Traditional veterinary medicine in the Near East: Jews, Arab Bedouins and Fellahs

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Summary: The authors review traditional veterinary medicine in the Near East region. The ancient Jewish sources – principally the Bible, the Talmud and other, more recent manuscripts – contain ample discussions of veterinary medicine and various aspects of the relations between humans and animals. These include zoonotic diseases, hygiene, intoxications, and various preventive and curative measures, as well as legislation and guidelines for the proper treatment of livestock. Arab shepherds, and particularly the Bedouins, have a long tradition of experience in the diagnosis and treatment of various ailments, predominantly using plant mixtures and fire branding.


INTRODUCTION

Livestock and field cultures are the two pillars of the ancient agricultural economy. The Biblical story of Cain and Abel, the dreams of the Egyptian Pharaoh about fat and thin cows and full and empty ears of wheat, and expressions such as ‘land of milk and honey’ are only a few examples which serve to illustrate the immense economic importance of these agricultural activities in the ancient Near East.

Among ancestral healers in human and animal medicine were the following: the wizard or witch doctor; the religious authorities including the Jewish kohanim (priests) or chachamim (‘bearers of knowledge’ or sages) and the Arab derwish; the chatib (maker of amulets and tokens); the medjabar (orthopaedist), treating bone fractures and healing by fire branding; the attar (seller of medical spices or herbologist); and the shepherd, having daily contact with the animals in pasture. Rabbi Akiva (1st century AD), who had been a shepherd in his youth before becoming one of the most prominent Jewish rabbis and national heroes in Israel during the Roman occupation, originated the phrase that ‘the cow wants to suckle more than the calf wants to suck’.

In ancient times, ailments were considered as misery and torture inflicted on sinners as punishment for their sins. Later, Hippocrates and Galen developed the theory of the four humours (blood, sputum, yellow and black bile) which dominated medicine for more than 2,000 years.

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Throughout this long period, the humoral theory was severely attacked, particularly by the famous Jewish physician Rabbi Moshe ben Maimon (AD 1135-1204), also known as Maimonides, and nicknamed Abu Amram by the contemporary Egyptian Arabs. However, the theory was never refuted during this period.

The ancient secluded sect of the Isiim, living around the Dead Sea in the period of the Second Temple in Israel (100 BC-AD 69), were engaged in plant therapy and the use of the healing properties of minerals. In fact, the early Christian fathers were deeply impressed by this mysterious group and their strictness in customs of purity and hygiene.

The Talmud, a sacred Jewish book of laws and customs, consisting of six volumes of the Mishnah and 60 chapters of the Gemara (AD 100-500), deals extensively with various aspects of medicine, such as pathological conditions and anatomy.

The physician is represented in the Talmud as a person of great dignity who was always in high demand; details are provided of the appropriate professional approach, instruments, salary and expertise. Methods of medical diagnosis and treatment are analysed and criticised. This discussion was undoubtedly influenced by the culture of the neighbouring countries.

The Mishnah already distinguishes between a physician and the veterinary surgeon, although experts with knowledge in both branches were available. Thus, Todos is mentioned as an expert in human anatomy as well as being familiar with surgical interventions such as hysterectomy in cows and sows. In fact, the expert testimony provided by Todos overruled a decision made by the authoritative Rabbi Tarfon (1st century BC) in a famous trial conducted in the town of Lydda with respect to the condemnation of a carcass of a hysterectomised cow. Ilah, an expert in the town of Yavneh, was authorised by the local chachamim to charge fees of four and six isras for inspecting a goat (or sheep) and a cow, respectively.

The Mishnah states that ‘he who charges fees for pregnancy diagnosis must be an expert – like Ilah of Yavneh – in order to permit the slaughter of the animal’. This official scale of fees might be considered the starting point of veterinary legislation and professional organisation.

Furthermore, numerous lesions mentioned in the Mishnah as leading to condemnation of the carcass are still considered serious public health problems. Ritual examination, on the basis of the pathological descriptions of Ilah and others, laid the foundations for state-authorised meat inspection and the establishment of modern abattoirs. The designation ‘kosher’ meat was institutionalised and an entire administrative system was established, including quality control and fees.

Rabbi Shlomo Itzhaki (AD 1040-1105) born in Troyes, France was knowledgeable in animals and explained paragraphs in the Bible dealing with animals. Maimonides and Rabbi Moshe ben Nachman (1194-1270) preached in favour of preventive medicine. Vast veterinary medical material is presented in the Shulchan Arouch written by Rabbi Yosef Karo (1488-1575), born in Spain, and Rabbi Moshe Iserlish (1525-1572) from Poland. This monumental religious study includes details pertaining to poisonous plants, rules of hygiene, etc.

The first book in Arabic dealing with small animals, birds and livestock was Kitab El Chaiwan (‘Book of Animals’), written by Amer Ibn Bachar (767-867), who was also known as El Chidjaz (‘bulging eyes’) due to his exophthalmia. El Chidjaz was born in Basra, Iraq and served under the Khalif. The book contains information collected from veterinarians, dealing mainly with digestion in animals.
El Chidjaz showed scientific curiosity and made several original observations. For example, he refuted the theory that the testicles of the camel disappear after slaughter, by sending a messenger to examine the carcass and retrieve the 'missing' organs. El Chidjaz also showed that the weight of the scorpion does not change after stinging (as claimed by Aristotle). In addition, he described the snake encircling the legs of a cow, immobilising the animal in order to reach the udder and suck the milk.

