Traditional veterinary medicine in India

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Summary: A tradition of veterinary therapy developed very early in India and this has survived to the present time. Based on the Ayurveda ('knowledge concerning longevity'), a medical art which had its roots in the literature of the Veda (1500-1000 BC), Indian veterinary medicine is known for its specialised literature, which provides information on ancient methods of preventing and treating diseases of animals before the advent of modern medicine. Some of these treatments, little known outside India, are still practised today.


INTRODUCTION

The earliest information on the art of caring for animals in India is provided by the sacred texts of the Vedic religion. These texts, written between 1500 and 600 BC, were transmitted orally from generation to generation, over the centuries, before being written down. The oldest Vedic literature consists of collections of hymns, liturgical chants and sacrificial or magical formulae, mainly in verse, which constitute the Veda proper (1500-1000 BC).

In these ancient times, knowledge already existed of how to prepare a number of remedies to counter prevailing ailments in human beings and also in animals. Thus, the Atharvaveda (IV, 9, 2) hails the benefits of a protective ointment for human beings, cows and horses. The concepts developed during this period formed the basis of subsequent medical doctrines. In fact, concepts incorporated in the Veda, sometimes retaining Vedic names, formed the basis of some of the most characteristic anatomical and physiological concepts of Indian medicine. These included the observation and recording of the behaviour of sick animals. For example, the Atharvaveda (VIII, 7, 23) states that ‘the wild boar knows the herb which will cure it, as does the mongoose’. This example recalls the shepherd Melampus who, according to Theophrastes (327-287 BC), discovered the purgative properties of hellebore by observing its action on goats. Such references illustrate the importance of observation in the choice of medicinal plants (18).

Towards the end of the Vedic period, Indian medicine began to adopt observation and rational procedure, which developed into a coherent system known as Ayurveda (from knowledge [veda] concerning longevity [ayur]) (16, 17). This knowledge served as a model for veterinary medicine, the history of which is still little known, producing a

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specialised literature in Sanskrit and in the other languages of India. Some of this literature was even translated into Tibetan, Arabic and Persian (4, 12, 18, 20). The surviving texts are concerned mainly with the treatment of horses and elephants.

The legends incorporated in these texts present knowledge regarding the medical treatment of horses and elephants as being directly revealed by the gods. This may be explained partly by the need to provide veterinary medicine with an origin similar to that of the Âyurveda, which is also presented as 'divinely-inspired' knowledge. In fact, this veterinary medicine developed from the Âyurvedic model over the seven or eight centuries which preceded the Christian era. It is also known, from the inscriptions of Asoka in the middle of the 3rd century BC, that this Buddhist sovereign opened hospitals for animals (25). Unfortunately, no actual veterinary records exist from this period.

**SANSKRIT TREATISES ON VETERINARY MEDICINE**

The oldest existing veterinary text from India is a treatise entitled Asvâyurvedasiddhânta (‘Complete Âyurvedic system for horses’) attributed to a certain Sâlihotra (20, 24). A person of the same name was mentioned in the Mahâbhârata, the great Indian epic (apparently written between 300 BC and AD 300). However, the treatise is definitely more recent, although probably earlier than the 10th century AD. There also exists a Tibetan version written at the beginning of the 11th century, and the text was translated into Persian in the 14th century. The same author apparently wrote two books on horses: Asvalakshanasâstra (‘Treatise on the marks of horses’) and Asvaprasamsa (‘In praise of horses’). Subsequently, various treatises on horses and diseases of horses were composed. Among the best known works of this specialist literature are Asvacikitsita (‘Therapeutics of horses’), written by Nakula around the year 1000 (20, 21), and Asvavaidyaka (‘Medicine of horses’) by Jayadatta, probably originating in the 13th century (14).

The principal surviving ancient text dealing with elephant medicine is a treatise which tradition ascribes to Pâlakâpya, a legendary person, also known as Dhanvantari, the father of Indian surgery (20, 23). The text, entitled Hastyâyurveda (‘The Âyurveda of elephants’) is divided into four parts. The first part is devoted to general diseases, the second to localised and minor ailments, the third to surgery and anatomy, and the last to the feeding of elephants and medicinal preparations. The text cannot be earlier than the Middle Ages, but it contains medical concepts and veterinary practices of long standing. The Greek Megasthenes, who lived in India for many years circa 300 BC as ambassador to Chandra Gupta (Sandrocottus), confirmed the existence of medical aid for elephants, and provided precise indications which agree with Indian sources. In particular, his evidence of care provided for elephants demonstrated that the state of veterinary medicine was already as advanced as in the Hastyâyurveda and other more recent texts, such as the Mâtangalîlâ (‘Elephant sport’) by Nilakantha (11, 22). In Assam, at the beginning of the 18th century, the Hastividyârnava (‘Ocean of knowledge concerning elephants’) was written. This has survived as a single manuscript, rendered valuable mainly by its illustrations: unlike older manuscripts which have survived to our times, this text on elephants is adorned with numerous miniatures illustrating the different chapters on the varieties of elephants, their capture (Fig. 1), habits, training procedures and care (Fig. 2). The text also incorporates popular beliefs and magico-religious practices (7, 10).
Fig. 1

