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A Disgusting and Useless Substance? Hyraceum between Folk Medicine and Pharmacopoeia

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Abstract

In an August 1899 address on 'The Pharmacology of some South African Plants', the Anglo-South African doctor John Maberly criticised the prior dependence of medical men at the Cape on Indigenous and colonial settler lay knowledge of 'native materia medica' and related failure to test local drugs clinically to determine action and efficacy. Maberly specifically attacked the recommendation by Matthew Hewat of six Cape therapeutic agents to the British Pharmacopoeia, especially 'hyraceum' which was 'supposed by some to be a menstrual secretion of the hyrax or rock rabbit'. Maberly pointed to the illustrious pharmacologist Jonathan Pereira's declaration 50 years earlier condemning hyraceum and other 'sexual and anal excretions' as 'disgusting and useless substances' the use of which in medicine 'belongs to the superstitious and absurd practices of a former age'.

This article examines the largely neglected history of the medical use and study of hyraceum, an aromatic black tar-like substance formed from the inspissated excrement of the Cape hyrax. This includes looking at hyraceum's use in Khoisan traditional medicine, its adoption by Dutch colonial settlers, and attempts by eighteenth and nineteenth century doctors and scientists at the Cape and beyond to study it and determine its nature and possible efficacy. The wider context of Maberly's dispute with Hewat is also detailed, including their shared interest in using vernacular knowledge to develop Cape pharmacology and their place in broader imperial debates about Indigenous materia medica and its regulation. The paper concludes by considering recent studies that suggest hyraceum may not be pharmacologically inert after all.

Keywords

Hyraceum, Castoreum, South Africa, Pharmacopoeia, Folk medicine, Vernacular knowledge

Introduction

On 25 August 1899, the Anglo-South African doctor John Maberly (1859-1949) spoke before the Cape Town Medical Society, giving 'An Address on the Pharmacology of some South African Plants'.[1] Maberly sought to review plants native to the region that had been ascribed medical uses and advise on which he thought good or poor candidates for further investigation and possible inclusion in the *British Pharmacopoeia*, for which an *Indian and Colonial Addendum* was being prepared for publication. He detailed several South African species with which he had either personal experience or credible testimony from fellow doctors regarding their utility, including buchu (*Agathosma*, the only South African medical plant then listed in the *British Pharmacopoeia*), Cape aloes (*Aloe ferox*, a formerly listed species), three species of *Monsonia*, and the pertinently named *Pelargonium antidysentericum*. Maberly prefaced this discussion by remarking that the poor state of pharmaceutical research in South Africa meant that he felt unable to recommend unreservedly any new species for addition to the *Addendum* because even those he had a favourable opinion of required more research.

Much knowledge of South African medicinal plants, Maberly further noted, still rested on the works of three authors: the Swedish traveller Charles Peter Thunberg (1743-1828) who had visited southern Africa in the 1770s,[2] the botanist Ludwig Pappe (1803-62) who in 1850 had drafted a short work on the uses of South African plants as remedies by Cape colonists,[3] and the more recent ethnobotanical writings of Andrew Smith (1828-98) based on his experience at the Eastern Cape's Lovedale mission of Xhosa medical practices.[4] Maberly was critical of dependence on these works given that none of the three authors placed 'on record any experiences of their own as regards the physiological action of any one of the drugs'. Rather, 'Their deductions were more generally collected from the statements of Hottentots, Bushmen, and old colonists'.[5]

It was in this context that Maberly severely criticised fellow Cape doctor Matthew Little Hewat (1868-1931) for his decision to send John Attfield (1835-1911), editor of the *British Pharmacopoeia*, a list of several South African drugs he recommended for

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[1] Maberly J. The Pharmacology of some South African Plants. *Lancet*. 1899; 154(3970): 873-876.
[2] Thunberg CP. *Travels at the Cape of Good Hope, 1772-1775*. Forbes VS (ed); Rudner J & I (Trans). Cape Town: Van Riebeeck Society; 1986.
[3] Pappe L. *Florae Capensis Medicae Prodromus, Or, An Enumeration of South African Indigenous Plants used as Remedies by the Colonists of the Cape of Good Hope*. 1st Edition. Cape Town: AS Robertson, 21, Adderley Street; 1850.
[4] First published as a short pamphlet 'A contribution to South African materia medica' in 1885 and greatly expanded in subsequent editions: Smith A. *A Contribution to South African Materia Medica*. 2nd Ed. South Africa: Lovedale; 1888; Smith A. *A Contribution to South African Materia Medica*. 3rd Ed. Cape Town: JC Juta & Co; 1895. Not to be confused with Sir Andrew Smith (1797-1872) who had attained fame as a zoologist and palaeontologist at the Cape earlier in the nineteenth century.
[5] 'Hottentot' is a derogatory term for the Khoekhoe people of the western Cape; 'Bushmen' refers to the peoples today usually referred to as the San, although some members of these groups reject 'San' in favour of 'Bushman' ('San' is a Khoe exonym meaning 'forager' or 'thief'.). See: Besten M. 'We are the original inhabitants of this land': Khoe-San identity in post-apartheid South Africa. In: Adhikari M (ed). *Burdened by race: Coloured identities in southern Africa*. Cape Town: UCT Press; 2009. p.134-155.

inclusion in the *Addendum*. Maberly was specifically aggrieved by the fact that Hewat appeared to have either lifted descriptions of drugs from Pappe,[6] or had recommended them based on the testimony of often non-white lay healers. Hewat's references were thus either dated or from uncredentialed sources, and he did not, in Maberly's view, show any evidence of having empirically tested these drugs or consulted more up-to-date professional medical opinion on them. Maberly surmised that:

> It would have been much more useful if Dr. Matthew Hewat had referred Dr. Attfield to Pappe's work and let him see for himself the imperfect state of existing information regarding a Cape Materia Medica rather than to have picked out a few drugs from that work without indicating from what sources he had drawn all his information.[7]

The drug Maberly expressed his strongest distaste for Hewat's recommendation of was unusual in that it was not derived from a plant but rather an animal. Hyraceum, 'supposed by some to be a menstrual secretion of the hyrax or rock rabbit', had been recommended as 'an excellent emmenagogue [a substance that stimulates menstruation] and proposed as a substitute for castoreum [a secretion of the beaver's castor glands, long used in European traditional medicine]'. Maberly noted that not only was Hewat's description taken directly from Pappe's *Florae Capensis* but evidently also Hewat 'had not been at the trouble to find out what has since been done respecting it'.[8]

Maberly here leaned on the opinion of no less than 'father of pharmacology' Jonathan Pereira (1804-1853), [9] who, having analysed the substance in 1850, was of the view that it was 'inert and useless' in terms of medical properties. Pereira went on to comment that the supposed similarity between hyraceum and castoreum was of little consequence given he was also strongly sceptical of the ascribed virtues of castoreum. Indeed he denounced 'The remedial use of sexual and anal secretions and of excrements (*e.g.* castor, musk, civet, ambergris, album graecum, and hyraceum)' as belonging to 'the superstitious and absurd practices of a former age' and recommended that 'the administration of such disgusting and useless substances should be banished from scientific medicine'.[10]