Other sources of veterinary knowledge derive from the Bedouins (nomads, shepherds) and Fellahs (sedentary farmers), who are an integral part of the agricultural landscape of the Near East.

The Bedouins describe the origin of mankind and livestock as follows: ‘From the heavy cloud that brings blessing to the land, God took a portion and created the camel - heavily moving and productive. God shot an arrow and caught part of a cloud and produced the horse - swift as an arrow that hits its target. From the wind which blows over the land, He created the Bedouins - wandering as free as the wind. He took a fist of earth and created the donkey - humble and humiliates. Finally, from the droppings of the donkey, God created the Fellah - the farmer.’ Nowadays, the Bedouins are present throughout the deserts of the Middle East, North Africa and the Arabian peninsula, which is the cradle of Islam, the religion adopted by the Bedouins in the 7th century.

The medical culture of the Bedouins is based on tradition, crystallised during generations in the vast deserts. Geographical isolation precluded the use of modern medical services and the traditional medicine currently practised is based on the old methods and the means available, which are principally of animal and plant origin. Some therapeutic customs actually proved very reliable and were eventually studied and used by the modern pharmaceutical industry.

The religious Arab shepherd believes that diseases are sent by God and that ‘for every ailment created, God supplied a remedy’.

The Bedouins seek medical care through traditional medicine. Only when this does not prove satisfactory will they address themselves to a physician.

The following sections deal with various aspects of traditional veterinary medicine in the Near East, which is based on many years of experience, verbal and written evidence, and sometimes witchcraft and false beliefs.

ANATOMY AND PATHOLOGY

In the Biblical period, reference was already made to a number of pathological conditions, such as blindness, fractures, biting, dermatitis, pox, favus and papules. The sages of the Talmud recognised and described in detail pathological lesions apparently related to tuberculosis. Actually, the Talmud speaks of ‘those involved in various activities’, apparently referring to experimenters or scientists. Knowledge of anatomy and pathology was greatly advanced by the debates and decision-making in regard to the ritual slaughter of livestock in Israel.

The sages closely observed livestock before slaughter, trying to detect defects as well as alterations after slaughter, condemning the carcass in certain cases. Thus, clinical and pathological anatomy was founded. In fact, more than 1,000 medical terms in the Talmud deal with pathological anatomy, thus indicating the wealth of research in this discipline.
Pathology in the Talmud period was not based on the humoral theory, but on the
detailed knowledge of ailments, supported by pathological findings in the corpse.
Condemnation or release of the animal for consumption (kosher) was based on the
principle that 'any animal with such pathological changes as to exclude survival is
condemned' (treifa). This differentiation calls for a thorough knowledge of the
pathological physiology of the affected organs.

Perforated intestines led to the condemnation of the carcass. However, in the
presence of intestinal adhesions, generally due to local inflammation without
peritonitis, the meat was kosher because the life of the animal was not jeopardised.

The two case studies presented below may shed some light on the 'state of the art' in
clinical pathology in the Talmud period.

**Case study no. 1**

Rabbi Habiba possessed a ewe which dragged both hind legs. Rabbi Yemer
diagnosed *ischiagra* (ischialgia). Rabbi Rabina protested, 'Why not paralysis due to
rupture of the spinal cord?' The ewe was examined, and the latter diagnosis was
confirmed. However, the original diagnosis was accepted officially: 'Because', claimed
the sages, 'ischialgia is frequent, while paralysis originating in the central nervous
system is rare.'

The Talmud distinguished three major pathological changes in the brain and spinal
cord: liquid encephalopathy, 'soft' brain and 'loss' (degeneration) of tissue.

**Case study no. 2**

Rabbi Tarfon (1st century BC), who was not an expert in medicine, was consulted with
regard to a cow, following hysterectomy. Tarfon decided that the animal might die, and
that the carcass should be condemned and fed to dogs. The sages from Yavneh, having
heard about the case, released the carcass for consumption because they claimed 'there
are cows in a similar condition which are alive'. Todos the physician accepted the decision,
also stating that 'a cow or a sow should not leave Alexandria unless hysterectomised, so as
to prevent the breeding of these highly selected animals outside Egypt'.

**PARASITIC DISEASES**

Parasitic agents and parasitoses caused by ectoparasites and helminths were well
recognised in the ancient Near East and various control measures were suggested.

The authors of the Bible warn humans to 'beware of fleas, flies and mosquitoes
borne by a cursed soil', thus alluding to the idea of spontaneous evolution, which was
widely accepted by the scientific world until modern biology entered the scene.

