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THE STAG AS AN HISTORICAL SOURCE OF MATERIA MEDICA

Abstract: This paper presents a brief overview of the items of *materia medica* harvested from male red deer [*Cervus elephas*]. The medicinal use of stag's antlers and other body parts began in classical times with the writings of Dioscorides and Pliny the Elder, and relied on the legendary vitality, sexual prowess, strength, alexipharmic and rejuvenative powers with which the animal was credited. In early modern times a wide range of organs harvested from stags killed in formal hunts were made available for use as amulets, Galenic simples and alchemical derivatives for incorporation into a wide range of medicaments used to treat a huge diversity of health issues ranging from deadly infections like the plague, through conditions such as barrenness and loss of sexual potency, to baldness. The stag provided a fundamental apothecarial resource which was exploited to the full.

Keywords: stag, antlers, plague, amulets, alchemy, *materia medica*

Non MeSH: Pliny the Elder, Byzantine medical treatise, The Hodocho Code, Serbian folk medicine

Introduction

Early modern medical texts in English often make reference to preparations obtained from the body of a 'hart'. This term refers to a male or stag of the red deer, *Cervus elephas* Linnaeus 1758 [Family Cervidae]. The species has a more-or-less pan-european distribution in suitable habitats but shows considerable biogeographical variation. One of the largest deer species, the male typically measures up to 250 cm from nose to tail base, stands 122 cm high at the shoulder and weighs up to 240 kg; the female [hind] is slightly smaller. In addition to their larger size, males, which live for around 10 years, can be recognised from their neck mane, visible during the autumn, and antlers. The latter grow in response to increasing levels of testosterone, and are covered by a specialised, highly vascularised layer of skin known as velvet. During the

autumn, falling levels of testosterone cause the velvet to be shed, the antlers cease to grow and begin to calcify in preparation for the rutting season when competing males go through a series of behaviours [including threatening parallel walking, stamping the ground, roaring and fights involving locked antlers] designed to assert dominance and attract a mate. The antlers are later shed only to be renewed during the following spring. A mature adult male has up to 18 antler points or tines. Recent genetic studies have suggested that the range of variation shown throughout its geographical distribution is illustrative of a species complex within which individual taxa are difficult to adequately define, and hybridisation probably obscures useful distinctions [1].

The red deer was one of the animals commonly hunted in medieval times; there was a formal, almost ritualistic approach to the hunt amongst members of the nobility. Designated areas of land [parks] were set aside for the hunt, which was often known as *chasse par force des chiens* [chase by strength of hounds]. The popularity of the hunt, particularly in 14th century France, is reflected in the number of volumes dedicated to the ‘art of venery’. It is clear from these and later accounts, some written in verse, that little of the stag carcass was wasted and that many components were harvested for medicinal purposes [2 p40] [Fig. 1].

The therapeutic virtues claimed for each of the wide range of body parts of the stag were believed to be rooted in the legendary vigour and supposed longevity of the animal. According to the English cleric, Edward Topsell [circa 1572-1625], the hart was believed to live for over 2000 years and to be able to resist all types of fever [3 p67]. Consuming various organs of the stag was seen as transferring their intrinsic vitality to the consumer’s immediate therapeutic benefit.

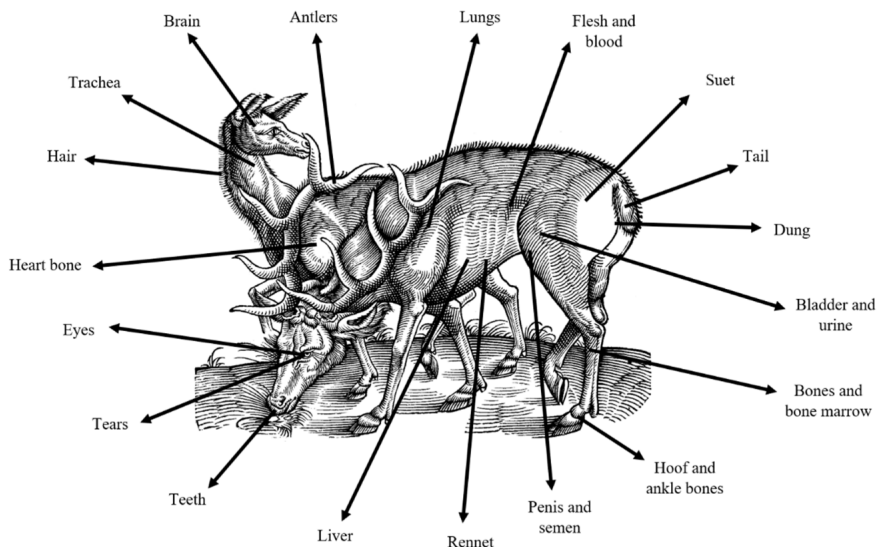


Fig. 1. The red deer [*Cervus elephas*] from Topsell [1658] *A History of Four-footed Beasts* [Author’s copy] annotated to show the items of materia medica which it yielded.

