* + 3*A*
Heel	..	1/2 *F* + 1 *A*
Thigh	..	11 *A*
Back thigh	..	3 + 1/6 *F*
Hock/Angle joint	..	9 *A*
Foreneck	..	1 *F* + 4 *A*
Origin of neck	..	2 *F*—10 *A*
Breast	..	2/3 *F*
Forehead over ears	..	1 *F* + 8 *A*
Face at nose below eye	..	2/3 *F*
Space between		
Thighs	..	1/3 *F*
Eyes	..	1/5 *F*
Ears and eyes	..	1/5 *F*
Heels, when horse is standing	..	= length of ear
Nostrils	..	1/3 *F*
Arms at breast	..	1/6 *F*
Breast hang	..	1/4 *F*

Neck : Length—2 + 1/6 *F*, Height—5/8*F*, Breadth where hair grows—1.5 *A*.
Ear : Width—3–4 *A*, Length—9 *A*, 4—5 *A*.
Eyes : Length—3 *A*, Width 2—2.5 *A*

mentioned. Measurements of *bhadra* elephant are, height : 7 cubits, length : 8 cubits and circumference and belly : 10 cubits. Measurements of *mandra* elephants are one cubits less on each aspect, and of *mṛga* elephant, one cubit still less.

In *ślokas* 299-300 are given the dimensions of bull. 'In bulls the circumference of belly is four times that of face, the height together with hump is three times the face and the length is 3.5 times the face.'

II. *Control of Animals Including Training :*

Fairly good account of the requirements of horses in terms of actions, pace and speed is given in Chapter 3 of *Aśvavaidyakam*. *Śloka* 93 reads 'A cheerful horse runs swiftly, lifting the legs high up as if they touched burning coals'. It is also stated that a good horse should be able to cover 400 cubits (one cubit is 24 *aṅgulas*, or one arm length, or 1.5 feet) in 16 fillips. If it covers 380 or 360 cubits, the horse is medium or lowest, respectively. Recommendations for good horse in *Śukranīti*, *śloka* 259, is that it should cover 100 *dhanus* in 16 *mātrās*, which means one *dhanu* should be equal to 4 cubits.

While horses have been classified into various breeds according to the speeds (besides other characters), importance of good training to horses is highlighted both in *Śukranīti* as well as in *Aśvavaidyakam*. *Ślokas* 243-247 of *Śukranīti*[8] read 'It is the good or bad qualifications of the trainer that give the good or bad gait. A good trainer is he who moves his legs below the knees, keeps his body erect and is fixed in his seat and holds the bridle uniformly. A good trainer should strike the horse at the proper place by whips mildly and not too severely but with medium pressure'. *Ślokas* 256-257 read 'One adds to the defects of the horse by striking at the wrong time and place. These defects exist so long as the horse lives'.

Citation from *Magesthenes Indica* reveals that the training of horses was imparted during Mauryan period also. 'Those trained from boyhood, can control horses with bit and bridle and can make them move at a measured pace and in a straight course. Trainers train them by forcing them to gallop round and round in a ring. Such trainers have strong hand and thorough knowledge of horses. They could control with ease a team of four high mettled steeds when whorling round a circle'.

Chapter 7 of *Aśvavaidyakam* is devoted to the rules for training of horses (*vāhanavidhāne*) which are discussed under the following heads :

IIA : Classes of horses (*viparāditād vāhana vivaraṇam*). Nature and strength of horses and their training (*sat vāsa katitad vāhana vivaraṇam*).

IIB : Description of training ground (*raṅgabhūmi vivaraṇam*).

IIC : Merits and demerits of rider (*doṣa guṇa taraṇa vivaraṇam*).

IID : Duties of a rider (*saikārya vivaraṇam*).