Sarcoptic mange in camels and sheep was one of the most common skin diseases in
the ancient Near East, and various measures were suggested for its control. In the time
of the Talmud, the lesions of sarcoptic mange were smeared with asphalt oil and honey.
The Bedouins in Sinai recommend the application of dry, powdered leaves of *Plantago
psyllium* ('isbaat il barait') for the treatment of skin lesions and dermatitis. The same
preparation is added to feed in cases of colic and diarrhoea in camels, horses and sheep.
Another plant preparation used for treating generalised dermatitis in camels is a
concoction of leaves of *Tufah Sedom* (the 'apple of Sodom', *Calotropis procera*).
Sulphurous water from natural sources in Ein Gedi (near the Dead Sea) is still used by the Bedouins of the area for this purpose, as well as ordinary car lubricating grease. The Bedouins know that sarcoptic mange is transmissible to humans, showing lesions mainly on the elbow and thighs. Sometimes, the body of the animal is covered with mud made of ‘white’ (calcareous) soil, or the head and tail are washed with waste water which has been used to soak olives. Hot-iron branding (kai or kawieh in Arabic, or kviyah in Hebrew) of the nose is also frequently used, mainly in sheep.

In other countries in Asia and North Africa, other medicinal preparations are proposed, such as taramira oil (Brassica eruca) combined with mud (in India), sesame oil (Sesamum indicum), sulphur, tar, application of pine oil and removal of affected areas of the coat of the animal (in Baluchistan), aromatic liquid extracted from taga (Thuya articulata) or arar (Juniperus phoenicea) mixed with sour milk (Algeria), fish oil with tar (Egypt) and crude distillate of colocynth seeds (Sahara). Flies and mosquitoes are repelled by burning green wood or applying mud to the skin of the camel. Infestation of fleas (barjhouf) in lambs, kids and calves are treated as follows: a ball of wool is attached to the nose or forehead of the ewe and the animal is pushed slowly into a bath of water. Avoiding the water, the fleas collect in the wool, which is then disposed of.

Ticks may generally be controlled using kerosene. However, the warwar (Ixodes ricinus gibbosus) constitutes a special case. This species of tick is attracted mainly to goats, causing tick paralysis, and is very rare in sheep. The tick can be found in northern Israel, in the hilly areas of Western Galilee and Mount Carmel, as well as parts of the West Bank as far south as Ramallah. The tick breeds mainly on the northern slopes of the wadis (canyons), which are densely covered by brushwood. Curiously enough, Ixodes ricinus gibbosus in these areas follows the usual three-year cycle, but each year only one developmental stage (larvae, nymphs or adult ticks) can be found on the goats. Cases of paralysis occur only in the ‘adult’ year, i.e. once in three years. The shepherds, knowing this cycle of events, avoid the northern slopes in these years and lead the herds to the much poorer grazing on the bare southern slopes. As the tick is known to prefer the head and neck area, attaching a rag with kerosene to the neck of animals provides a degree of control.

The ‘cave tick’ Ornithodoros tholozani (‘krad el maujour’) is very familiar to the shepherds, who are also aware of borreliosis (due to Borrelia persica) in human beings. Flocks of goats are often sheltered in spacious, tick-infested caves at night. The shepherds then sleep on wooden platforms maintained by two-metre wooden supports, and the ladder is dragged up. The Arab shepherds claim that the degree of tick infestation (mainly Hyalomma spp. and Rhipicephalus spp.) in livestock is closely related to the abundance of rodents (mainly Meriones spp. and Microtus guentheri), which are now known to serve as hosts for the pre-imaginal stages of these three-host ticks. The Bedouins discourage ticks from infesting tents and the surroundings by keeping fowl.

Oestrus ovis is mentioned in the Talmud, and a treatment is described whereby yachnoun twigs are thrust into the nostrils to provoke sneezing and removal of the larvae. The exact nature of this plant (yachnoun) is not known today. Shepherds now use tar, administered in the drinking water. Hot-iron branding on the forehead or nose is also used occasionally.

Leeches (or alak) (Limnatis nilotica) infest some water sources and are found attached to the pharynx in horses, sheep and cattle. The leeches are removed manually with a rag soaked in a mixture of salt and lemon.
Blood parasites occupy a place of honour in the pathological panorama of livestock in the Near East. The main diseases involved are sheep babesiosis (caused by *Babesia ovis* and *Babesia motasi* and transmitted in the area by adult *Rhipicephalus bursa* ticks) and *Trypanosoma evansi* infection (surra) in camels.

Shepherds in the enzootic areas of Israel relate the occurrence of outbreaks of babesiosis to the *elet* (*Cichorium pumilum*), the blue flowers of which appear in the spring months of April and May, concurrently with the infestation of the sheep by adult *R. bursa* ticks. However, the Bedouins in the Negev region of Israel correlate sheep babesiosis with the ingestion of *rodja* (*Hypericum* sp.), also causing photosensitivity. The symptoms are familiar to the shepherds, who describe the disease as ‘malaria’ (*chom*) because the animal trembles and avoids sunlight.

Camel trypanosomosis is widespread in the area and is well known to the Bedouins, who sometimes offer their clinical experience and diagnostic abilities to the camel breeders. Empirical field tests were developed for the diagnosis of clinical as well as chronic cases of the disease, enabling the segregation of affected animals.