The different body parts of the red deer were incorporated into medicinal amulets, used as Galenic simples, and processed to produce Paracelsian derivatives and concentrates. The details presented here have been culled from a widely scattered literature, but one publication has the red deer as its main focus. *Elaphographia* was published by Johann Andreas Graba [1625-1669] in 1667 [5] [Fig. 2]. He combines the traditional view of the longevity of the stag with a Paracelsian explanation of its cause; he conjectures that the animal is particularly well endowed with a life-preserving balsam, closely allied to the principle of salt. He speculated that this abundance of innate life principle invested in its bodily organs accounted for the wide range of medical virtues with which the animal was blessed, especially the volatile salt and spirit extracted by alchemical means from the horns and the blood.

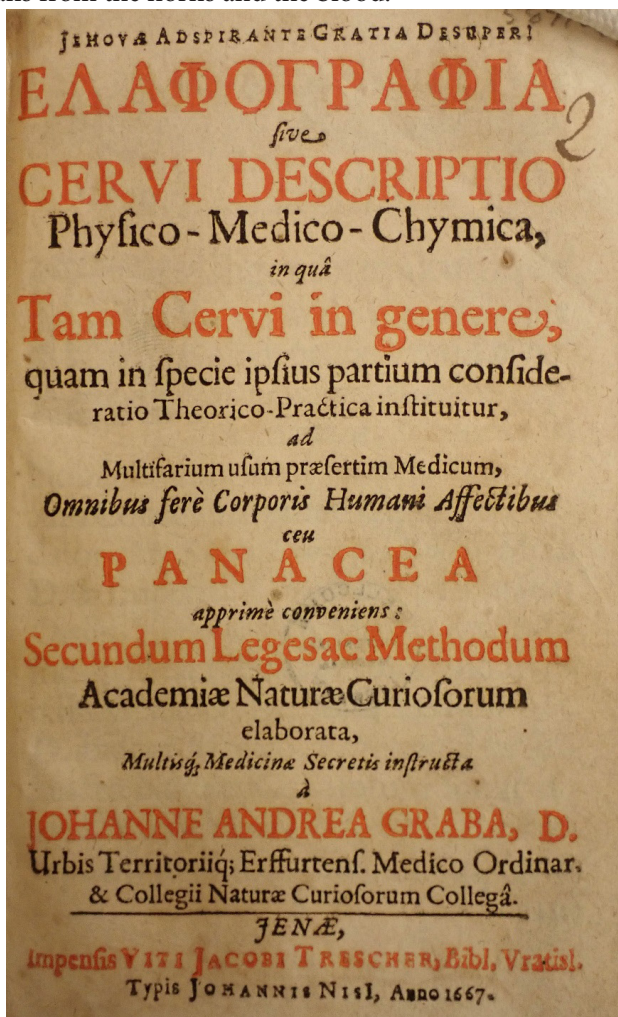


Fig. 2. Title page of Johann Graba's *Elaphographia* [1677]. Wellcome Collection.

Stag-derived items of materia medica

1. Stag's tears or *Lacrymae cervi*

These have been considered in detail elsewhere [3] so, for the sake of completeness, only a brief summary will be presented here. In a tradition extending back to classical times, a natural enmity was believed to exist between deer and snakes; stags were believed to hunt down and consume them. The tears which the deer shed as a means of eliminating the snake's poison hardened to form solid, spherical, acorn-like concretions sometimes known as *Kenne*. They are the hardened secretions of the pre-orbital glands which extend as a dark slit anteriorly from the medial canthus of each eye [3 p79]. Believed to possess drying, strengthening, astringent, alexipharmic and diaphoretic qualities, these 'tears' were employed therapeutically [mostly as a Galenic simple, often taken in wine or honey] in cases of poisoning, fever, plague and other infectious diseases, jaundice, epilepsy and to help during labour, especially in cases of stillbirth [5 p214].

2. Heart bone or *Os e corde cervi*

The *os cordis* is a heterotopic bone – an ossification developing in the soft tissues and unrelated to the axial and appendicular skeleton. Two *os cordia* develop in the fibrous trigones of the heart as a result of age-related mineralisation and confer additional stability during cardiac contraction and relaxation. In addition to being a trophy of the hunt, perhaps unsurprisingly, the Stag's heart bone was deemed particularly efficacious in the treatment of cardiac conditions. Gaston Fébus [11th Count of Foix and viscount of Béarn; 1331-1391] dedicated his *Livre de Chasse*, written some time between 1387 and 1389, to Philip the Bold, Duke of Burgundy [1342-1404] [6 p21]. In an English translation from the early 15th century the bone is described as having 'great medicine, for it comforteth the heart, and helpeth for the cardiac, and many other things which were too long to write, the which bear medicine and be profitable in many diverse manners' [7 p34].



Fig. 3. *Os e corde cervi* from the red deer [*Cervus elephas*] from Aldrovandi [1642]: *Paralipomena Accuratissima Historiae Omnium Animalium* [Wellcome Collection].