IIA. *Classes of horses, their strength and nature :*

In first 7 *ślokas* of Chapter 7,[5] horses have been classified into *Brāhmiṇ*, *Kṣatrīya*, *Vaiśya* and *Śūdra*. Characters and the treatment they demand are given in Table 3. In the subsequent *ślokas* corresponding terms used are good,

TABLE 3

Award of Treatment According to Castes of Horses

Caste	Nature	Treatment	Time for riding
Brāhmiṇ	Mild nature, nervous temperament, somewhat greedy	Encouraging words	Dawn
Kṣatrīya	Valiant when infuriated, retains passion for long time	Conciliatory or caressing words.	3 hours after sunrise
Vaiśya	Harsh coat, dirty appearance, wicked, and vicious	Sound or swish of whip or whip itself	Approaching evening
Śūdra	Ugly, devoid of symmetry, and furious	Whip	Night

medium, and inferior horses and the treatment suggested for them are coaxing words, encouraging words and whip or sound, respectively. Use of above terminology even for horses, perhaps reveals that the *varṇa* concept was deep-rooted at the time the book was written and this criteria may be used for assessing the period to which the manuscript belongs.

IIB. *Training ground :*

It is stated that the training ground or *Kaṭa* should be flat, even, spacious, covered with sand or sandly soil, pleasing to eyes, away from or at the end of the city. It should not be swampy with weeds and coarse wild grass. It is further suggested that the training to the horses should be imparted in serial order in Circular Kaṭa (*maṇḍala*), Rectangular Kaṭa (*caturāsra*), Serpentine Kaṭa (*gomūtra*), Semi-circular Kaṭa (*ardha candraka*), Serpentine Kaṭa with short circles in between' (*nāgāpāsa*). Dimension suggested for a rectangular ground is 100×7 cubits.

For circular Kaṭa, *Śukranīti ślokas* 261-63 read 'The circle that is to be made for training the horse is one of the highest class if one 1,000 *cāpas* in circumference, is medium if half that size, inferior if half that, small if 100 *dhanus* in size, and very small if half that'.

IIC. *Merits and demerits of a rider :*

It is stated in the *Aśvavaidyakam* that 'Rider should not be corpulent, of irritable nature, wanting in common sense, and of easily disturbed mind. Rider should not move on his seat and hold arms high'. Six qualities expected of a good rider are :

1. Whose seat is firm.
2. Who is possessed of knowledge of horse.
3. Whose rein is firm.
4. Who is active, anticipates intentions of horse.
5. Who is not easily disturbed.
6. Who is cool and steady.

This section also provides information of six sites, which should be struck if the horse behaves abnormally, lest it should learn vices.

On Head—if the horse neighs unnecessarily.

On Knees—if the horse slips.

On Hind Quarters—if the horse is frightened.

On Face—if the horse goes astray.

On Breast—if the horse is enraged.

On Belly or Abdomen—if the horse is bewildered.

Modern books on horses describe five types of gaits of horses all of which are provided both in *Śukranīti* and *Aśvavaidyakam*. In Table 4 is given the terminology used for various types of gaits.

TABLE 4

Gaits of Horses

Terminology in current literature	Terminology in *Aśvavaidyakam*	Terminology in *Śukranīti* (*Śloka* No)
Full gallop	*Vikrama*	*Dhara* (289)
		Arkandita (292-293)
Canter	*Purankaṇṭhī*	*Racite* (Rectia) (293)
Amble	*Dhara*	*Pluta* (294)
Trot	*Pluta*	*Dhuritaka/Dhauritaka* -For drawing chariots (295-296)
Fast walking	*Tvarite*	*Valgita*

The section further refers to 12 types of reins. Details are not given. They are *puṣpadantī, gokarṇī, tulotutā, tulodhratā, nāgpiti, puṣpādharī, durmuṣṭī, rājastānī, dvihastī, ekahastī, subhagā,* and *subhanā.*

It may sound strange but it is mentioned that the training should only be started on auspicious time and day after reciting specific *mantra* in the praise of the god of horses, *Raivanta* (Appendix I).

It is further claimed that certain fumigations help in promoting control over horses.

III. *Duties of a Rider :*

A rider is expected to follow the procedure given in Appendix II and recite the *mantras* before riding a horse.