A handful of earth is taken from a clean place, and the suspected camel is made to urinate on this until it is wet enough to be formed into a ball, which is then laid aside for half an hour. At this time, the ball is broken up and smelt by the ‘expert’. The urine of healthy camels merely smells of ammonia. Urine taken from camels suffering from surra during an intermission period (when trypanosomes are temporarily absent from the blood) has a similar ammoniac smell. However, in camels suffering a paroxysm of fever accompanied by the presence of numerous trypanosomes in the blood, a characteristic smell can be noticed, although not invariably. This smell – which may be described as pungent, sweetish and rather sickly – seems to be dependent on the presence of a large number of trypanosomes, rather than on the actual degree of fever; in fact, when parasites are few, the smell is generally imperceptible. The smell may be detected when no albumen is present in the urine, and in urine which is alkaline or neutral to litmus.

Another traditional diagnostic test for trypanosomosis involves pulling some of the long hairs from the tail of a camel suspected of being infected and applying the roots to the down-turned palm of the hand: if the hairs stick to the palm, the camel is considered healthy; if the hairs drop off, the animal has surra. Camel handlers consider this as a test of the vitality of the hair itself while, in fact, it is the flesh attached to the roots of the healthy hairs which causes them to stick to the hand. This test has some value when no history of a sick camel is available; when the hairs do not stick, the camel is generally ‘going downhill’ from some cause or other, although not necessarily surra. Camels recovering spontaneously from surra yield the same results in this test as healthy animals. Undoubtedly, the microscope is incomparably superior to these tests as a diagnostic aid.

Problems due to helminths constitute an important factor in livestock management in the area. Taeniosis of meat origin, lungworms, echinococcosis and cysticercosis were well known to the sages of Yavneh (1st-2nd centuries AD) and several medicinal treatments were recommended, including the use of cabbage, *tardin* and dry *sisin*. Prohibition of pork in the Jewish religion was generally related to the presence of *Trichinella spiralis* in the meat (however, it seems that the main reason for prohibition was leptospirosis).

In ritual Jewish slaughter, echinococcal hydatids were named *kandi kandi*. The Bedouins relate echinococcosis to insufficient watering of the flocks during the preceding summer.
The Bedouins recognise gastrointestinal worms and lungworms as well as fasciolosis, and recommend appropriate treatments. Gastrointestinal roundworms frequently affect sheep, causing *jiam*, a disease which was closely observed and studied by shepherds over several centuries. The tale of the epizootiology of *jiam* has survived for generations and is still narrated among the tribes.

**Jiam**

This disease occurs between September and December in extensively-kept flocks of sheep and goats, grazing in the hilly regions of the Upper and Lower Galilee and Samaria. Sporadic cases occur every year while, in some years, morbidity and mortality affect a large section of the adult sheep and goat populations, with considerably higher mortality in the latter. The status of *jiam* as a reportable disease was maintained after the establishment of the State of Israel in 1948.

The disease assumed serious proportions between September and December in the years 1963 and 1967, with peaks in October and November. Morbidity in some flocks approached 100% of the adult animals, with a mortality rate of 10-30%. Abortions in goats with negative bacteriological and serological findings (for brucellosis and leptospirosis) occurred concomitantly in some of the flocks. Abortion, traditionally regarded as part of the *jiam* syndrome, was not observed in sheep.

The climate in Israel and other parts of the Near East is characterised by a division into two distinct seasons: a hot, dry summer and a cool, rainy winter. Four or five months of the year are completely dry; during the remaining months, variations occur in rainfall and temperature.

According to local tradition, mainly among the Bedouins in the northern part of Israel, *jiam* occurs only if the previous rainy season commenced earlier than usual. The Bedouins believe that the rainy season ought to begin within a fortnight of the annual celebration of St George’s Day, on 16 November. St George’s Day is locally known as *Eid Lod* (‘The Feast of Lydda’), due to the tradition that St George was born in Lydda in the 3rd century AD and was buried there on 16 November AD 303. St George is popular among both Christian Arabs and Moslems, who call him *Mar Gerias*. Pictures of St George on horseback fighting the dragon can be seen in many houses in the Near East. Many shepherds believe that 'too early' heavy rains – namely during October – are followed, eleven to twelve months later, by serious outbreaks of *jiam*, with the most harmful effects in goats.

The two outbreaks of *jiam* observed in 1963 and in 1967 were indeed preceded by early heavy rains in October of the preceding years, i.e. 1962 and 1966. The availability of early green pasture during the late autumn might be associated with the disease, and this corresponds with the traditional knowledge of the herdsmen.

Trials conducted in goats kept indoors and on pasture (4) indicated that the phenomenon of autumnal, clinical gastroenteritis known as *jiam* is associated with the maturation of *Ostertagia circumcincta* and *Chabertia ovina* larvae, ingested during the preceding grazing season, mainly affecting pregnant goats in a lesser physical condition.

This phenomenon of 'autumn rise' is assumed to prevail in areas with a Mediterranean climate, e.g. a hot, dry summer and a cool, rainy winter, and forms an 'oversummering' mechanism for helminths in these conditions.