Use of the bone blossomed in early modern times [5 p231] when, in addition to being prescribed for heart problems, it was used against plague and pestilence [8 p.31], melancholy [9 p58] and as a general cordial or strengthening medicine [10 p679]. It was commended against nightmares, nosebleeds, malaria and epilepsy [11 col104]. It was also incorporated into a large number of popular compound medicines such as *Laudanum paracelsi* [Paracelsus' opiate, used against dysentery], *Pulvis pannonicus rubeus* [Red Hungarian Powder against fevers, epidemics and poisons], *Confectio de Hyacintho* [Confection of Hyacinth, against plague and fevers] and the Countess of Kent's Powder [recommended for plague and a wide range of infectious diseases].

The morphology of a typical specimen was illustrated by the Italian naturalist, Ulisse Aldrovandi [1522-1605], in 1642 [12 p126; Fig. 3]. Specimens survive in several *materia medica* cabinets dating from the early 18th century [e.g. Heberden's cabinet in St John's College, Cambridge], although in many cases they seem to have been substituted by equivalent bones from oxen [Fig. 4].



Fig. 4. Os e corde cervi from the red deer [*Cervus elephas*]. Burges Collection, Museum of the Royal Pharmaceutical Society [author's photograph].

3. Teeth

Often harvested from the carcass as trophies of the hunt, deer teeth were frequently worked into items of amuletic jewellery and worn for good luck [especially when hunting] and protection against snakes and eye diseases [13 p109]. Mounted in finger rings, these *Hirschgranl* were used as amulets against toothache in Austria [14 p150] [Fig. 5].



Fig. 5. 19th century silver ring with red deer tooth. V&A 173-1872. Copyright Victoria and Albert Museum.

4. Eyes

According to the German polymath Heinrich Cornelius Agrippa von Nettesheim [1486-1535], the eye of a rutting stag, tied to an elder root and soaked with the urine of a red bull, is an infallible means of enhancing sexual potency [14 p150]. Also, a dried deer eye is noted as being worn as an amulet against toothache [14 p150].

5. Lungs

Pliny the Elder [AD 23-79] notes that, in Roman folk medicine, the lungs [or 'lights'] of a stag were dried by smoking, together with the gullet of the animal, and then beaten together with honey to form an electuary which was taken as a remedy for coughing and the spitting of blood [*haemoptisis*] [15 p343]. He further noted their use in cases of 'Corns, chaps, and callosities of the feet' [15 p353] and 'phthisis' [*pulmonary tuberculosis*] [15 p356; 16 p51; see also 5 p282ff.].

6. Blood

Whilst most parts of the stag could be relied upon to deter snakes, Pliny asserts that the blood, burnt on the fire together with certain woods and herbs, attracts them [15 p329]. He also commends stag's blood in cases of diarrhoea [15 p346]. The Polish scholar and physician, Johannes Jonstonus [1603-1675?] recommends the blood of a fawn slain *in utero* against snakebite, the bites of a mad dog and ingesting hemlock and poisonous fungi [16 p51], a point repeated by Topsell who writes 'His blood stayeth the looseness of the belly and all fluxes, especially fryed with Oil, and the inferior parts anointed therewith, and being drunk in Wine, it is good against poisoned wounds and all intoxications' [4 p103]. The English naturalist, Robert Lovell [1630?-1690] concurs, stating it 'helps the ulcers of the intestines and old fluxes.' He also refers to Galen [129 – c216] noting that, suspended in vinegar, it was used as a psilothron or depilatory, and to Rhazes [864/5 – 935] who suggested that when drunk in wine it 'helpeth against venommed arrows' [20 p67; original references not checked in this study].

Nicholas Lémery [1645-1715] esteemed its qualities as being both sudorific [sweat-inducing] and resolutive [dissolving or relaxing] and suitable for use in cases of gout and pleurisy [17 p224; 5 p26off.]. In German folk medicine, the blood was also employed against dizziness and epilepsy, and to help mitigate deafness. It was also employed in an oil given as part of an enema to treat pains in the hip and sides as well as intestinal problems. Drunk in wine, it was commended for poisonous apostems [abscesses], podagra [gout in the big toe] and convulsions [11 col106]. Johann Schroeder [1600-1664] recommended frying the blood in a frying pan as a treatment for 'Dysentery and Caeliack flux', and also its use against gout [18 p31].

One author explains how to produce a 'pain-soothing salt' [*de salibus dolorem sedantibus*] from the blood of an old stag [19], which was heated gently in a bath until an 'oile and salt' was driven off ready to be condensed in a receiver. The oil could then be used topically on the affected area.

7. Bones

The bones of the lower leg, sometimes identified as the pastern, heel or ankle bones, or *los de talon*, were singled out as being particularly efficacious. Most authors agree that when taken as a powder it was especially appropriate in cases of the bloody flux [dysentery] [4 p104; 17 p224; 18 p32]. One author adds that the leg bones were incorporated into a particular medicine against the gout, and that, being burned, were utilised against renal calculi and epilepsy [20 p68], as first mentioned by Pliny [15 p353].