This article will contextualise Maberly's dispute with Hewat over hyraceum by discussing what it is, how it is produced in nature, its uses in Indigenous pre-colonial medicine and its adoption by colonial settlers, and its advocates and detractors among late nineteenth-century doctors and scientists after it reached the attention of Western

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[6] This was particularly evident where Hewat copied over errors or outdated information, such as citing the scientific class and order for bitter melon (*Citrullus amarus*) as being 'monaecia monodelphia', as listed in 1851 by Pappe but no longer current classification by 1899.
[7] Maberly. Pharmacology, 1899 (Note 1).
[8] Maberly. Pharmacology, 1899 (Note 1).
[9] Storey GO. Jonathan Pereira (1804-1853), the Father of Pharmacology. *Journal of Medical Biography*. 1998; 6(4): 206-216.
[10] Pereira J. On Hyraceum, a Proposed Substitute for Castoreum. In: *Pharmaceutical Journal and Transactions, Volume X: 1850-51*. Churchill, J (Ed). 1851: 124.

medicine.[11] The paper will show how the question of whether hyraceum and other Indigenous and settler drugs were deemed pharmacologically active revolved around not only chemical analysis of substances and patients' responses to their administration but also around whose expertise and testimony was considered credible. It will further show how the case of hyraceum and other native South African materia medica can be linked to a broader trend in this period of white scientists both drawing on local vernacular knowledge for their research and denouncing it in often highly racialised terms as unreliable. Finally, the article will consider more recent attempts to analyse hyraceum biochemically in the light of revived interest in Indigenous medicine in post-Apartheid South Africa.

How hyraceum is produced in nature and its historical use in Indigenous and colonial settler folk medicine

Hyraxes are small herbivorous mammals found throughout most of Africa. Although superficially resembling rodents or lagomorphs, the source of their popular Afrikaans name 'dassie' ('little badger') and the English 'rock rabbit', they are in fact members of the mammalian superorder Afrotheria which has its origins in the late Mesozoic/early Cenozoic period when Africa was relatively isolated from other continents, and their closest living relatives are generally believed to be elephants and sirenians (manatees and the dugong).[12] There are six living species of hyrax but the most widespread is the rock hyrax *Procavia capensis*, found from the continent's southern tip to Egypt, the Levant and Arabian Peninsula, particularly in arid and rocky environments. See Figure 1.

[11] The colonisation history of South Africa is complicated, with the initial waves of Cape settlers associated with the Dutch East India Company's rule (1652-1795) including not only white Europeans (largely of Dutch, German and French descent) but also large numbers of East African, South Asian and Malay people, most arriving as slaves, and who brought along their own medical traditions that interacted and intersected with European and Indigenous ones. Nineteenth-century British rule would further see substantial British settlement, especially in the Eastern Cape, and later in the century Indian immigration to Natal, mainly via importation as indentured labour. 'Settler' therefore covers a diverse group of white and non-white, European and non-European, and free and non-free immigrants and their descendants, albeit a grouping politically dominated by white European settlers.

[12] Springer MS. Afrotheria. *Current Biology*. 2022; 32(5): R205-R210; Tabuce R, Asher RJ, Lehmann T. Afrotherian mammals: a review of current data. *Mammalia*. 2014; 72: 2-14; Monadjem A. *African Ark: Mammals, Landscape and the Ecology of a Continent*. Johannesberg: Wits University Press; 2023. p.67-71. Although initially classified as part of the guinea pig family by Pallas (hence the rock hyrax's original scientific name of *Cavia capensis*), it had been recognised by the early nineteenth century that hyraxes were not closely related to rodents or lagomorphs, with Georges Cuvier placing them in his grouping 'Pachydermata' alongside elephants, hippos, rhinoceroses, tapirs and horses. Cuvier described the hyrax as in skeleton and dentition a 'miniature rhinoceros'. For a discussion of hyrax systematics as understood around Pereira's time, see: Longmuir J. The Coney (Hyrax Syriacus). *The Naturalist, Vol. IV*. London: Groombridge and Sons, Paternoster Row; 1854: 1-3.

Figure 1. A female rock hyrax (*Procavia capensis*) and two pups. Photograph, 2017. Credit: Chester Zoo. Permission to use granted on request.

Figure 2. Sample of hyraceum on display at the Aftel Archive of Curious Scents, Berkeley CA, USA. Credit: Mx. Granger, 2024. Creative Commons License. Source: https://commons.wikimedia.org/wiki/File:Hyraceum_at_the_Aftel_Archive_of_Curious_Scents.jpg

Rock hyraxes are social animals which live in colonies and typically shelter in the crevices of stone outcrops. Colonies habitually defecate and urinate in the same locations near their shelters, this likely playing a role in marking group territory. The resulting mass dries into a hard, resinous material varying from yellowish-brown to tarry black in colour. In arid conditions, desiccated layers of this material may be preserved for millennia.[13] This is hyraceum (Figure 2), which, despite its excremental origins, has an aromatic, if musky, quality derived from the herbivorous diet of hyraxes. It has commonly been compared in smell and taste to castoreum, which, along with use in medicine, was historically used for 'leather' notes in perfume and as a luxury food additive, including in vanilla ice cream.[14]

Hyraceum was likely used in the folk medicine of Khoekhoe and San peoples of southwestern Africa for thousands of years before the arrival of Europeans. Determining original prevalence of use and specific beliefs around its curative powers is difficult to reconstruct, given the fragmentary records of initial contact, the strong anti-Indigenous bias of colonial sources and the destructive impact of white settlement on Khoekhoe and San society, including deliberate genocide.[15] Ethnographic records of later surviving Khoekhoe and San medical practice, such as Percy Ward Laidler's (1887-1945) late 1920s work on the Nama (a Khoekhoe group living today in northwestern South Africa and southern Namibia), do however indicate that hyraceum was regarded highly by Indigenous healers. Laidler observed the Nama to use a boiled and strained hyraceum liquor prominently in women's medicine, including 'in dry confinements, during parturition generally, and for irregularities of menstruation', noting further that: 'In large doses it is believed to be the perfect abortifacient'. Hyraceum matures into white potassium nitrate as it ages, and this, Laidler stated, the Nama regarded as 'the "big boss of all medicines', being used particularly for poisonings, where it was either drunk as a decoction or rubbed into snake bites and scorpion stings, but also for 'such minor complaints as stiffness of the back and pains in the stomach'.[16]