An elephant which has just been captured
(Miniature illustrating the Hastividyârnava, edited by P.C. Choudhury, p. 165 detail)

Fig. 2

Medicinal herbs are rubbed on the foot of an elephant
(Miniature illustrating the Hastividyârnava, edited by P.C. Choudhury, p. 37 detail)

OTHER SOURCES

Specialised treatises are not the only source of existing information. The treatises of the Ayurveda sometimes refer to veterinary treatments. Thus, a passage in Carakasamhitâ (Siddisthâna, XI, 20-26) contains a list of ingredients for preparing...
enemas for elephants, camels, cattle, horses and sheep (26). A small collection of therapeutic formulae from the 11th century, the Rājamārtanda, contains a chapter devoted to the treatment of domestic animals (19).

In addition, certain non-medical texts contain information on the veterinary art. Some information regarding veterinarians is contained in the Arthasāstra, a treatise of government traditionally attributed to Kautilya, possibly an adviser to Chandra Gupta (313-289 BC), founder of the Maurya dynasty. The Arthasāstra (II, 32) reveals that veterinarians accompanied armies to 'treat the beasts weakened by travel, disease, work, rut or age' (15). Veterinary medicine also features in a falconry treatise, the Syainikasāstra, which might have been written in the 15th or 16th century AD, and also in the Sivatattvaratnākara, an encyclopaedic work of the 18th century. In the latter, Ayurvedic medicine and associated topics occupy some thirty chapters. Three chapters are devoted to veterinary medicine: a treatise on elephants and their medical treatment; one on horses and diseases of horses; and the third on the care of cattle and other domestic animals (27).

ÂYURVEDIC PRINCIPLES FOR ANIMALS

In the field of anatomy, the knowledge of Indian veterinarians in ancient times seems to have been quite extensive, and possibly more precise than corresponding knowledge on the human body. Observations on animal carcasses were favoured by sacrifices, wars and other events. For example, equestrian texts provide a rich anatomical nomenclature, but the concepts derived from this were quite rudimentary in the case of visceral anatomy. The value of dissecting carcasses was recognised. One of the oldest Ayurvedic treatises in Sanskrit, the Susrutasanhitâ (‘Collection of Susruta’, from the beginning of the Christian era) even describes a dissection procedure for the study of the human body. Veterinarians, like surgeons, had to be aware of vulnerable regions (marman) in which any injury would be fatal or particularly severe (3, 20). The marman concept, which was an innovation of Ayurvedic surgery, is found in veterinary medicine and is known to have originated in a Vedic concept. The word is derived from the root MR (signifying death) and was used particularly to designate a vital region of the body. In animals, as in human beings, the location of the marman shows that they often coincide with highly vascular regions, and also tendons and major nerve trunks, where any injury is serious because of the risk of heavy bleeding, incapacity or paralysis. In the absence of detailed knowledge of the internal anatomy of animals, anatomical knowledge was confined to empirical observation of the body surface, enabling operations to be performed without harming vital organs.

The physiopathological concepts contained in Sanskrit texts are those of the classical Âyurveda. According to these concepts, the health of both animals and human beings depended on the equilibrium and good functioning of the three vital principles: 'wind' (vāyu), 'bile' (pitta) and 'phlegm' (kapha or sleshman). Each of these three principles was supposed to act, embracing the secondary forms which corresponded to various functions and manifestations of life. The most important of the three primary principles seemed to be 'wind', which referred to various organic fluxes and governed ingestion, digestion and assimilation of nutrients, the differentiation of organic substances and their distribution, and also the internal circulation of fluids, respiration and general motor functions, thus including numerous aspects of body functioning which modern medicine attributes to the central, peripheral and autonomic nervous systems (16, 17).
Generalised diseases and localised ailments were linked to imbalance in these principles, or disturbances in the secondary forms of a single principle. Consequently, the name tri-dosha (‘three troubles’) was given to this triad of elements. Disorders in the functions governed by the three principles were themselves the outcome of multiple causes related to behaviour, character, feeding, mode of life, season, habitat, etc. In particular, equestrian texts often invoked a nutritional cause: food poisoning or unbalanced feeding.