The belief of the Bedouins with regard to the effect of early precipitation on the subsequent occurrence of *jiam* is based on valid observations and many years of experience.
In addition to the use of modern anthelmintics, the Bedouins recommend an old recipe consisting of 1 kg of fish which is placed in the manure of sheep for a few days, then boiled in water, cooled down and administered to the animals twice a year at a dosage of 50 ml per head.

Lungworms are also known to the Bedouins and generally treated by hot-iron branding: the brand is streaked on each side of the thorax.

Jar-jar, meaning ‘bottlejaw’ (fasciolosis), is treated by iron branding under the chin and moving the flock to another pasture the following year. The Bedouins know that the disease may affect cattle, sheep and goats. Submaxillar oedema (bottlejaw) is also a typical symptom of haemonchosis, and jar-jar may also relate to this condition.

Finally, coenurosis is also known to the Bedouins, who recommend treatment by hot-iron branding in the middle of the scalp.

**INFECTIONOUS AND ZOONOTIC DISEASES**

Zoonotic diseases such as anthrax, tuberculosis and leptospirosis were recognised and vehemently discussed throughout the pages of the Talmud, mainly in relation to kosher slaughter (Fig. 1). Rabies was also known and described in detail.

Anthrax is mentioned several times in the Talmud. The disease is called techal (spleen) by Arab shepherds. The body of an affected animal is burned far from the tents. These shepherds relate the disease to the soil and, in one case, they refused to bring the flocks for dipping, claiming that the site was cursed with anthrax. Bovine tuberculosis is extensively described in the Talmud in relation to ritual slaughter. The vegetative outgrowths were known and referred to as tsimchi-tsimchi (fresh purulent lesions), tinri-tinri (calcified lesions) and sirchot (pleural adhesions causing lung perforation and escape of air when removed on examination). On another occasion, boiling the milk of an apparently tuberculous goat is recommended prior to consumption.

The disease mentioned in the Talmud as yerakon (‘green-yellowish’) is actually leptospirosis. The recommended treatment is administration of the urine of a donkey. Pronounced anaemia is mentioned on several occasions. Rabbi Yehuda Hanassi (4th century AD) was as pale as ‘the pig breeders’, and the Jewish prohibition of eating pork may thus be related to leptospirosis rather than trichinellosis.

Arab shepherds know leptospirosis by the term safari, meaning icterus (jaundice). Outbreaks of safari occur cyclically every few years, causing havoc mainly in flocks of goats, considerably reducing the population which otherwise would have increased abnormally, decimating the natural brushwood. A branch of a tree of the Rosaceae family (closely related to the apricot and growing near Tiberia) is hung on the head of three or four animals; this is said to protect the flock against the disease. To ensure recovery, branding is also used.

Rabies was of utmost importance in ancient human society in the Near East. The disease is mentioned in the Bible and in greater detail in the Mishnah, which warns of ‘stray (rabid) dogs, as their bite is cureless’. The Mishnah proposes five symptoms of rabies in the dog: open mouth, salivation, drooped ears, tail between the legs and difficulty in barking. The Mishnah also relates the story of a slave of Rabbi Yehudah Hanassi who was bitten by a rabid dog and died despite having eaten the diaphragm of the animal. The following description can be found in the Mishnah: ‘A bite of a rabid
Religious meat inspection in ritual Jewish slaughter

dog is very bad and the bitten person will become furious, exhibiting a fear of water. Urine taken from the bitten person in a glass container will reflect the image of a puppy and when filtered the figure disappears to reappear when disposed again in the glass.'

The bite lesion should be opened by a scalpel and 'sucking cups' applied. Leeches should be attached near the wound, which should be covered with marrow leaves and boiled wine, or powder from the bone of a calf mixed with blood. A person bitten by a rabid human or animal should be administered human urine orally, or dog hair should be placed on the bite. At the time of Maimonides (12th century AD), Egypt experienced a high incidence of rabies in persons bitten by stray dogs, with a high rate of mortality. Maimonides was approached by the Chief Judge, El-Fadel, who requested him to write a book in simple, popular style describing what to do in such cases.

Rabbi Moshe ben Nachman (13th century AD) recommended that persons bitten by rabid dogs be isolated, while Eliahu from Pesaro (Italy), visiting the region in the 16th century, described rabies control by the elimination of dogs in Jerusalem: 'a dog penetrated the Mosque of Omar, and the Kadi (religious judge) ordered the extermination of all the dogs. Every Jew and Christian had to bring one dog each, pay for the killing and obtain an official receipt stating that they had complied with their duty'.

The Bedouins permit the consumption of the meat of livestock within five days of biting by a rabid dog. Humans affected by rabies should be tied down and fed with flour
and oil until death occurs. Finally, the Bedouins in the Negev kill the rabid dog (*masuur*), the liver is roasted on the fire (*shishlik*) and fed to the bitten person over three to five days according to the size and number of the bites. A similar recommendation can be found in the Talmud.