Laidler records the Nama names for hyraceum of '//am uru' and '/gaous' (Khoekhoe and San languages include click consonants: '//' is a lateral click and '/' is a dental click).[17] But it is by its crude Afrikaans name of 'dassiepis' (and variations such as 'dasjespis' and 'dassenpis') that it first became well known outside of southern Africa. How '//am uru' became 'dassiepis' is inextricably tied with the colonial history of southern Africa. Following the 1490s Portuguese discovery of the sea route to India, the Cape of Good Hope became a highly important and strategic waypoint for expanding European commercial and colonial activities in the Indian Ocean region. This eventually

[13] Carr AS, Boom A, Chase BM. The potential of plant biomarker evidence derived from rock hyrax middens as an indicator of palaeoenvironmental change. *Palaeogeography, Palaeoclimatology, Palaeoecology*. 2010; 285: 321-330.
[14] Poliquin R. *Beaver*. London: Reaktion Books; 2015. p.67-68.
[15] Adhikari M. Settler Genocides of San Peoples of Southern Africa, c.1700-c.1940. In: Blackhawk N, Kiernan B, Madley B, Taylor R (eds). *The Cambridge World History of Genocide, Volume 2.* Cambridge: Cambridge University Press; 2023. p.69-95.
[16] Laidler PW. The magic medicine of the Hottentots. *South African Journal of Science*. 1928; 25: 433-447.
[17] van Wyk B-E. A review of Khoi-San and Cape Dutch medical ethnobotany. *Journal of Ethnopharmacology*. 2008; 119: 333-334.

motivated the Dutch East India Company to establish a refreshment station at Cape Town in 1652, initiating European settlement in the region. Although interactions with local Khoekhoe and Cape San were at first on largely equitable terms, settler expansion characterised by violent theft of land and livestock, combined with decimation by European diseases such as smallpox, ultimately led to subjugation of Indigenous peoples under European rule or their expulsion from colonised territories.[18]

White settlers, who came to be known as Boers (from the Dutch for 'farmer'), Afrikanders or Afrikaners, commonly denigrated Indigenous peoples of the Cape, particularly Khoekhoe and San, as ignorant, uncivilised, indeed even as subhuman.[19] This racist animus obscured the dependence of settlers not only on subjugated Indigenous labour but also on enlisted Indigenous expertise and appropriated knowledge, including regarding local materia medica. Most plants from which European pharmaceuticals were derived were not present at the Cape and, even when introduced, did not necessarily flourish. This necessitated a search for substitute drugs, for which settlers heavily depended on Khoekhoe, San, Nguni and Sotho-Tswana healers' knowledge of local plants.[20] This is undoubtedly the means by which important Cape medicinal plants such as buchu and Cape aloes came to the attention of white settlers.

The absorption of Cape medicinal flora into settler herbalism led to the development of a syncretic system of folk cures, known as *boerenmiddels* or *boererate* ('farmer's remedies'), that combined European and African traditions of home doctoring, along with elements of South Asian folk medicine practiced among Dutch slaves trafficked from the Indian subcontinent and Malay archipelago. This syncretic tradition used not only plants but also animal-derived materia medica, particularly fat, dung and blood.[21] Animal excrement, blood and related '*Dreckapotheke*' ('filthy medicaments') have a long history in European folk medicine, being used well into the nineteenth century, and had had some enthusiastic supporters among early modern European doctors, most notably the seventeenth-century German physician Christian Paullini (1643-1712).[22] However, while some Dutch settler folk practices likely derived from these European

[18] Thompson L. *A History of South Africa*. London: Yale University Press; 2014. p.31-39.

[19] Helping lay the foundation for the enduring racist myth of the Khoekhoe and San as developmentally primitive and closer to animals than other humans see: Dubow S. *Scientific Racism in Modern South Africa*. Cambridge: Cambridge University Press; 1995. p.20-25.

[20] 'Nguni' refers to the ethnolinguistic grouping that includes the Xhosa, Swazi and Sotho peoples. Nguni and Sotho-Tswana represent the two major Bantu language groupings in South Africa (along with Venda and Tsonga). 'Bantu', formerly widely used in South Africa as a collective ethnonym for speakers of these languages, is now viewed as dated given its problematic associations with repressive Apartheid policies such as the 1953 Bantu Education Act that restricted non-white schooling and training opportunities.

[21] Burrows EH. *A History of Medicine in South Africa up to the End of the Nineteenth Century*. Cape Town: Balkema; 1958. p.187-194. Burrows cites an 1898 reminiscence by an Afrikaner who had been part of the 1830s Great Trek, who recounted: 'Then we had, in place of doctors, good old women who worked amongst us as doctors … For fits the old people usually used dog's blood, for measles goat's dung, for a sore throat wolf's dung, for abscesses bread poultices, and so on'.

[22] Rumor M. *Perplexing Remedies in Ancient Medicine*. Berlin, Boston: De Gruyter; 2025. p.16-17. This should serve to remind us of the comparative recency of Pereira's view of 'sexual and anal excretions' as 'disgusting and useless'.

folk therapies, the influence of Indigenous medical beliefs is also clearly visible in other *boererate*, such as the use of animal stomach and intestinal contents. In a well-known incident, the young Paul Kruger (1825-1904), later President of the Transvaal Republic, developed a septic thumb. When partial amputation did not stymie the infection, his hand was plunged into the innards of a freshly killed antelope, the logic being that his thumb, which ultimately healed, would benefit from the curative power of digested herbs in the animal's stomach.[23] Notable parallels are here evident with medical beliefs Laidler reported in the late 1920s among the Nama, namely the idea that porcupine stomach was a powerful medicament because the animal eats many 'Bush things and strong things'.[24]

Hyraceum was thus one of a broad range of Indigenous materia medica adopted into settler folk medicine in South Africa. Khoekhoe belief in its importance in women's medicine appears to have also crossed over into European settler practice, as evidenced by its reputation as an emmenagogue. In 1850, it was further reported by Pappe as valued amongst farmers as 'an antispasmodic in Hysterics, Epilepsy, Convulsion of Children, St. Vitus's dance, in short, in spasmodic affections of every kind'.[25] It is notable that castoreum, the substance hyraceum has often been compared to and suggested as a substitute for, also had a long history of use as an antispasmodic and anti-hysteric, and its purported 'uterine influence' was further thought to promote postpartum lochial vaginal discharge and expulsion of retained placenta after childbirth.[26] One possibility is that the similar odour and taste of hyraceum and castoreum led European settlers to ascribe similar antispasmodic virtues to the South African substance. Another is that these two substances were observed to have similar physiological effects, although this might require conceding them to be less inert and useless than Pereira and Maberly supposed (see below).