On the control of elephants, *ślokas* 339-40 of *Śukranīti* read 'The hook with two mouths, one for movement forward and the other for movement backward has to be used in controlling the elephant.'

According to *śloka* 345 of *Śukranīti*, bulls and camels are to be governed by strings with which the nose can be pulled.

III. *Index to Longevity of Various Animals :*

Information given in *Jātakaparijātaka* and *Śukranīti* on the longevity of various animals is compiled in Table 5.

TABLE 5

Longevity of Animals According to Jātakaparijātaka and Śukranīti

Species	Longevity	Reference (*śloka* No.)
Man and Elephants	125 years, 5 nights	2,5
	100 years	306–307
Horses	32 years	2,6
	24 years	310
Camels	25 years	2,3,11
Asses	25 years	2
Dogs, Cuckoos, Pigeons	12 years	3,7,8
Bullocks, Buffaloes	24 years	3,6
Goats	16 years	7
Peacocks	20 years	7
Swan	14 years	7
Cocks	8 years	8
Animals born of bubbles and eggs	7 years	8
Demons	150 years	5
Vultures, Owls, Parrots, Crows, Serpents	1,000 years	4
Hawks, Monkeys, Bears, Frogs	300 years	4

The information can very well serve as a base data for further study and confirmation. However, what Demon stands for is not clear. Further, ages of animals in the last two categories seem to be improbable primarily because a man is not expected to have watched them for periods longer than his life-span of 125 years.

IV. *Judging the Age of Animals* :

Our ancients were aware of judging the age of animals from sequential changes in their teeth. *Śūkranīti* demarcates infancy from the middle age with the replacement of naval teeth. Distribution of age of animals is compiled in Table 6.

TABLE 6

Distribution of Age of Animals

Species	Maximum Age	Youth	Middle Age	Reference (*śloka*)
Man	100 years	20 years	60 years	306–309
Elephant	100 ,,	20 ,,	80 ,,	306–309
Horse*	24 ,,	5 ,,	16 ,,	310,312
Bull	25 ,,	5 ,,	15 ,,	311,312
Camel	25 ,,	5 ,,	16 ,,	311,312

*Maximum age of horse as could be calculated from the data in chapter 5 of *Aśvavaidyakam* and Sālihotra's *Aśvaśāstra* is 32 years.

Teeth pattern in horses is given in *ślokas* 159-164 of *Śukranīti* and Śālihotra's *Aśvaśāstra*. Horses have six lower incisors, termed as central, lateral and corner pairs. In the first year, their colour is milky white, which turns muddy white in the second year. In the third, fourth and fifth years, central, lateral and corner pairs get replaced by permanent teeth, respectively. With advancing age, permanent teeth acquire dots, whose colour changes in the order—black (*kālikā*), yellow (*hariṇī*), white (*śukla*), glassy (*kāsa*), honey or chocolate (*pākṣika*). Finally, conchshell holes (*śankha*) appear followed by final shedding. Information on age from sixth year onwards is compiled in Table 7.

Besides the stated changes in teeth, the horses having attained full age also acquire three circular rows on upper lips[8] (*Śl.* No. 326-27).

TABLE 7

Relation between Age of Horse and the Colour of Teeth

Age* (Years)	Colour of dot on teeth						
	Black	Yellow	White	Glassy	Chocolate	Cream	Loose & Shed
6–8	x						
9–11		x					
12–14			x				
15–17				x			
18–20					x		
21–23						x	
24–26							x
27–29							

*In each block of three years central pair of teeth acquires the colour in the first year, latteral in the second year and the corner pair in the third year.

For bulls and camels it is stated in *ślokas* 322-328 that all the eight white teeth grow in the fourth year. Replacement of teeth is in reverse order *i.e.*, in the fifth, sixth, seventh and the eighth year respectively, extreme pairs, next two pairs, and the central pairs get replaced. Subsequently, the teeth get black, yellow, white, red and conch-like after every two years, before they finally lose.