Among the bacterial diseases recognised by the Bedouins and Fellahs are tetanus, blackleg, haemorrhagic septicaemia, glanders (*malleus*) and nocardiosis in horses. Tetanus is known to occur in lambs, the animals 'becoming as stiff as a piece of wood'. Blackleg (*draa asswad*) is known to be related to the soil. The affected animals are isolated and the healthy animals are taken to another pasture. For horses suspected of being affected with glanders (*saraji*), a bag is prepared with a 15 cm layer of finely cut straw. Boiling water is added with cotton soaked in tar and the bag is put on the head of the animal. The vapours provoke sneezing with elimination of the nasal discharge. A horse with nocardiosis is killed. Glanders is treated with grease or sesame oil (*techina*), smeared on a cloth and placed on the neck of the horse.

Viral diseases include foot and mouth disease and pox, in sheep and camels. The *Mishnah* describes a bull owned by Rabbi Papa which suffered from sore gums and was cured by being given wine to drink. Arab cattle herders used to place the affected herd on muddy soil and avoid contact with the animals. Others attempted to infect all the animals in the herd by letting the infected cows drink from a large pot and then allowing the other animals to drink, or by rubbing the mouth of the healthy animals with a rag soaked in the water. The Damascus (Syrian) red cattle (*Shamieh*) are considered to be more susceptible than the local breed (*Baladi*).

Pox in sheep is prevented by 'vaccination' with virulent material. A few papules are removed, placed in a glass and crushed with some water. A piece of string attached to a needle is soaked in the mixture and then passed through the auricle. Within one week the animals are claimed to recover and to be immune. In some places, Bedouins and Fellahs used to vaccinate children against chicken pox by exposing them to camel pox.

**SURGERY AND METHODS OF TREATMENT**

In Biblical times, castration was already practised by three methods: crushing, disconnection and ablation. Surgical interventions mentioned in the *Mishnah* include Caesarean section, splenectomy and hysterectomy. In the *Mishnah* period, Rabbi Shimon Ben Chalafta from Tsipori was reported as repairing a bone fracture in a chicken using fixation.

Bleeding (*faacid*) is performed by the Bedouins in cases of fever in both small and large animals, and in cases of colic (*marhes*) and laminitis in horses. The procedure involves bruising the skin on both sides of the neck or on the inside of the thigh and, more recently, threading primitive home-made needles through the jugular vein. Assistance in abnormal parturition (dystocia) and respiration were practised as well. Arab shepherds treat infertility caused by metritis, in horses, by flushing the uterus with hot water and soap, using a rigid tube 1-2 m long made of *kuseib* (*Phragmites australis*). Infertility in cattle and sheep is considered by the Bedouins to be imposed by God; no treatment is given and males are replaced.

Numerous methods of treatment are suggested in the various pathological situations, including the use of chemicals, plants, etc.
Dental interventions were also performed in ancient times. The Talmud discusses the external appearance of animals unfit for slaughter, describing deformed teeth and tooth extraction in cattle. The absence of a single tooth was insufficient to condemn the animal; however a space between two teeth was considered to render the animal unfit for slaughter. Absence of teeth in a dog is also described. A case is mentioned where a circus bear attacked human beings and consequently its teeth were extracted.

One of the first plants mentioned in the Bible as being endowed with healing properties is the dudaim (Mandragora officinarum), which ‘has a good smell and resembles a human figure’. The plant was attributed aphrodisiac effects.

A total of approximately 120 plants with healing properties is mentioned in the Bible, and approximately 400 species in the Talmud. A book by Rabbi Shabtai Donolo (‘Concoctions and Lotions’), published in the Middle Ages, indicates that the industry of spices, drugs and cosmetics derived from plants was already rather advanced.

The following plants are also used in livestock, mainly by the Bedouins:
- khandall (Citrullus colocynthis): the skin of the fruit is soaked in water and given in cases of constipation in sheep and horses
- inheeda (Achillea santolina): immersed in water and administered in cases of colic and melena (dark faeces due to the presence of blood altered by intestinal juices) in sheep and horses
- rhabbel (Matricaria aurea): given in cases of urinary retention in equines
- shiich or ba’atran (Artemisia herba-alba): the leaves are boiled and given in cases of diarrhoea and inappetence in sheep
- na’aman (Glaucium arabicum): the leaves are soaked in water for a few days and used to treat conjunctivitis in livestock.

Other plants used by the Bedouins on various occasions are charmalan (Peganum harmala), rhimet (Hammada salicornica), tarfa (Tamarix chinensis) and siaal (Acacia raddiana).

Finally, arthritis of the shoulder joint in camels (akr) in the Near East and India is thought to be caused by feeding young shoots of the shisham tree (Dalbergia sissoo) or leaves of the mulberry tree. The recommended treatment consists of covering the shoulder joints with leaves of wild olive and salt bush (Atriplex spp.).