Hyraceum and European travellers, doctors and scientists up to 1850

As Maberly noted, among the first detailed written records on Cape materia medica are those found in the travel writings of Swedish botanist Charles Peter Thunberg, who spent three years in the Dutch colony between 1772 and 1775. Whilst travelling in the inland semi-desert Little Karoo, he was shown by farmer Jacobus Botha 'a kind of mountain bitumen, which the country people were pleased to call *dassipiss*; supposing it to be the inspissated [congealed] urine of the great mountain rat (*Cavia capensis*)'. He further recorded that he was 'informed that this bitumen was to be found in great abundance in the cracks and crevices of the mountain', and was considered of great use for producing casts for broken bones. In a slightly earlier passage, Thunberg also observed that: 'In the crevices of the mountains a great number of *dasses* (*Cavia capensis*) were found, which were generally supposed to have the menstrual flux'.[27] Although he did not explicitly connect these claims about hyrax menstruation to 'dassipiss', this does point to a

[23] Burrows. *A History of Medicine*, 1958 (Note 20). p.192.
[24] Laidler. The magic medicine, 1928 (Note 15). p.445.
[25] Pappe. *Florae Capensis,* 1850 (Note 3). p.32.
[26] Pereira J. *The Elements of Materia Medica and Therapeutics, Vol. II*. Carson J (ed). Philadelphia: Blanchard and Lea; 1854. p.1176.
[27] Thunberg CP. *Travels at the Cape,* 1986 (Note 2). p.71-73.

variance in opinion among his interlocutors as to the source of hyraceum, with some believing it urinary and others menstrual in origin. Thunberg's compatriot and fellow Linnaeus student Anders Sparrman (1748-1820), who also visited the Cape during the 1770s, was supportive of the latter view, stating that 'observations made on a tame female of this species' led him to the view that 'dassen-piss' was 'most probably the menstrual excretion of the creature'.[28]

It is not clear whether either Thunberg or Sparrman brought any samples of 'dassiepis' with them back to Sweden when they returned from their travels in the late 1770s. The German naturalist Hinrich Lichtenstein (1780-1857) visited the Cape between 1802 and 1806 during the transition between Dutch and British rule, befriending the Cape Town apothecary Pieter Heinrich Polemann (1779-1839),[29] who assisted his collecting whilst there. Following his return to Germany and 1811 accession to Director of the Berlin Zoological Museum, Lichtenstein organised for the pharmacy student Karl Heinrich Bergius (1790–1818) to be sent to Cape Town in 1815 to serve as an assistant to Polemann while collecting for the Museum in his spare time.[30] It was from Bergius, via Lichtenstein, that a sample of 'dassen-pis' was passed on to Johann Friedrich John (1782-1847), Professor of Chemistry and Pharmacy at Berlin, credited by Ludwig Fikentscher (1826-94) as the first scientist to subject hyraceum to chemical analysis.[31] John concluded 'dassen-pis' to be an animal, vegetable and mineral admixture likely of excremental origin, although neither his 1817 work, nor Johann Christian Karl Schrader's (1762-1826) subsequent 1818 analysis,[32] was viewed by Fikentscher as doing much to resolve questions of hyraceum's origins or possible pharmaceutical value.[33]

By the late 1840s, two notable champions of hyraceum had emerged: Ludwig Pappe in South Africa and Eduard Martiny (1808-76) in Germany.[34] They nevertheless espoused diametrically opposed views on the nature of its production. Pappe was a Leipzig-educated Hamburg doctor who emigrated to Cape Town in 1831, where he

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[28] Anders Sparrman, *A voyage to the Cape of Good Hope, towards the Antarctic polar circle, and round the world: but chiefly into the country of the Hottentots and Caffres, from the year 1772 to 1776, Vol. I*. Anon (Trans). London: GGJ & J Robinson, Pater-Noster-Row; 1785. p.309.

[29] Also spelled 'Pohlmann' and 'Poleman' in some sources.

[30] Arnold K. *German Natural History Collectors in Southern Africa, 1815-1867*. PhD Thesis: LSE; 2021. p.92-97. Bergius subsequently fell out with Polemann and died at the Cape of tuberculosis.

[31] Fikentscher L. *Das Hyraceum in historischer, chemischer, pharmaceutischer und therapeutischer Beziehung*. Erlangen: Carl Heinrich Kunstmann; 1851. p.16.

[32] Schrader appears also to have used material secured via Lichtenstein's collecting links. See: Perreira. On Hyraceum, 1851 (Note 10). p.122.

[33] John JF. Chemische Analyse des Dassipiss oder Dassiespiss (Dassen-Pis), einer bisher problematisch gebliebenen Materie vom Vorgebirge der guten Hoffnung. *Deutsches Archiv für die Physiologie*. 1817; 3: 179-195. On John's career, see: Sourkes TL. Devitalising the Elements: Johann Friedrich John (1782-1847) and the Liberation of Phosphorus and Potassium from a Vital Force. *Ambix*. 2000; 47: 37-46.

[34] Fikentscher also supported the medicinal value of hyraceum in his 1851 thesis, reporting that he had successfully treated 18 of 26 patients (some hysterical, some with gastralgia) using hyraceum tincture. See: Fikentscher. *Das Hyraceum*, 1851 (Note 30). p.35-38; Pereira. *The Elements of Materia Medica*. 1854 (Note 25). p.1179-80.

established a practice. His background was in medical botany and at the Cape he came to play an important role in documenting and advocating for the protection of the region's unique flora. This included campaigning for re-establishing a botanical garden at Cape Town, ultimately successful in 1848, and extensive correspondence with William Jackson Hooker (1785-1865), the first director of Kew Gardens in London, whose support in 1858 would help persuade the Cape parliament to formalise Pappe's role as Colonial Botanist.[35]

In 1847, Pappe published a piece entitled 'A list of South African indigenous plants used as remedies by the colonists' in the short-lived *Cape Town Medical Gazette*, which would later form the basis for his 1850 *Florae Capensis*.[36] In addition to some 60 or so medicinal plants, Pappe also added an appendix where he included hyraceum as the sole animal-derived drug in his list. Noting that this substance's 'production has baffled the researches of eminent Zoologists', and contrary to the view that it might be produced by a hidden gland, Pappe maintained instead that it was 'produced by the uropoetical [urinary] system of the animal' because hyraxes drink seldom so produce a concentrated glutinous urine 'like that of the *Har'*. Pappe also cited the reddish tint of fresh hyrax urine as the source of the erroneous claim that hyraceum was menstrual in origin.[37]

Pappe initially claimed to have coined the scientific name 'hyraceum' (appending 'mihi' in the 1850 edition of his *Florae Capensis*), as an alternative to the 'harsh and unpoetical name of *Dasjespis*' and with reference to its resemblance in smell and therapeutical effects to castoreum.[38] Pappe's claim to priority appears, however, to have been disputed by Martiny, who likewise promoted use of the name hyraceum in his 1847 book *Naturgeschichte der für die Heilkunde wichtigen Thiere* (*Natural History of Animals Important for Medicine*).[39] Martiny's motivation, however, was not only to provide a less crass name, for he was also convinced that hyraceum was 'a secretion connected with the sexual functions, and produced by highly developed preputial and probably also vaginal glands'.[40] The name hyraceum, Martiny maintained, thus also helped avert the 'erroneous' impression the Dutch name gave of a urinary origin for the substance:

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[35] Grove R. *Green Imperialism*. Cambridge: Cambridge University Press; 1988. p.328-329; Beinart W. *The Rise of Conservation in South Africa*. Oxford: Oxford University Press; 2003. p.74-76; Dubow S. *A Commonwealth of Knowledge*. Oxford: Oxford University Press; 2006. p.53-54.