8. Marrow

Once again, Pliny is the first to introduce the marrow of stag's bones into the materia medica. He esteems it the best type of mammalian marrow for therapeutic use because of its 'emollient, expletive, desiccative, and calorific properties' [15 p327]. He notes its use [hot] in a preparation used to treat suppuration from the ears [15 p145]

and also, together with various herbs, in cases of fistula [15 p201]. For sunburn he cites recipes combining stag marrow with veal suet and whitethorn leaves, or with resin, and for chapped lips in combination with goose-grease, resin and lime [15 p341]. Marrow mixed with certain oils could also be applied to ulcers in order to encourage the growth of new flesh [15 p359]. An enthusiast for the use of snails in the treatment of gynaecological and obstetric conditions, he suggests combining them with stag marrow in cases of uterine displacement [15 p463].

Some of these suggestions are carried over into early modern medical writings [e.g. 18 p32; 20 p72; 5 p285ff.], but a certain amount of expansion and adaptation also takes place. Topsell, for example, not only associates the marrow with the treatment of ulcers, fistulas and cracked lips, but also identifies its ability to disperse ‘all bunches in the flesh and old swellings’, in combination with calf suet to ameliorate pain in the mouth and jaws and, when drunk in warm water to ‘aswage the pain in the bowels and small guts’ [large and small intestines] and to help in cases of dysentery [4 p104]. When mixed with powdered oyster shells it could be used to cure chilblains, even when they are ulcerated [‘kibes’] [4 p104].

Théodore Turquet de Mayerne [1573-1655] included stag marrow as one of the ingredients in his ‘Balsom of Batts’ commended for the treatment of ‘Hypochondriacal Distempers’ [21 p37]. Also, Jacques Guillimeau [1550?-1613] recommended including stag marrow in a liniment designed to maintain the health of the mammary glands during pregnancy [22 p.28], whilst John Pechey [1655-1716] suggested applying stag marrow to the feet of feverish children in order to bring relief [23 p73]. Elsewhere, it was associated with treating scalds, ‘softening’ the womb, and easing menstruation [16 p51] while Lémery commends it for rheumatism, ‘gout sciatique’, fractures and to strengthen the nerves [17 p224]. In German folk medicine, it was also used to strengthen the limbs, and against tumours, ulcers, pneumonia, fractures, epilepsy, insomnia, poisonous boils and wounds, fevers, to promote menstruation, as well as being a component in suppositories and aphrodisiacs [11 col105]. In Swabian folk medicine, the bone marrow of a doe was dissolved in warm beer and drunk as a treatment for epilepsy [62 p231].

9. Fat and Suet

Suet is the hard fat found around the kidneys and both it and regular body fat are sometimes referred to as tallow which, in modern usage, is reserved for the rendered form. The German military physician Raymund Munderer [1570?-1621] was a strong advocate for the use of stag fat in abdominal treatments, presumably both for its effectiveness as a delivery vehicle and its supposed intrinsic medicinal virtues [24]. He suggested it be used to ease sores, and as a component in various clysters or enemas. One recipe for the latter combined stag suet with milk in which red hot pebbles had been quenched multiple times, beaten egg yolks, sugar and *album graecum* [dog faeces]. The concoction ‘cleanseth and healeth the Guts, and allays the sharpness of the Blood and other corrosive humors, that annoy the Bowels’ [24 p76]. His anecdotal claim was that the treatment had successfully cured a ‘patient of quality’ who had produ-

ced over 100 stools in a 24-hour period [24 p83]. He also suggested seating a patient on a board of heated oak smeared with stag suet and smearing the anus [‘fundament’] with a suet-containing salve as a means of treating bowel problems [24 p89].

Others recommended stag fats for ‘mollifying’ or reducing the severity of tumours, as a wound astringent and anodyne as well as in the treatment of kibes [ulcerated chilblains] [18 p32; 20 p68; 5 p292ff.]. Topically, it was also used in preparations to maintain the quality and integrity of the skin during and after childbirth [25 p37], and to prevent chapping of the face and lips [26 p.91, 137]. It was also used in the treatment of horses for coughs, lung complaints and haematuria [blood in the urine] [20 p68]. Distillation of the fat produced an oil which was suggested as being useful in cases of gout [20 p72]. Several authors agree that stag fat was the best emollient then available [e.g. 27 p257]. In folklore, like the rest of the stag, the tallow was believed to protect against snakes, and in folk medicine it was used in cases of sore feet, wounding, burns, haemorrhage, haemorrhoids, overactive bladder and urinary urgency, swellings, fractures, tuberculosis, nosebleed, snakebite and against lice, ulcers and genital warts, toothache and to draw out worms [11 col105; 62 p231]. Children suffering from haemorrhoids were recommended to sit bare-bottomed for several hours a day on a warm, planed oak board thickly coated with deer tallow [62 p231]. It was also smeared on the chest to prevent vomiting in children and was a component in a corn plaster. The consumption of fat from around the right eye was believed to encourage enlargement of the genitals [11 col105]. In the Tirol it was also a component in an oil applied to the stomach by means of a sheet of blue paper in cases where a child was believed to have been bewitched [14 p151].

10. Rennet

Rennet is the fluid produced in the stomach of ruminants; it contains a complex of protease and lipase enzymes utilised by the young mammal in the digestion of milk. Pliny continues to praise the stag for its ability to ward off snakes and treat snakebite. Deer rennet is no exception; he commends it, mixed with vinegar as an antidote so effective that merely touching it was believed to afford such protection for a full day [15 p329]. The same recipe was also suggested to treat haemorrhage [15 p358]. He also recommended rennet for intestinal problems, boiled with beef and lentils [15 p347].