V. *Miscellaneous :*

Chapter 5 of *Aśvavaidayakam* is devoted to life in relation to parts of body of horse. *Śloka* 8 reads 'The intelligent physician who knows the science should give his opinion after giving due consideration on the influences of the particular stage on the particular field'. If this seems to have a validity, Smithcore[12] believes that a definition of new science of Geriatrics, only recently extended to veterinary medicine, might have to be consulted to understand the above relationship.

Description of the ten stages (*daśakṣetra varṇanam*), each consisting of three years and seventy two days, is as under :

1. Upper lip to forehead,
2. Forehead to the head,
3. Neck to shoulder,
4. Breast and withers,
5. Shoulder,
6. Loins,
7. Quarters,
8. Hocks,
9. Shanks,
10. Fetlock joint to hoof.

Judgement of prognosis from the eye symptoms revealed in Śālihotra's *Aśvaśāstra* could also be an interesting piece of study. As a background information, it may be pointed out that Sircar[2] represents *vāta* as nervous troubles, *pitta* as metabolic disturbances, *kapha* as organic trouble to tissues. Śālihotra recommends that the eyes should be fully opened for examination at the inner canthus. Index to prognosis from the eye symptoms is given as under :

Dry and glassy	*Vāta*
Yellow and dark pink	*Pitta*
White and watery	*Kapha*
Dark yellow	Fever
Peticheae	Death in 6 months
Bluish tint and discharge smelling like honey	Death in 2 months
Conjuctive blood diseased by *pitta*, lachrymation is of blood tint and conjuctiva is pale	Immediate death
Bluish yellow tint in conjunctiva	Death in 3 months
Streaks of various colours on conjunctiva, particularly during cold season	Death in 4 months
Watery golden discharge	Death in 10 months
Conjunctivta bluish tint	*Vāta*—Death in 3 months
Pitta affected animals, eyes acquire a colour similar to that of *Curcuma longum* (*halakuṇḍa*)	Dealth in 7 months
Appearance of colour on conjunctiva in early part of a season.	Dealth in 7 days
Pitta affected animals, one eye blue and eyelid inside becomes dark black.	Dealth in 1 months
Inner canthus of both the eyes dark red or dry or dots similar to those on peacock feathers, black or disquamation of epithelium on different parts of eyes	Immediate death

Other empirical data available for the study of life span of horses is the study of 'lines on the tip of nose'. Could it be palmistry equivalent in horses ?

White lines running upwards to the left, if very short, represent very short life.
Straight and upward running lines represent death in the 10th year of life.
If the length of line is 3 fingers, life is 14 years.
If the length is 4 fingers, life is 13 years
If there are two lines obliquely upwards, life is 14 years.

If the horse lies down only on one side or voids urine in large quantities, life is short.

Life is also short if front portion is lower than hind portion, or
knees are very thick, or eyes have swollen appearance, or eyeballs appear to be motionless.

To conclude, the ancient Indian Veterinary Science manuscripts have the possibility of containing rich information. Their study may enlarge the dimensions of modern science, and at the same time will help the reconstruction of History of Indian Veterinary Science. Dr. Tirumurthi[13], then Principal of Stanley Medical College, Madras, in his address at the 26th session of the Indian Science Congress held at Lahore in 1939, lamented that 'Caraka Clubs' flourished in America, not in the country where Caraka was born. Let there be no more contempt for our past, under our own governance.

Appendix I

Formalities at the Start of Training of Horses

After placing the image of God *Raivanta* (deity of horses and offspring of Sun), clad in clean red clothes and wearing garland of red flowers, offering worship with flowers, incense, light, sweets made of rice, milk and sugar and five sounds (of cow, goat, sheep elephant and horse), training should be commenced with the following *mantra* :

Om namo Raivantayā aśvahṛdayā, hṛm, klim oṃ namo
Ati śvetā saumyarūpayā
Imām mam aśvam sādhayā sādhayā
Bandhayā bandhayā basyam kuru kuru
Mahāvīryāyā Raivantayā namaḥ

(Chapter VII, *Śloka* 41)

The *mantra* is to be recited 21 times in the right ear. Then the horse should be saddled or harnessed.