[36] A translation of Pappe's 1847 letter was also published in Erlangen, Germany, by a 'Dr. Martius' where it 'caused some interest': Pappe. *Florae Capensis*, 1850 (Note 3). vii. Martius was Fikentscher's uncle and was responsible for organising the first shipment of hyraceum to Erlangen, which arrived in December 1848 and from which the tincture was made that was the basis for Fikentscher's medical trials: Fikentscher. *Das Hyraceum*, 1851 (Note 30). p 34.

[37] Pappe. *Florae Capensis*, 1850 (Note 3). p.31-32.

[38] Pappe. *Florae Capensis*, 1850 (Note 3). p.32.

[39] Martiny E. *Naturgeschichte der für die Heilkunde wichtigen Thiere*. Darmstadt: Carl Wilhelm Leske; 1847.

[40] Martiny. *Naturgeschichte,* 1847 (Note 39). p.119-120. Pereira's translation is used here: Perreira. On Hyraceum, 1851 (Note 10). p.123.

> I choose the name 'hyraceum', by analogy with the formation of 'castoreum' from 'castor', because we do not yet have a suitable name for this substance, a Latin one not at all and the Dutch one gives to us an entirely erroneous description.[41]

Fikentscher, adjudicating on the matter in 1851, inferred that Martiny was likely already familiar with the term 'hyraceum' before Pappe's publication. Martiny had corresponded with the Stuttgart naturalist Ferdinand von Krauss (1812-90) who spent time at the Cape between 1838 to 1840 at the invitation of Pappe's mentor the pharmacist Carl von Ludwig (1784-1847).[42] This suggests that the word 'hyraceum' was in circulation amongst doctors and naturalists at the Cape before 1847 and was likely neither Pappe or Martiny's original coining. Pappe clearly read Fikentscher, as he cited him in the 1857 second edition of his *Florae Capensis*, where he notably also dropped 'mihi' and so appears also to have dropped his claim to priority.[43]

The castoreum analogy and Pereira's negative assessment of hyraceum

Pappe had noted that castoreum was 'a remedy which is decreasing in quantity every year' and that should hyraceum be favoured as a substitute it would not only help meet castoreum demand but also for the Cape: 'A new article of export would thus be gained'.[44] Martiny likewise recommended hyraceum as '*ein vortreffliches Ersatzmittel für das so äusserst kostspielige Castoreum*' ('an excellent substitute for the ever so costly Castoreum'), noting further that it was so plentiful and cheap at the Cape that it could be spared for use in stuffing bird skins as a preservative as Leipzig Professor Eduard Friedrich Pöppig (1798-1868) had found when he received specimens from the Cape some years prior.[45] Castoreum, especially the highly prized Russian product, was scarce and expensive by 1850 because beaver populations, especially the near extinct Eurasian species, had collapsed due to overhunting. Hyraceum, abundant and not dependent on the slaughtering of its animal producer, appeared to have clear commercial potential if proven an adequate substitute for castoreum. However, a number of influential pharmacologists, notably London's Jonathan Pereira, were by this time increasingly sceptical of castoreum's medicinal virtues and in this context the analogy with castoreum proved as much hindrance as help for hyraceum's advocates.

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[41] '*Ich wähle den Namen Hyraceum, als analog dem Castoreum von Castor gebildetes Wort, weil wir für die in Rede stehende Substanz noch keinen passenden Namen besitzen, einen lateinischen gar nicht und der aus dem Holländischen zu uns übergegangene eine ganz falsche Bezeichnung gibt*'. Quoted in: Martiny. *Naturgeschichte*, 1847 (Note 39). p.119. Author's translation.

[42] Fikentscher. *Das Hyraceum*, 1851 (Note 30). p.14; Nyhart LK. *Modern Nature: The Rise of the Biological Perspective in Germany*. Chicago: University of Chicago Press; 2009. p.58.

[43] Pappe L. *Florae Capensis Medicae Prodromus, Or, An Enumeration of South African Plants used as Remedies by the Colonists of the Cape of Good Hope*. 2nd Edition. Cape Town: W Brittain, 44, St George's-Street; 1857. p.46-48.

[44] Pappe. *Florae Capensis*, 1850 (Note 3). p.32.

[45] Martiny. *Naturgeschichte*, 1847 (Note 38). p.120.

By 1850 a small amount of hyraceum was being commercially sold in Europe. Pereira reports that he received his sample from 'Messrs. August Faber and Co., of London' who further 'inform me that they believe all that has been imported into Europe as yet, is a dozen tins, of about one pound and a half each, which were sent from the Cape of Good Hope… to Hamburg, and there sold at about eight shillings each'.[46] This was considerably cheaper than castoreum, which cost around twenty shillings a pound from North America, sourced in Britain via the Hudson's Bay Company from Canada, and fetched as high as £2 an ounce for 'exceeding scarce' Russian castoreum.[47]

Pereira and his colleagues, William Sharpey (1802-80) and John Quekett (1815-61), subjected the sample to a battery of tests, including heating, boiling, distilling, sectioning for microscopic examination, and testing with litmus paper. On the physiological origins of hyraceum, Pereira was inclined to view it as excremental in origin, against the menstrual theory favoured by Martiny, citing Sharpey's declaration that in his microscope studies he had seen 'nothing which could for a moment be taken for blood particles or the remnants of blood particles', with most of the constituent matter appearing to be vegetable tissue and resinous or oily globular particles. Pereira further endorsed Schrader's view that hyraceum was a largely faecal product in which urine was 'an accidental impurity', given that the litmus tests both Schrader and Pereira had subjected distilled hyraceum to had shown it as neutral or alkaline, whereas urine was expected to be acidic. Quekett concurred with Pereira that the hyraceum sample appeared to be 'composed entirely of excrement' and, *contra* Martiny, 'not like castoreum and musk the secretion of a gland', dissections having shown that 'the hyrax capensis has no anal or other glands'. Quekett acknowledged here that only details of dissections of male hyraxes had been published, but endeavoured to investigate further, sending a short note after Pereira had submitted the paper for publication to state that he had 'examined, with Prof. Hyrtt, of Vienna, a foetal male and female hyrax, and can detect no trace of any glands likely to produce the hyraceum'.[48]