Classification of diseases was broadly similar to the principles applied to human diseases but differed in detail, except in certain cases such as the diseases common to horses and human beings. The various conditions were classified according to their supposed origin, their apparent seat, or the nature of the symptoms. In the first category were diseases attributed to a disorder of ‘wind’, ‘bile’, etc. ‘Diseases of wind’ were the most numerous, totalling 76 in the case of elephants. In the second category were diseases of the skin and the head, chest pains, etc. The last category notably included fevers, which were differentiated into many types according to the involvement of ‘wind’, ‘bile’ or ‘phlegm’, and according to the other symptoms which accompany hyperthermia. One of the most detailed classifications is that of the Hastyāyurveda, which placed diseases of elephants in two broad groups (23). The first group was endogenous disease, including diseases attributable to disturbance of the vital principles. The second group was exogenous disease, mainly traumatic injuries: accidental wounds and those caused by weapons, bites of wild animals, etc. However, identification of the diseases listed in the texts is often uncertain, and sometimes even impossible, due to a lack of information.

PROPHYLAXIS OF ANIMAL DISEASES

As in Ayurvedic human medicine, prevention occupied an important place in veterinary medicine in ancient India. Prevention was based on general hygiene and food hygiene. Texts insist on the cleanliness of animals, giving details of the location and maintenance of stalls and stables, the qualities and defects of different sorts of feed, and husbandry rules to be observed. The texts also stress the importance of moderation in feeding domestic animals, and enumerate the disadvantages of overfeeding.

Ancient Sanskrit texts on veterinary medicine discuss every variety of edible products and indicate their different properties, which were suitable for animals of a given ‘temperament’, comportment and state of health, taking into account the climatic conditions, time of the day, etc. For example, a feed which may be given safely to a healthy animal may complicate a diseased state. The feeding of grass was ruled out, as it weakened the vitality of horses. However, barley, beans and butter were particularly recommended for mares during pregnancy. Sea salt should be added to feed in the case of diseases caused by ‘wind’ disorders and venous diseases, or for a horse with sleeping difficulties. However, sea salt was not recommended for very old or very young horses, etc. (4, 24).

In addition, as in Ayurveda, the veterinary tradition of India placed an emphasis on procedures which would enhance the general state of health, notably the administration of tonics and stimulants (rasāyana), and aphrodisiacs (vājīkarana). The latter, containing various constituents which have been the object of little study to date, augmented the strength of enfeebled animals and those of poor virility. Sanskrit texts
provide various recipes for potions enabling a stallion to mate repeatedly. The *rasâyana* ('elixirs of long life') were prescribed to strengthen animals and were recommended for preventing all sorts of illnesses. For example, a mixture based on aconite and three peppers was recommended for extending the life span of horses. The following plants were main constituents of such elixirs: *Asparagus racemosus* Willd., *Emblica officinalis* Gaertn., *Terminalia bellerica* Roxb., *Terminalia chebula* Retz., *Tinospora cordifolia* (Willd.) Miers and *Zingiber officinale* Rosc. Buffalo horn was also a valued ingredient.

**VETERINARY THERAPEUTICS**

Veterinary medicine is theoretically divisible into eight branches, corresponding to the eight divisions set out in the *Āyurveda*. Thus, equestrian matters were divided into general surgery, general therapeutics, ophthalmology and otorhinolaryngology, care of foals (corresponding to Āyurvedic pediatrics), toxicology, fortifying treatments, demonology, and the use of aphrodisiacs.

Apart from surgical interventions, therapeutics usually consisted of the administration of medicinal preparations by different routes and in various forms: mixtures of powders, decoctions, electuaries, ointments and snuff. The principle remedies cited by the texts were based on plants, but some substances of animal or mineral origin were also used. All these natural ingredients served to prepare thousands of remedies, often of very complex formulation.

The complexity of preparations is explained by the care taken to combine ingredients in order to counterbalance, enhance or prolong the effects of some ingredients through the effects of others. There are basic preparations to which various other ingredients are added to adapt the treatment to a given species. For example, the passage in the *Carakasamhitā* (Siddhisthâna, XI, 20-26) concerning enemas for elephants, camels, cattle, horses and sheep provides a basic formula composed of the following plants: *Acorus calamus* L., *Glycyrrhiza glabra* L., *Piper longum* L., *Randa spinosa* Poir., *Saussurea lappa* C.B. Clarke. A dozen other plants may be added to these basic ingredients for elephant enemas. For cattle preparations, addition of decoctions of *Butea monosperma* (Lam.) Kuntze, *Cedrus deodara* (Roxb.) Loud. and *Terminalia chebula* Retz. was recommended. Other plants were indicated for horse enemas, such as *Baliospermum montanum* Muell.-Arg. or *Croton tiglium* L. (26).

For hippiatric purposes, various procedures were available for making horses sweat, in addition to the use of cauterisation techniques, bleeding and several kinds of enemas (18). Eight procedures for inducing sweating were used to treat diseases due to 'wind' and 'phlegm'. Texts distinguish violent and mild sudorific agents for use in horses. The mode of use and the best time for treatment were specified.