11. ‘Umbles’

‘Umbles’ is an archaism for the edible components of the viscera. The liver, spleen, lungs, trachea, brain, heart, bile and tongue will be considered here under this titular umbrella.

Topsell, whose work [including the figures] was based largely on an earlier publication of Conrad Gessner [1516-1565] [28], suggests placing the liver in the shoes as a means of easing sore feet. He also remarks on using dried liver reduced to a powder, together with the stag’s trachea, and mixed with honey to treat cough and other treat-

hing problems [4 p104; 20 p70; 62 p231]. Elsewhere, the organ has been cited as a cure in cases of gout, dropsy [oedema], pains in the body and eyes, nyctalopia [night blindness], joint stiffening and immobility, haemorrhage and in aphrodisiacs [14 col105]. Hildegard von Bingen [1098-1179] recommended ingesting the liver so as to ‘restrain his gicht [a word of unknown meaning in this context] and purge his stomach’ [51 p213].

The brain has been recommended against epilepsy as well as for night phantasms [5 p28off]. In Alpine folk medicine, the brain was made into an ointment used to treat hard ulcers and ‘blood flow’ [*Blutfluß*] [62 p213].

The heart was also prescribed against ‘blood flow’, the spleen against abdominal pain, bile against constipation and ailments of the teeth, eyes and skin, and the lungs against respiratory diseases [14 col105]. The ashes of the heart and skin were also seen to be good for wounds [20 p71]. One author recommends using three stag’s hearts plus a series of herbal ingredients steeped in Malmsey wine in a complex recipe designed to treat palpitations of the heart [29 p47].

Another recommends the tongue of the stag for a condition known as ‘the spleen’ – probably a synonym for melancholy [30 p99].

12. Hair and skin

Stag’s hair [*Pila cervinae*] is mentioned by Pliny; he indicates that wearing an amulet of the white flesh of a hyaena taken from its breast region wrapped up with seven hairs and the genitals of a stag in a gazelle’s skin pouch will protect a woman from miscarriage [15 p311]. Burning deer hair as a uterine fumigant was seen as protecting against many gynaecological and obstetrical conditions [15 p361] and later on as a means of preventing miscarriage [16 p51; also 4 p104]. Wearing a stag’s hide girdle around the waist was adopted as a means of preventing ‘hysterick passions’ [20 p72; 18 p31], easing childbirth [14 p152] and unspecified maternal complaints [11 col107]. Graba indicates that skin and hair could also be used to treat poisoning and convulsions [5 p307-310].

In Roman times it was said that the worms found in the body of a large hairy spider [the ‘phalangium’], wrapped in a piece of deer skin and hung on a woman’s body would prevent conception [15 p401].

Jonstonus remarks that a stag’s skin, once depilated using vinegar and pumice, can be hung on the door to deter the entry of poisonous creatures, as well as being used to cure St Anthony’s Fire [which probably embraces ergotism, erysipelas and possibly even shingles; 15 p357] and urinary incontinence [16 p51; 4 p104; 20 p68]. As mentioned above, stag skin ashes were mixed with oil and used to treat wounds [20 p.71].

Pila cervina also refers to trichobezoars obtained from the stomach of a deer, and which were accorded the same therapeutic virtues as bezoar stones [cordial and alexipharmic properties].

13. Dung and Urine

Stag's dung has been cited for its use in the treatment of oedema [4 p104] especially when reduced to ashes and dispersed in 'mulse' – a mixture of honey and wine or water [20 p71]. Pliny recommends the first dung voided by a foal following its birth when taken in wine, cures jaundice after three days' application [15 p354].

Topsell advises that stag's dung cures oedema and that its' urine 'easeth the pain in the Spleen, the wind in the ventricles and bowels, and infused into the ears, healeth their ulcers' [4 p104; 16 p51; 20 p71]. Graba cites the use of dung against 'intermittent fevers' [5 p303] and urine in cases of flatulence, hydrops fetalis [oedema in newborn children], gout, paralysis and ulcers in the ears [5 p303-304].

Lémery notes that the bladder of a stag should be applied to ringworm in order to effect a cure [17 p224].

14. Meat

Lovell gives the warning that the flesh of the deer 'nourisheth little and increaseth melancholy' [20 p67] but that, nevertheless, eating it protects against fevers [relying on the classical idea that stags never suffer from this condition] [see also 5 p275ff.]. Topsell, meanwhile, records that 'I am sure that I have known certain Noble women, which every morning did eat this flesh, and during the time they did so, they never were troubled with Ague [malaria]: and this virtue they hold the stronger, if the beast in dying, have received but one wound' [4 p103].

15. Hooves

The french pharmacist, Pierre Pomet [1658-1699], remarks that the hooves of the stag possess all the same virtues as are ascribed to the horns [see below], but that they are more powerful 'Cephalicks' or medicines suitable for treating the nervous system [27 p257; also 5 p259].

In Austria, deer claws were worn as amulets to protect against all types of cramp [62 p231].