The investigations of Pereira and his colleagues cast doubt on claims for hyraceum as a product of menstruation or a specialist gland analogous to beaver castor glands in favour of an excremental origin. However, in terms of actually testing hyraceum therapeutically, Pereira asserted that: 'My sample is too small to enable me to make any experiments with it'.[49] His assessment of its possible medicinal qualities was therefore grounded in chemical analysis and analogies with other animal-derived pharmaceuticals, particularly castoreum, and not based on experience with patients prescribed it. Pereira had spent substantial time analysing castoreum, including work he would publish the subsequent year on the presence of 'hydruret of salicyle' in *aqua castorei*, a liquid produced by distilling castoreum in water. Again, Pereira did not carry out trials on patients with castoreum, but based on prior findings such as those of William Alexander (died 1783),[50] and Johann Christian Gottfried Jörg (1799-1856),[51] who found it to only produce odorous belching and slight stomach upset, Pereira considered castoreum 'an

[46] Perreira. On Hyraceum, 1851 (Note 10). p.119.
[47] Perreira. *The Elements of Materia Medica*, 1854 (Note 25). p.1173.
[48] Perreira. On Hyraceum, 1851 (Note 10). p.121-124.
[49] Perreira. On Hyraceum, 1851 (Note 10). p.124.
[50] Alexander W. *Experimental Essays*. London: Edward and Charles Dilly; 1768. p.83-85.
[51] Jörg JCG. *Materialien zu einer künftigen Heilmittellehre*. Leipzig: Carl Cnobloch; 1825.

almost inert recipe'.[52] Therefore, Pereira concluded: 'to say that hyraceum is equal to castor in medicinal properties', as Martiny had, was 'to say little in its favour; for, in my opinion, there is no valid evidence that castor possesses any medicinal power whatever'.[53]

Hyraceum's condemnation as a 'disgusting and useless substance' by Pereira, cited five decades later by Maberly as definitive, was thus grounded in: (a) its repugnant excremental character, and (b) the apparent therapeutic inertness of castoreum, the substance for which Pappe and Martiny proposed hyraceum as a substitute. It was condemned, therefore, by inference and association more than any direct empirical evidence Pereira had to hand. Pereira's judgement was, however, influential, particularly in Britain, and likely contributed to the failure of hyraceum as a Cape export product for medical use.[54] Nevertheless, it remained a popular folk remedy in southern Africa and continued to have advocates among medical men based there in the second half of the nineteenth century. Pappe, on revising his *Florae Capensis* in 1857, sought to better defend his good opinion of hyraceum by appending the testimony of Cape-born doctor Alexander Brown (1810-67),[55] who affirmed, particularly as a tincture and in combination with valerian, that hyraceum was 'a very valuable remedy' for 'hysterical, nervous and spasmodic affections'. He further commended its effects as 'an emmenagogue in amenorrhoea and chlorosis' as 'beyond all conception'.[56]

The *Indian and Colonial Addendum* and the Hewat-Maberly dispute in context

Having reviewed the original mid-nineteenth-century debate over hyraceum, which had seen Pereira and other British medical men reject Cape and German claims for its medical utility, this article now returns to Maberly's 1899 critique of Hewat but seeks to put it in the context of wider events. That the dispute was initiated by the General Medical Council's call for contributions towards an *Indian and Colonial Addendum* to the *British Pharmacopoiea* is no coincidence, for this publication had already previously played its part in triggering conflicts between metropolitan medicine and colonial doctors over the value of non-Western materia medica. A product of the 1858 and 1862 Medical Acts, with its first two editions published in 1864 and 1867, the *British Pharmacopoeia* had been intended to create a standardised British national compendium

[52] Pereira. *The Elements of Materia Medica*, 1854 (Note 25). p.1176.
[53] Perreira. On Hyraceum, 1851 (Note 10). p.124.
[54] Although therapeutic failures experienced by those few British doctors who did test it medically does appear to have played some role in consolidating negative opinion of hyraceum. Five years after Pereira, the Liverpool surgeon and botanist Thomas Croxen Archer reported that: 'Its value is pretty well determined now, by its almost ceasing to be an article of commerce, for instead of its superseding castor as an antispasmodic medicine, the bulk imported has been used for manure'. See: Archer TC. On Economic Zoology. *The Pharmaceutical Journal and Transactions Vol. XIV 1854-55*. Bell J (ed). London: John Churchill; 1855: 351.
[55] For a brief biography of Brown, see: Burrows. *A History of Medicine*, 1958, (Note 20). p.303-304.
[56] Pappe. *Florae Capensis,* 1857 (Note 42). p.47-48.

of drugs, their preparation and usage.[57] Well received closer to home, it however had a mixed reception in British colonies due to its lack of accommodation for local materia medica and cultural and environmental conditions of practice.[58] In India, this would motivate the 1868 publication of a separate colonial pharmacopoeia. Metropolitan doctors, however, objected to the *Indian Pharmacopoeia*'s inclusion of 'non-officinal' medicines, that is, locally used drugs whose curative power was deemed inadequately proven by western medical standards. In part to combat colonial competitors, the General Medical Council insisted on more rigorous testing of drugs before inclusion in the 1885 edition of the *British Pharmacopoeia* to ensure that this publication represented the 'state of the art'. Leaning on the 1885 edition's authoritative character, metropolitan medical authorities persuaded the Indian secretary of state to declare in 1886 the *British Pharmacopoeia* the 'sole authority on all matters relating to pharmacy', putting an end to the *Indian Pharmacopoeia*.[59]

While the *British Pharmacopoeia*'s chief imperial competitor had now been eliminated, this did little to address colonial doctors' objections regarding the metropolitan bias of the publication. These criticisms would, following the publication of the 1898 edition, prompt the decision to create an *Indian and Colonial Addendum* to enable the 'imperialisation' of the pharmacopoeia, with a draft version sent out to colonies for comment in 1899.[60] Hewat, a member of the Cape Medical Council, was one of several South African respondents and his recommendation of six drugs was small compared to the Natal Medical Council's recommendation of 60 Zulu remedies. Other responses, such as those from the Eastern Cape and Transvaal, however, were more cautious, noting that there were native plants and products believed to be of medicinal value but that they required further investigation before any could be recommended.[61] This reluctance to accept Indigenous materia medica without formal scientific study was reflected in the metropole, where the compilers of the *Addendum* ultimately only deigned to recognise three new pharmaceutical ingredients for African colonies: sesame and peanut oil (to substitute olive oil in plasters, ointments and liniments), and extract of the blistering beetle *Mylabris bifasciata* (to substitute for cantharides).[62]

The conservatism of Cape doctors towards Indigenous drugs had been previously noted by Andrew Smith, who commented that while 'there is a large number of real

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[57] Anderson S. Pharmacy and Empire: The "British Pharmacopoeia" as an Instrument of Imperialism 1864 to 1932. *Pharmacy in History*. 2010; 52(3/4): 112-121.