**HYGIENE, KOSHER PROCEDURES AND PREVENTION OF DISEASE**

Hygienic measures evolved and were institutionalised mainly in relation to the ritual slaughter imposed by the Jewish religion. The largest slaughterhouse in the Second Temple period in Israel (100 BC-AD 69) was built on the Temple Mount in Jerusalem. Cleanliness and sanitary conditions were claimed to be strictly maintained, using easily-cleaned marble tables, and sanitising ketoret (incense) to keep away the flies which were considered by the ancients as vectors of pathogens. The floor was swept and washed even on the Sabbath, and it is said that ‘not one fly could be found in the slaughtering hall’. Already in Biblical times, people were instructed to dispose of dead animals by fire or burial. The Koran (sacred Islamic text) instructs believers in hygiene and cleanliness in their daily routine. Eldad Hadani (AD 950) visited the Jewish communities
in Babylonia and North Africa and, among other pronouncements, prohibited slaughtering by women. His book on the laws of ritual slaughter appeared later, in 1480. As mentioned above, rules of slaughter were assembled and formulated by Rabbi Yosef Karo (17th century AD), assisted by Rabbi Moshe Iserlish in a monumental document, the *Shulchan Arouch*.

Radan (3) demonstrated clearly that ritual Jewish slaughter, considered by some as inhumane, leaves the carcass with much less blood than the stunning method, thus contributing to better preservation of the carcass and freedom from pathogens.

The importance of preventive medicine is emphasised in the *Mishnah* with respect to rabies, stating that dogs should be chained. Maimonides preached in favour of preventive medicine in his essays on medicine.

**INTOXICATIONS**

The main intoxications recognised by traditional veterinary medicine in the Near East are those caused by toxic plants.

*Nerium oleander* was known to be toxic to animals, and the *Mishnah* orders that cases of intentional poisoning with this bush should be brought before a judge.

The Talmud described animals developing enteritis and haemorrhagic diarrhoea after eating *N. oleander*. However, the meat of such animals could be consumed. The Bedouins in the Israeli Negev are well aware of the dangers of *dilfah* (*N. oleander*) near water sources. Camels in the wild avoid this plant, but milking females and particularly young camels will eat it. Rabbi Shlomo Itzhaki (11th century AD) mentions that animals which have eaten *hardufani* (*N. oleander*) are bound to die.

Intoxication by *Ferula communis* is mentioned by Assaf Harofe (‘Assaf the physician’) in the 6th century AD, who claimed that the toxic element was *amoniacon*.

*Kelach* (*F. communis*) is very widespread in northern Galilee, the Gilboa’ mountains and the foothills of Judea, causing haemolytic syndrome in sheep and goats (1). This plant is familiar to the Bedouins, who treat the haematomas by bruising the skin and branding. The Bedouins avoid using pasture lands with young *Ferula* florescence.

*Acacia arabica* causes night blindness in equines and sheep, and *Sorghum halepense* intoxications (cyanogenic glycosides) are known. *Trigonella foenum graecum* (‘hilbeh’) intoxication, which causes night blindness, severe motor syndrome (muscular dystrophy) and mortality (2), is treated with sedatives by the Bedouins. A complete list of poisonous plants known to traditional medicine in this region is beyond the scope of the present communication. Intoxication by chemicals is not familiar to the Arab shepherds, nor is this type of intoxication mentioned in the Jewish religious literature.

**VETERINARY LEGISLATION AND PREVENTION OF CRUELTY TO ANIMALS**

Hammurabi (18th century BC) gave the Babylonians 282 laws consisting of 3,600 lines written in hieroglyphics, the text of which was discovered in 1901 in Persia. Laws 224 and 225 deal with veterinary medicine. Later, the Hittites and Solon the Greek (7th-6th centuries BC) issued legal codices with some veterinary aspects.
In Biblical times, the legislator dealt with relationships between humans with respect to animals, between animals and humans, and among animals, as well as questions regarding animal husbandry and the storage of animal products.

Contrary to general belief, humane attitudes to animals and prevention of cruelty are deeply rooted in Jewish tradition and are covered extensively in the sacred texts. The prevention of cruelty to animals is an order from the Bible (d'Oraita). 'Noah's Ark' can perhaps be considered the first game reserve ever created. The Bible stipulates several basic laws with regard to animal keeping, such as rest on the Sabbath (for man and his animals). Among the very few activities permitted on the Sabbath were the treatment and care of animals, i.e. activities with the purpose of diminishing animal suffering, including milking, parturition and various veterinary interventions.

The first Jewish veterinarian in Israel (Palestine at that time) was Joseph Shem Tov (Sinto), who was sent by the Turkish Sultan in 1904 to investigate outbreaks of rinderpest (Fig. 2). On the steep path leading to the Mount of Olives near the tomb of Saint Mary by the Kidron Valley in Jerusalem, Shem Tov observed a signboard requesting donkey riders to dismount.


**FIG. 2**

Veterinary surgeon Joseph Shem Tov vaccinating a cow against rinderpest in Kfar Hashiloach near Jerusalem in 1904
MISCELLANEOUS TREATMENTS

One of the most frequently used treatments was hot-iron branding (Fig. 3).

Branding is mentioned in the Talmud, as follows: ‘... a female donkey was sick and brought to the hippiatros who branded her and she gave birth to a donkey which showed a fire mark at the same site where his mother was branded’. The term hippiatros, which derived from Greek, was also used by the Jews of that time to describe an 'animal physician who uses fire branding to cure equines'.