16. Head

The Water of a Stag's Head is an ingredient that appears several times in early modern medical literature. The French alchemist, Nicolas leFèvre [1615-1659], explains how this water should be produced. Having been killed by dogs in the hunt some time between 15 May to the end of June, the 'Velvet-head', which presumably refers to the velvet-covered antlers, was cut into a series of sections and placed in a retort. This was then heated in a bath until no further volatiles were driven off for capture by condensation in a retort. The extracted fluid might then be mixed with wine, cinnamon, mace and saffron in order to enhance its efficacy in helping to ease labour, to help expel the afterbirth and to cleanse the womb from 'serosities' [various fluids].

It was also one of the ingredients of de Mayerne's anti-hypochondriacal Balsom of Bats [21 p54] and Samuel Hartlib [c. 1600-1662] prescribed it against cardiac conditions [32 p97].

The preparation sounds very similar to a preparation described by Schroeder using new antler growth [with the 'bloudy juyce in them'] to produce a preparation esteemed for its use in mitigating fevers [18 p30].

17. Genitals or *Priapi Cervi* and *Testiculorum cervi*

In early modern English texts, the penis is usually referred to by the archaisms 'pizzle' [also pisle, pizzel, pizzell, pissel, peezele, pesyl and pizle] and 'yard', whilst the testes are often called 'stones'. Once again, Pliny is the source of many of the suggested therapeutic uses of stag genitals. As cited above, the penis wrapped together with hyaena flesh and seven stag hairs in a gazelle skin pouch was worn in order to protect against miscarriage [15 p311].

It is not surprising that the main medicinal application of stag genitals was in the promotion of sexual drive and potency [5 p247ff.]. According to Topsell, the penis had 'a virtue to encrease lust in every creature, it being either dried and drunk; or else bound fast to their privie parts' [4 p104] and Schroeder indicates that the testes, dried and drunk dispersed in wine 'stir up Venery' [18 p31]. That same mixture was also esteemed against snakebite, and Lovell further indicates that the 'ashes with wine applied to the genital of an admissary animal make it more strong for copulation' [20 p71]. In Alpine folk medicine, infertile women were recommended to take the powder of dry deer rod or deer mother after copulation [62 p231].

Quite complex penis-containing recipes are recommended by several authors in order to overcome barrenness and promote fecundity [33 p99; 34 p77; 35 p137], including the Satyrion Electuary of Moyse Charas [1619-1698] [36 p153]. One author commends stag pizzle for overcoming the 'Flaccidity of a Man's Yard, stirring up Libidinous Images' [37 p135]. In at least one instance, stag's penis was included in a medicine designed to treat gonorrhoea [38 p711].

The penis was also appreciated for its ability to ease abdominal problems, particularly dysentery and colic [e.g. 16 p51; 18 p31; 23 p207; 20 p71; 39 p68; 40 p120-122]. It was also an ingredient of choice in treatments for pleurisy [23 p207; 39 p68; 41 p16] and is listed by several authors as a simple in the treatment of hernias and ruptures [42 p287; 43 p616].

Finally, Adrian von Mynsicht [1603-1638] incorporated stag's penis in his Compound Powder of Plantain, which he recommended for 'those that loath their meat, that piss or spit blood; yea young Women, whose Urinary passage is injured after a hard labour. In Dysenteries, pains in the Guts, and superfluous Menstrua's; it yields great relief to all Ulcerations in the Guts, Reins, Bladder and Urinary passage, and soon removes all the Symptoms' [44 p104].

18. Horn or *Cornu cervi*

The antlers of the stag are a potent symbol of the strength, vitality and virility of the animal, and their regular shedding at the end of winter and new growth in the spring speaks of renewal – all qualities which were believed to be harnessed by using preparations derived from them in order to strengthen the individual, protect them against various dangers and treat a wide range of maladies.

Like the rest of the animal, stag's horns were esteemed because of their supposed ability to protect from and cure cases of poisoning. Topsell indicated that 'if men drink in pots wherein are wrought Harts horns, it will weaken all force of venom' [4 p103]. Similar qualities were claimed for cups made out of unicorn, ibex, rhinoceros and even cow horn. He also specified that the right antler, hidden in the ground, provides protection against bufotoxins, and that very young antlers could mitigate poisoning by Henbane [*Hyoscamus niger*] [4 p104].

Amulets made of stag's horn are quite common in European folklore. In Austria [Styria] rings made of antler, often decorated with an image of a deer, were worn to protect against epilepsy and eclampsia [14 p148]. In Spain, Portugal and Italy, deer horn pendant amulets [Fig. 6] were worn by children to protect against the evil eye and sometimes to ease teething [45 p456; 46 p216; 47 p64; 48 p404-5; 49 p66].

The *Geoponica*, a collection of 10th century agricultural lore compiled in 20 books for the Byzantine emperor Constantine VII Pyrogenitus at Constantinople, records the use of hart's horn amulets around the necks of horses in order to prevent them from falling ill [52 p93].



Fig. 6. 19th century stag's horn amulets [Spanish]. Left: V&A M.14-1917 [Length 95mm]. Right: V&A M.18-1917 [Length 65 mm]. Hildburgh Gift. Copyright Victoria and Albert Museum.