[58] For example, hog's fat was included in earlier editions of the *British Pharmacopoeia* without suggestion of a suitable alternative when treating Muslim or Jewish patients, or acknowledgement that high tropical temperatures could render it too soft for use in ointments or plasters. See: Anderson. Pharmacy and Empire, 2010 (Note 56). p.116-117.

[59] Anderson. Pharmacy and Empire, 2010 (Note 56). p.115. Anderson points to some pecuniary interests behind arguments against non-officinals given their common use as substitutes for expensive European drugs and the lucrative nature of the Indian export market for British pharmaceutical producers.

[60] Anderson S. *Pharmacopoeias, Drug Regulation, and Empires: Making Medicines Official in Britain's Imperial World, 1618-1968*. Montreal & Kingston: McGill-Queen's University Press; 2024. p.150-175.

[61] Anderson. *Pharmacopoeias*, 2024 (Note 59). p.167-168.

[62] General Medical Council. *Indian and Colonial Addendum to the British Pharmacopoeia*. London: Spottiswoode & Co. Ltd; 1900. p.36-40.

medicinal plants employed … by people in general and by Native specialists', buchu and Cape aloes were the only local drugs widely used by medical practitioners and commercially exported. He attributed this conservatism in part to doctors' education in Europe.[63] This points to some specifically South African dimensions to the Maberly-Hewat dispute that should be highlighted. Unlike India, Canada or Australia, where medical colleges were established earlier in the nineteenth century, Cape doctors required training abroad, with no South African medical schools opening until 1912. Scottish universities and London hospital schools were the most common *alma maters* for late nineteenth-century Cape doctors, Hewat (Edinburgh) and Maberly (Middlesex) being fairly representative of this trend.[64] Hewat and Maberly were also both British emigrés, although Hewat came to Cape Town as a child, whereas Maberly arrived after graduating.[65] In this they were again fairly typical, as the expense of training abroad generally restricted medical education among the Cape-born to a small elite, who constituted a minority of the local medical profession.[66]

The emigré roots of most late-nineteenth-century Cape doctors meant that many of them lacked a cultural background of growing up alongside Cape folk medicine. Their European education meanwhile tended to instil in them a view of Indigenous and settler remedies as backward and unscientific. This was particularly true of Indigenous medicine, with many doctors sharing then common racist views of Africans as intellectually inferior and culturally uncivilised.[67] Hewat, however, is notable in offering qualified praise for Indigenous medicine, as seen in his 1899 MD Edinburgh thesis and related 1906 book. Drawing on Smith's work at Lovedale and his own experience 'in the border districts of the Cape Colony' in the early 1890s, Hewat, whilst condemning the *isanuse* (diviner, or 'witch doctor') as a 'villainous and unmitigated fraud', described the 'herb doctor' (*i-gqira elemicisa*) as differing 'in no essential respect from a European doctor, only he employs native drugs and herbs', comparing their methods and principles 'favourably with those ascribed to Aesculapius and Galen in the early history of medicine'. Hewat further stressed the empirical character of African herbalism, asserting that the general practice of 'No cure, no pay' ensured that 'worthless remedies are sifted out'.[68]

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[63] Smith. *A Contribution,* 1895 (Note 4). p.227.

[64] Phillips H. Home Taught for Abroad: The Training of the Cape Doctor, 1807-1910. In: *The Cape Doctor in the Nineteenth Century*. Deacon H, Phillips H, van Heyningen E (eds). Amsterdam: Rodopi; 2004. p.105-132.

[65] On the Hewat family, see: Anon. Obituary: Sir John Hewat, M.B., C.M. (Edin.). *South African Medical Journal*. 1928; 2(16): 450. John was Matthew's elder brother; their two other brothers were also doctors. On Maberley, see: Plug C. Maberly, Dr John Frederick. S2A3 Biographical Database of Southern African Science. https://www.s2a3.org.za/bio/Biograph_final.php?serial=1748 (accessed, 20 May 2025).

[66] Phillips. Home Taught, 2004 (Note 63).

[67] Dubow. *Scientific Racism*, 1995 (Note 18).

[68] Hewat ML. *Bantu Folk Lore (Medical and General)*. Cape Town: T Maskew Miller; 1906. vi; Hewat ML. *Bantu Medical Folk-Lore*. MD Thesis: Edinburgh; 1899. p.6, 24, 27 & 40; Digby A. *Diversity and Division in Medicine: Health Care in South Africa from the 1800s*. Oxford: Peter Lang; 2006. p.311-312.

Hewat's willingness to recommend Indigenous drugs for the *Addendum*, including hyraceum, was thus reflective of a broader, if qualified, respect he had for vernacular medical knowledge and expertise.[69] This was something Hewat shared with Pappe, who noted in his first edition that he was initially motivated to compile his *Florae Capensis* after observing that 'many indigenous plants', were 'sucessfully [sic] used by the Boers and coloured people as House-remedies'.[70] Pappe's second edition further acknowledged his reliance on Indigenous and settler expertise, stating that 'the greater part of our information … we owe, not so much to scientific research, as to the experience of the colonial farmer, residing in the more remote parts of the interior, to occasional travellers, or to the wandering native'.[71] Andrew Smith likewise acknowledged in 1888 the valuable input of many 'Native contributors', particularly the poet and journalist William Wellington Gqoba (1840-88) who 'placed his own knowledge at my disposal, and did all he could to procure a knowledge of these remedies from others', further noting that 'His intelligence and experience in plant remedies made him an excellent referee'.[72]

Maberly, however, was extremely dismissive of medical claims made on the basis of settler and Indigenous vernacular knowledge, suggesting, regarding Hewat's recommendation of 'umkomo-komo', a plant used as a Zulu anthelmintic, that even though it 'is in colonial use in some parts in cases of tapeworm … we could hardly suggest it to the British Pharmacopoeia upon lay testimony and without definite research'. Similarly, on Hewat's suggestion of substituting the blistering beetle *Mylabris bifasciata* for *Lytta vesicatoria* (better known as 'Spanish fly', the source of cantharides), Maberly protested that: 'there has been no investigation of the matter and it is wrong to rush this sort of thing on to the Committee of the British Pharmacopoeia and to ask them to accept drugs upon mere hearsay'.[73] Along with dismissing vernacular

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[69] The term 'vernacular knowledge' is borrowed from Nancy Jacobs (Jacobs N. *Birders of Africa*. New Haven: Yale University Press; 2016), via Jules Skotnes-Brown (Skotnes-Brown J. *Segregated Species*. Baltimore MA: John Hopkins University Press; 2024. p.16-18), who use it to denote the expertise of people from groups viewed as operating outside the remit of professional science but whose information and labour was often relied on by scientists and bureaucrats, a usage which they view, in a South African context, as helping avoid the suggestion of stasis or racialised exclusivity from science suggested by 'traditional knowledge' and 'indigenous knowledge'.