Meaning of the *mantra*—
Salutation to thee— O Raivanta
of very white and pleasing appearance,
Do Thou subdue and control this, my horse,
Salutation to Raivanta, of great prowess

(Oṃ, hṛm and klim are mystic syllables)

Appendix II

Formalities at the Start of Journey, before Riding the Horse

Rider in the morning, after having bath, being clean and pure, clad in white garments, before breaking fast, with ascetism or state of mental restrain, should cant the following *mantras* in the right ear of the horse (*Ślokas* 64-70, chapter VII *Aśvavaidyakam*).

64. *He Gandharvarājā tvam śṛnusvā bacanam mama /*
Gandarvakula jātas tvam mā bhūyaḥ kuladusānah / /

65. *Dvijanām satyavākyānām somasya gurulāsya sā /*
Rudrasya varuṇasyaiva pavanasya valena sā / /

66. *Hutāsanasyā dīptāsyā smara jātim turaṅgam /*
Smara rājendraputra stvam satyavākyam nu ṣvarā / /

67. *Smara tvam vāruṇīm kanyām smara tvam kaustubhamaṇīm /*
Kṣīrodsāgare śaivamavamātya surāsuraih / /

68. *Tatra devakule jātaḥ svavākyama paripālaya / /*

69. *Kule jāta stvamaśvānām mitram me bhava śāsvatam /*
Vijayoham dhārana śaiva saṅgrāme siddhimāvahaḥ / /

70. *Taba prastham samāruhya hatā daityā surai purā /*
Adhunā tvam samāruhya yesyāmi ripubāhinim / /

O' king of horses, hear my words
You are born in *Gandhrava* race,
Don't be disgrace to your race
Remember the truthfulness of twice-born,
Moon God and Garula, Gods of thunders, water, wind
Remember your own race and follow the truth
Remember that you belong to the race,
That came out of ocean, being born in the race of Gods,
You should keep your words, become my friend,
For all times to come
Gods riding on your back, killed the *Dānavas* in gonebye days.
And now, riding on your back, I will
Win my victory over the forces of the enemy.

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[5]*Aśvavaidyakam* is supposed to have originally contained 1,800 *ślokas*, distributed in 68 chapters, covering right from parts of body (anatomy) to management, nutrition, breeding and diseases. N. N. Majumdar claims to possess 1,632 *ślokas* of which 468 were reproduced in *Indian Vet. J.*, **3**, 64, 118, 221 (1926-27); **4**, 48, 142, 234 (1927-28); **5**, 271 (1928-29); **15**, 409 (1938-39); **16**, 28, 118, 196, 261 (1939-40). Information contained in these 468 *ślokas* but not discussed in the present article is on types of ulcers and their treatment, sinuses and their treatment, purification of milk, treatment of sterility in virgin and barren mares, knowledge of pregnancy.

Remaining *ślokas* not available so far deal with housing and rearing, cauterisation, enema, drug administration through nose, mode of sweating, oleogenous drenches, preparation of medicated oils and ghees, care of animals after exercise, prognosis and specific diseases.

[6]Seventeen *ślokas* of Śālihotra's *Aśvaśāstra* reproduced by M. S. Apte in *Indian Vet. J.*, **15**, 415, 1939.

[7]Seven *ślokas* dealing with longevity of various animals reproduced by L. V. Rishi in *Indian Vet. J.*, **10**, 145, 1933-34.

[8]*Ślokas* 64-353 of *Śukranīti* deal with veterinary portion and have been reproduced from B. D. Basu's compilation *The Sacred Books of the Hindus* series in *Indian Vet. J.*, **21**, 398, 1945.

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[13]Tirumurti's remarks are quoted in the Editorial to *Indian Vet. J.*, **15**, 393, 1939.