Fig. 3

Branding of the stifle joint in a camel
In the Bedouin tribes of Sinai, branding (wassem) is the speciality of women, and is performed using a red-hot nail, producing a superficial scorching of the skin around the affected site. Branding is used extensively by the Bedouins in Israel. Several uses of branding are mentioned above. Branding is also used in cases of mastitis (maraad ederii), fractures and pneumonia. The Bedouins in the Israeli Negev prepare wood fires, ‘softening’ the glowing brazier with kadach (Phangalon rupestre). Sheep are branded with a large spoon, while larger animals are fire marked with a type of iron bar used in house construction. The scorched site is smeared with samneh (cream) or leben (a kind of yogurt). Arthritis in sheep (riich) is treated by fire branding of a circle and a cross in the centre of the affected articulation.

Camel herders use fire branding in circles around wounds to limit the burrowing of pus. Wound dressing by branding is intended to dry up the wound; however, this often delays healing and scar formation.

A case of probable mineral deficiency is mentioned by Rabbi Binyamin Metudela who travelled in Europe, Asia and Africa during the second half of the 12th century AD. Rabbi Metudela described a condition in sheep near the Dead Sea ‘licking the salt rock of Lot’s wife and the rock always regenerates’, thus possibly reflecting a lack of salt or other minerals. Camel herders traditionally diagnosed shoulder/prescapular abscesses caused by lack of salt in the diet or lack of Atriplex (salt bush) grazing.

In the case of foot rot, the Bedouins keep sheep on a muddy soil, and if recovery does not ensue, the animals are fattened and sold for slaughter. Gangrenous mastitis in sheep is treated by blood-letting from the abdominal veins.

Conjunctivitis in sheep is treated by washing the eyes with a salt solution.

Snake bites are frequently encountered in the Near East, particularly in the desert. Maimonides already differentiated between neurotrophic and haemotrophic effects of snake poisons, and recommended the use of theriak – a mixture of yeasts, honey and tissues of various insects and reptiles with the addition of scorpion powder and meat of Echis colorata (this was perhaps the forerunner of antivenoms?) – as well as haemostasis and iron branding.

The Bedouins now treat snake bites by cutting open the wound, pressing to extract blood and applying a fire brand. The bitten animal is offered milk to drink. If the animal is in lactation, its milk is discarded for the next two weeks.

Finally, the Talmud deals with wasp stings, stating that an adult horse died following four stings in the eye, whereas one stinging wasp killed a one-year-old horse, a case of dose/effect relationship. The treatment recommended was to crush a fly on the wound.

EPILOGUE

Human beings and livestock have co-existed in the Near East for many generations, and the vast amount of traditional knowledge and experience of Arab Bedouins and Fellahs in the region can still be observed today. The ancient cultures and religions were deeply influenced by the daily agricultural activities and economic requirements of the farmers, which constituted a dominant part of the ancient society. Veterinary medicine
and prevention of animal diseases were widely practised, depending mainly on natural products, simple surgery, fire branding and preventive hygienic measures. Significant milestones of professional organisation and legislation can already be found in the laws of Hammurabi (18th century BC) and the Jewish sacred texts.

The present paper is by no means exhaustive. It is hoped that this review will stimulate readers to document, in their respective spheres of activity, the traditional methods upon which modern veterinary medicine and science were founded and which will otherwise fade into oblivion.

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MÉDECINE VÉTÉRINAIRE TRADITIONNELLE AU PROCHE-ORIENT CHEZ LES JUIFS, LES BÉDOUINS ET LES FELLAHS. – A. Hadani et A. Shimshony.

Résumé : Les auteurs décrivent ce qu'est la médecine vétérinaire traditionnelle au Proche-Orient. Les textes judaïques anciens, notamment la Bible, le Talmud ainsi que des manuscrits plus récents, comportent d'importants passages sur la médecine vétérinaire et sur les différents aspects de la relation entre l'homme et l'animal. Plusieurs questions y sont abordées, concernant notamment les zoonoses, l'hygiène, les intoxications, les divers traitements préventifs et curatifs, mais aussi les lois et règles à respecter lors des soins prodigués au bétail. Les pasteurs arabes et, en particulier, les bédouins, savent depuis longtemps diagnostiquer et traiter nombre de maladies, essentiellement par des préparations à base de plantes et le marquage au fer.


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LA MEDICINA VETERINARIA TRADICIONAL PRATICADA POR JUDÍOS, BÉDOUINOS Y FELÁS EN EL CERCANO ORIENTE. – A. Hadani y A. Shimshony.

Resumen: Los autores describen las características de la medicina tradicional en el Cercano Oriente. Los textos hebraicos clásicos, la Biblia, el Talmud pero también manuscritos más recientes, incluyen importantes pasajes acerca de la medicina veterinaria tradicional y de diferentes aspectos de la relación entre el
hombre y los animales. Dentro de los muchos temas a que se refieren se encuentran las zoonosis, la higiene, las intoxicaciones y diversos tratamientos preventivos y curativos; también se ocupan los textos de las leyes y reglas que deben respetarse al tratar el ganado. Por su parte, los pastores árabes y los beduinos en particular cuentan con una sabiduría tradicional para diagnosticar y tratar numerosas enfermedades de animales, sobre todo mediante preparaciones a base de plantas y marcación con hierro.


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REFERENCES


Information from the following sources was widely used throughout this paper