[70] Pappe. *Florae Capensis*, 1850 (Note 3). vi.

[71] Pappe. *Florae Capensis,* 1857 (Note 42). v.

[72] Smith. *A Contribution,* 1888 (Note 4). v. On Gqoba and Smith's other Xhosa informants, see: Hammel T. *Shaping Natural History and Settler Society*. Basingstoke: Palgrave Macmillan; 2019. p53-55.

[73] Maberly. The Pharmacology, 1899 (Note 1). p.874. *Contra* Maberly, Smith claimed *Mylabris bifasciata* to have been tested, including by a 'London expert', and found to produce twice the cantharadin of Spanish fly, indeed was expected by Smith to supersede the latter 'in certain markets'; see: Smith. *A Contribution,* 1895 (Note 4). p.230-231. The main species referenced in *Mylabris*' entrance in the 1900 *Indian and Colonial Addendum* was the East Asian *Mylabris phalerata*, (now *Hycleus phaleratus*), widely used in Chinese folk medicine; see: Wang G-S. Medical uses of mylabris in ancient China and recent studies. *Journal of Ethnopharmacology*. 1989; 26: 147-162. However, p.37 of the *Addendum* noted that in India, African and 'Eastern'

testimony, Maberly also disparaged Indigenous gathering practices, asserting that the delisting of Cape aloes from the British Pharmacopoeia was 'to some extent the fault of the collectors, specifically that its preparation had been left in the hands of Africans, and that due to their alleged carelessness 'the repute of the drug has been very much damaged'.[74] Maberly's attitude is perhaps best summarised by his statement in an earlier paper:

> We must, of course, *deduct a large percentage from the records of cures stated to have been effected by those outside the profession*, but we cannot shut our eyes to the fact that there are drugs in South Africa known to the colonists the knowledge of which was probably originally derived from the Hottentots and Bushmen of the Cape Colony, which, *in the hands of qualified men*, would be of the greatest value.[75]

Conclusion: revisiting and reassessing hyraceum

While Indigenous and settler knowledge and practices were useful starting points for investigating new potential medications, Maberly insisted that it must only be after extensive testing by qualified (presumably white) doctors and scientists that such materia medica could be accepted into the imperial pharmaceutical canon. Maberly's attitude reflected conservative metropolitan views on Indigenous materia medica, which professed a need for thorough scientific testing but also affirmed that settler and Indigenous vernacular expertise could not alone be treated as credible. Further, where a pharmaceutical was tested by European experts but failed to perform on British soil, as with hyraceum, the testimony of British-based scientists such as Pereira should be favoured over colonials (Pappe and Brown) and Continentals (Martiny and Fikentscher).

This article has shown, however, that Pereira's negative 1850 appraisal of hyraceum was less well-grounded than Maberly supposed, depending substantively on the analogy with castoreum, which Pereira initially concluded was near therapeutically inert. In 1851 Pereira suggested that the minute amount of carbolic acid present in castoreum might be responsible for its ascribed curative properties, but believed that 'should its medicinal activity be found to depend on the latter, a cheap and more effective substitute for castoreum would be found in carbolic acid obtained from coal tar'.[76] However, although Pereira recognised castoreum to also contain salicin (derived from the willow and poplar that beavers feed on), which he further acknowledged to be a useful tonic and febrifuge,

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colonies where *phalerata* was not found, other *Mylabris* species could be utilised in preparations 'provided they yield a proportion of cantharidin equivalent to that contained in Mylabris phalerata'. Colonial doctors' discovery of *bifasciata*'s usefulness for producing cantharidin may likely be traced to its use by Indigenous peoples such as the Xhosa, as observed by Hewat: Hewat. *Bantu Medical Folk-Lore,* 1899 (Note 67). p.39.

[74] Maberly. The Pharmacology, 1899 (Note 1). p.874.

[75] Maberly J. *Dysentery and its Treatment*. London: printed at The Lancet office; 1897. p.8. Emphasis added.

[76] Pereira. *The Elements of Materia Medica*, 1854 (Note 25). p.1175.

he does not appear to have considered this therapeutically active in castoreum.[77] Ultimately, Pereira was correct that coal tar would provide a cheaper, more effective substitute for castoreum, but was in error in assuming the main active ingredient was carbolic acid. In fact it was salicin, a derivative of which, acetylsalicylic acid, formed the basis for aspirin, developed by Bayer in the 1890s as the first mass produced chemically synthetised pharmaceutical.[78] This suggests Pereira unfairly dismissed castoreum as 'almost inert', albeit the evidence suggests it was never a particularly efficient nor a humane source of salicin.

Hyraceum, largely ignored during the twentieth century, has recently received some minor attention from pharmaceutical science amid greater interest in Indigenous and settler folk medicine in post-Apartheid South Africa and alongside increased efforts to acknowledge the role of Indigenous knowledge in drug discovery and to combat biopiracy.[79] In 2008 a Danish-South African team published details of analyses carried out on hyraceum samples taken from a broad range of South African sites representative of five different biomes. The samples showed considerable range in chemical signatures, attributed partly to differences in hyrax diets across biomes. The team specifically tested for GABA-benzodiazepine receptor affinity (an *in vivo* test used to identify candidate anti-epilepsy pharmaceuticals), with four of fourteen samples assaying positively. One positive sample had been collected from Gamkaskloof, an isolated valley where hyraceum infusion had been used as an anti-epileptic into the second half of the twentieth century.[80] Then in 2018 a National University of Lesotho team tested hyraceum for cytotoxicity and genotoxicity using an *Allium* assay and concluded it to be somewhat efficacious, especially at higher concentrations.[81] These limited studies suggest that hyraceum, like castoreum, is not entirely inert and that there may be some justification in Indigenous beliefs that animals that eat 'Bush things and strong things' (as Laidler reported of the Nama) can produce somewhat useful (if disgusting) medicaments.

[77] Pereira. *The Elements of Materia Medica*, 1854 (Note 25). p.314-317 & 1174-75.
[78] Fuster V, Sweeny JM. Aspirin: a historical and contemporary therapeutic overview. *Contemporary Reviews in Cardiovascular Medicine*. 2011; 123(7): 768-778.
[79] van Wyk B-E. A review, 2008 (Note 16); Foster LA. *Reinventing Hoodia: Peoples, Plants, and Patents in South Africa*. Seattle WA: University of Washington Press; 2017.
[80] Olsen A, Prinsloo LC, Scott L, Jäger AK. Hyraceum, the fossilized metabolic product of rock hyraxes *(Procavia capensis),* shows GABA-benzodiazepine receptor affinity. *South African Journal of Science*. 2008; 103: 437-439.
[81] Asita OA, Rants'o T, Magama S, Taole M. Evaluation of *Procavia capensis* hyraceum used in traditional medicine for modulation of mutagen-induced genotoxicity. *Journal of Medicinal Plants Research*. 2018; 12(17): 209-216.

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