In many medical texts, *cornu cervi* is abbreviated to C.C. Completely unprepared horn supposedly resisted putrefaction, ‘correcteth malignity’, and acted as a sudorific, so strengthening the patient’s vital force or ‘Balsome’. Forceful sweating to eliminate harmful humors otherwise present in excess therefore made it useful in the treatment of measles, smallpox and fevers [5 p112; 18 p28; 20 p72]. Shavings of the horns [*cornu cervi rasurae*] were incorporated into a wide range of compound medicines, including the Margave anti-epileptic powder [57 p4].

Simple processing involved burning the horn until it passed from black through to white in colour. This was referred to as *Cornu cervi praeparatum* and is one of the common forms of storage for which dedicated drug jars were produced [Fig. 7]. The fumes from the burning horn could be employed as a fumigant in the treatment of epilepsy [16 p51].



Fig. 7. Drug jar for prepared stag’s horn, 18th century, Lunéville. Pharmazie Museum, Basel University [author’s photograph].

Burned hart's horn, taken in a drink, was well established as a medicament in classical times. Dioscorides [AD c.40-90] commended it for use in cases of haemoptisis, dysentery, bowel problems, jaundice, bladder pains, and leucorrhoea. Baked in a clay pot until it turns white, the powder was also deemed suitable for ocular sores and discharges, toothache and for incorporation into dentifrices [50 p107]. According to Hildegard von Bingen, burning shavings of the horn together with frankincense produces an odour that 'chases off airy spirits, spells, and bad worms and checks magic' [51 p213]. In early modern times it was also commended for killing intestinal worms and being a suitable preparation for administering to children [18 p29; 20 p72]. In German folk medicine, powdered hart's horn is recorded as being taken in brandy both morning and evening, and utilised against possession and enchantment, epilepsy, [hysterical] fainting, excessive bleeding, urinary retention, hydrocele [serous fluid accumulation], jaundice, haemoptisis, colic, dysentery, stomach cramps, worms, plague, scabies, unspecified pain experienced in childhood, toothache, uterine prolapse, infertility and to initiate menstrual flow [11 col107].

Jonstonus records the topical use of [presumably] prepared hart's horn in the elimination of freckles and certain skin blemishes and, mixed with Sandarach [a resin from the cypress-like tree, *Tetraclinis articulata*] as a snuff to deal with nasal swelling [16 p51]. In combination with occasional other ingredients, he also notes its use in cases of the King's evil [Tubercular lymphadenitis], toothache, colic and worms. Applied to the head, both the oil and powder of hart's horn supposedly restored the hair of the scalp in cases of baldness, prevented further hair loss, killed nits and lice, and eased headaches [4 p104].

'Philosophical calcination' [rather more intense, alchemical heating as practised by Paracelsians] involved heating the horns with a little water in a retort for a period of three days until they turn white and friable. The resulting powder [*cornu cervi philosophicè praeparatum*] was praised for its sudorific properties and usefulness in 'malignant diseases' [18 p29].

Slightly more controlled heating resulted in fractional distillation in which, successively, a volatile liquor or spirit [5 p199, 205], salt [5 p189] and finally an oil [5 p210] were driven off and could be collected [31 p147]. These fractions could be purified further by subsequent distillations or rectification and then added to a wide range of compound medicines too broad to consider in great detail. The spirit of hart's horn [an aqueous solution of ammonia] was judged to be excellent at cleansing the blood, largely by promoting sweating and acting as a diuretic. More specifically, it was used to treat scurvy, sexually transmitted diseases and ulcers [31 p148-9]. In Austrian folk medicine, the spirit was rubbed on the feet of pregnant women as they gave birth in order to encourage easy labour, and also used to treat rheumatism and lumbago [62 p231].

The salt of hartshorn was actually a mixture of two components: sal ammoniac [ammonium chloride] and ammonium carbonate. LeFèvre is gushing concerning the therapeutic benefits of the salt, stating that it 'might truly be called a Panacea, or Universal Medicine' since it is 'soverain' against epilepsy, apoplexy [strokes] lethargy, all neurological disorders, resists all poisons, pestilence, fevers and malarial chills and cleanses the liver, spleen mesenteries, pancreas, kidneys, bladder, belly and lun-

gs. He further notes it is effective against diarrhoea and helps to control menstruation [31 p150], and that it can be modified through further rectification and the addition of ethanol to form a tincture with even more concentrated properties than the salt itself [31 p151; 5 p204].

Oil of hart's horn, recommended topically in the treatment of gout [18 p32], may well have been the source of inspiration for the later *oleum animale* produced by the German alchemist Johann Conrad Dippel [1673-1734] involving the destructive distillation of animal bones, horns and leather [58 p197]. Dippel's oil was the result of multiple distillations of crude animal oil, two of the stages involving potassium carbonate [K₂CO₃] and burnt lime [calcium oxide, CaO]. Dippel claimed that the oil was an *elixir vitae* – a universal medicine capable of curing virtually everything [59, 60]. Dippel also produced a second popular liquid whose inspiration came from spirit of hart's horn. Despite the name, Dippel's Hartshorn comprised various carbonates of ammonia and was produced from dried Bull's blood and potash.