Cauterisation with a red-hot iron was reserved for conditions which could not be cured by nutritional means, 'errhins' or enemas. The cauterisation site, and the type and number of cauterisations depended on the particular case. Ample information was available on post-operative care and precautions for the days following intervention. Reference was also made to the use of caustics.

The hippiatric treatises also describe the veins to be chosen for blood-letting in particular cases. There was also information on contra-indications, on feeding to 'reconstitute' the blood, and on remedies to be administered following major bleedings.
The texts emphasise the benefits of medicinal butter oils for feeding, external applications and enemas.

**REMEDIES STILL IN USE**

Since India gained its independence in 1947, the Indian Government, recognising the services rendered by traditional medicine, has given a new impetus to these practices. The study and practice of traditional medicine has been regulated, and training is provided at present by a large number of schools with associated hospitals and care centres. This movement has also benefited traditional veterinary medicine, which has undergone a revival (2). For example, India still provides leading elephant specialists.

Several Indian laboratories now produce preparations from ancestral recipes, which are packed under modern conditions and sold throughout India for the treatment of domestic animals. Traditional formulations produced on a large scale include tonics, fortifiers and digestives, as well as antiparasitic and antifungal products.

Many of these medicaments are polyvalent, due to the multiplicity of ingredients used in their preparation. For example, a stomachic and tonic containing 59 ingredients is produced by a company in Bangalore. This preparation is recommended for treating digestive disorders (anorexia, dyspepsia, constipation, etc.) in cattle, sheep, goats, horses and dogs, in doses proportional to the size of these animals. The principal ingredients of vegetable origin include the following: *Aegle marmelos* Corr., *Aquilaria agallocha* Roxb., *Butea monosperma* (Lam.) Kuntze, *Centratherum anthelminticum* Kuntze, *Curcuma longa* L., *Ferula narthex* Boiss., *Moringa oleifera* Lam., *Piper longum* L., *Punica granatum* L., *Terminalia bellirica* Roxb., *Terminalia chebula* Retz., *Tinospora cordifolia* (Willd.) Miers, *Trachyspermum ammi* (L.) Sprague and *Zingiber officinale* Rosc. These ingredients were prescribed in Ayurvedic medicine for their aperitive, digestive, stomachic, carminative or anthelmintic properties.

Another example is provided by an ointment against sprains and sores, prepared from the following plants: *Abrus precatorius* L., *Acorus calamus* L., *Celastrus paniculatus* Willd., *Hyoscyamus niger* L., *Moringa oleifera* Lam., *Nardostachys jatamansi* D.C., *Ocimum sanctum* L., *Saussurea lappa* C.B. Clarke and *Vitex negundo* L. To these oils are added extracts of seven other plants: *Anacyclus pyrethrum* D.C., *Colchicum luteum* Baker, *Curcuma amada* Roxb., *Gloriosa superba* L., *Litsea sebifera* Pers., *Myrica nagi* Thunb. and *Nerium odorum* Sol. All these plants have been investigated and their active principles are known (1, 6). *Nardostachys jatamansi* is often combined with oil of henbane (*Hyoscyamus niger*) as an antineuritic. *Ocimum sanctum* and *Vitex negundo* are used as wound dressing. In traditional medicine, the root of *Curcuma amada* is applied to contusions and sprains. Extract of *Colchicum luteum* is applied externally as an analgesic.

Many plants of the Ayurvedic pharmacopoeia have since been shown to be effective. Listing and identification of the many plant species used in preparing remedies described in the ancient medical literature was accomplished during the 1970s. Veterinary applications of these medicines were also taken into account. Despite the increase in chemical and pharmacological studies in recent years (8, 13, 28), there is still much to be done in evaluating the resources of India with regard to medicinal plants which may be useful in veterinary medicine.
CONCLUSION

Long before the development of veterinary medicine in the West, the veterinary tradition of India had already originated a large body of theoretical and practical knowledge. Before the advent of modern medicine and the discovery of antibiotics, the knowledge of veterinarians in the West was not much further advanced than that of their Indian predecessors. This can be demonstrated by comparing the information contained in Sanskrit texts with books on horses published at the end of the 19th century or the beginning of the 20th century (4, 5, 9). There are some striking similarities, particularly concerning the feeding of horses, daily care, training and certain operations (bleeding, setons, etc.). Studies have shown that the traditional usage of Indian remedies was often justified (8, 28).

Certain aspects of ancient veterinary medicine in India, neglected or unknown in the West, merit deeper study. These include the ideas regarding the feeding of animals, preventive methods and cauterisation techniques. Also of interest are the medicines derived from plants which are still in use, as well as those medicines which are no longer used but are fully described (together with indications, and mode of preparation and administration) in ancient texts.

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REFERENCES