A perfume concocted from hart's horn, castoreum and brimstone supposedly encouraged delivery in cases of stillbirth [4 p104].

Boiling the antlers in water resulted in the extraction of the protein content, which was then collected as hart's horn jelly, commonly used to speed up difficult labours [27 p257]. The jelly was often added to various strengthening, restorative drinks and caudles [a hot beverage] as part of the treatment for plague [53 p22], including being incorporated both into the Philosopher's egg and Gascoigne's Powder for that purpose [54 p133, 173; 61 p1], and fevers [11 col107].

It is worth noting that stag antlers were also an important part of Chinese Traditional Medicine [TCM]. In this system, *fan* seems to be a term denoting an acute illness of unspecified origins. The word is usually qualified by the names of various organisms which characterise the external expressions of these conditions. Deer *fan* is described and illustrated in the *Huitu zhenjiu yixue* [Illustrated Acupuncture Made Easy], by Li Shouxian in 1798. The patient suffering from deer *fan* characteristically erupts in a purple rash and brings up a bloody froth [Fig. 7]. Treatment is by means of Deerhorn Glue [*lujiao jiao* or *colla cornus cervi*], which seems to be the essentially the same thing as hart's horn jelly. The preparation has been the subject of serious modern investigation [e.g. 55, 56].



Fig. 8. Early 20th century Chinese lithograph: 'Fan' diseases, including Deer fan. Wellcome Collection.

19. Stones

A series of stones are cited in the literature as being associated with the red deer. Following Pliny [15 p361], Topsell explains that the hind, on realising she is pregnant, ingests a 'certain stone' which can later be located either in the intestines or in the faeces [4 p104]. Since the hind was famed for its easy and rapid labour with only very rare

examples of miscarriage, the stone was esteemed to be ‘profitable for all Women with childe and in travell’ [4 p104].

Schroeder notes that further stones may be found in the heart, stomach, or intestines of the stag, and also the uterus of the hind. He comments that, medicinally, their virtues match those claimed for bezoar stones [18 p32; see also 15 p361, 16 p51, 20 p72].

Conclusions

The stag of the red deer [*Cervus elephas*] was the subject of considerable focus as one of the main targets in the organised system of medieval hunting amongst the European nobility. Perhaps the most bizarre therapy associated with later stag hunting is the use of the bullet with which it was shot to treat [without further details] cases of ganglion and umbilical hernias [11 col107].

Once slaughtered, the animal yielded numerous body parts which could be harnessed for their perceived therapeutic applications. The use of stag-derived simples dates from classical times but had its heyday in early modern medicine. According to legend the enmity between stags and snakes led to the stag being able survive the supposed consumption of the poisonous reptiles by being able to eliminate the venom from its body. This led to the idea that the entire body of the stag had alexipharmic properties. This, coupled with its supposed longevity, extreme strength, sexual potency and vitality and the ability to regenerate its antlers informed many of the medicinal applications of its body parts. Nearly all were accounted as being effective antitoxic agents in cases of envenomisation, even by such specific items as bufotoxins and herbal alkaloids such as hyoscyamine. This was also true for diseases which, in early modern times, were believed to have a toxic component associated with them [because people of different humoral types all suffered in the same way], such as plague.

The antlers harvested from the stag were the most versatile components. They were employed as amulets, rasped to provide shavings, burnt to provide a therapeutic ash, as well as being processed by alchemical distillation to yield spirit, salt, oil and tincture of hart’s horn. Simple boiling in water led to the production of hart’s horn jelly. All these preparations enjoyed a wide and varied therapeutic application. The remainder of the animal – skin, hair, bones, rennet, fat, marrow, lungs, eyes, brain, flesh, hooves, blood, liver, bladder, urine, dung, genitals and heterotopic bone in the heart – was also commandeered for therapeutic benefit. Overall, the stag enjoyed considerable popularity as a provider of diverse medicines during early modern times, gradually falling out of use from around 1750 as chemical medicines began to dominate the apothecarial market place. Some do survive, however, in Traditional Chinese Medicine even today, where active research is being conducted into their potential efficacy.

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List of Illustrations

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Rezime

U ovom radu dat je kratak pregled o medicinskim sredstvima (materia medica) koja su se koristila od mužjaka crvenog jelena (*Cervus elephas*). Medicinska upotreba jelenskih rogova i drugih delova tela ove životinje započela je u klasično doba, pominje se u spisima Dioskorida i Plinija Starijeg, a oslanjala se na legendarnu vitalnost, seksualnu snagu, te snagu, aleksifarmičke i pomlađujuće moći koje su se pripisivale ovoj životinji. U ranom modernom dobu, veliki broj organa jelena, ubijenih u lovu, bio je dostupan za upotrebu u vidu amajlija, galenski jednostavnih i alhemijskih derivata za ugradnju u širok spektar lekova koji su se koristili za lečenje velikog broja zdravstvenih problema, od smrtonosnih infekcija, poput kuge, kroz stanja kao neplodnost i gubitak seksualne potencije, do čelavosti. Jelen je bio temeljni apotekarski resurs koji se u potpunosti koristio.

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