A SPACE FOR CONFLICT:

THE SCAB ACTS OF THE CAPE COLONY, circa 1874-1911

by

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ABSTRACT

Sheep farmers who protested against the promulgation of anti-scab legislation presented their opinions of the disease in a slew of letters to the press and in testimonies before various scab commissions. Although the farmers' beliefs about scab were heterogeneous, they contained elements of an environmental theory of disease. Progressives ridiculed these ideas: they constructed the struggle surrounding the Act as the struggle between progress and ignorance.

It is argued in this dissertation that the progressives' explanation for the motives of their opponents is not sufficient. Despite government education campaigns, the opposition remained sceptical of the scientific explanation for scab and completely disbelieved that eradicating scab was in their economic interests. In order to evaluate the farmers' resistance and scepticism adequately, the progressives' side of the divide has to be examined. Was the cure for the disease as simple and accessible as presented by progressives? How persuasive and logically coherent was the scientific account of scab? Was the Scab Act really economically beneficial in the straightforward manner it was presented to be?

These are the questions any account of the Scab Act must ask and try to answer. However, the progressives' assertions that eradicating scab would benefit the pastoral sector of the Cape Colony has never been subject to thorough investigation

This thesis draws on current debates in anthropology and the sociology of science to provide a theoretical framework to contextualize the apparent conflict between scientific knowledge and trek farmers' purported 'traditional' knowledge. It is concluded that the division between veterinary knowledge and trek farmer knowledge on epistemological grounds is misguided. A critique of nineteenth century veterinary knowledge of scab is also provided. It is argued that the

official aetiology of scab contained a number of inaccuracies that obscured how difficult it was for farmers to clean their sheep.

Through a close reading of primary source material government efforts to convince trek farmers of the necessity for a general scab act is analysed. Proceeding from the conviction that trek farmer views on scab were mistaken, officials believed that proving this to them would convince them of the necessity of anti-scab legislation. This, it is argued, was naïve. The 'error' of trek farmer views could not be conclusively proven while the scientific aetiology of scab was not logically persuasive.

It is also shown in this dissertation that eradicating scab would only be beneficial and affordable for wealthier wool farmers. Mutton farmers had no economic incentive to clean their sheep and therefore did not exert themselves to this end. The practical necessities of trek farming in arid areas also made complying with the legislation arduous. Anti-scab legislation is therefore revealed as class legislation.

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NOTES ON THE TEXT

The words "Scab Act" or the "Act" (if capitalized) refer to Act 20 of 1894. While previous scab acts were permissively applied on a district-by-district basis, this was a compulsory, colony-wide act. Act 20 of 1894 was amended with Act 28 of 1899. As these two acts were enforced together, they were collectively known as the "Scab Acts". "Scab act(s)" refer to any anti-scab legislation. All other scab acts mentioned in the text will be specifically named and appropriately capitalized. The words "Scab Act" will, for example, not be used to refer to the Scab Act of 1886 (Act 28 of 1886).

Using the term "Afrikaner" for the Dutch/ early Afrikaans-speaking population of the Cape Colony has been largely avoided in this text. Although Herman Giliomee's *The Afrikaners* shows that a proto-Afrikaner ethnicity emerged at the Cape in the late nineteenth century, Giliomee also indicated that the tern "Afrikaner" was not exclusively used during this period to refer to this Cape Dutch ethnicity. It is also argued below that construing the anti-Scab Act movement in exclusively ethnic terms is inappropriate. The anti-Scab Act movement's members were men Giliomee would have called "Afrikaners" but being Afrikaners did not underpin their protest. The opponents of the Scab Act were mainly motivated by economic concerns. Their being Afrikaners or Dutch-speaking farmers (the short-hand used in this text to refer to the Dutch/ early Afrikaans-speaking farming community) did cause them to attempt to use the Afrikaner Bond in their struggle but their opposition to anti-scab legislation transcended Bond politics.

I use the term "progressives" rather loosely in this dissertation. The progressives were a parliamentary lobby consisting mainly of Eastern Province English-speakers who campaigned for a range of government interventions in the colonial economy. They later formed the Progressive Party and ruled the Cape from 1904 to 1908. But the progressive cause exceeded the agenda of

this party. The ideology of progress was widespread across the English-speaking world and progressives were normally self-appointed advocates of modernity.

The term "*acari*" is used in the text to refer to the scab mite, *Psoroptes ovis*. *P. ovis* is one of a multitude of *acari* sub-species; the genus *acari* include other species of lice and ticks. The term "*acari*" and its singular "*acarus*" together with "scab insect" were widely and indiscriminately used to refer to *P. ovis* in the primary literature. There are, however, three different scab mite species, each with sub-species, which cause different types of scab in different hosts. The proper name for scab in sheep is psoroptic mange. This should not be confused with scab in goats (or sarcoptic mange) which is caused by *Sarcoptes caprae*. Since goats were subsumed in the Scab Act of 1894's definition of "sheep", this distinction was not always made in the primary literature on scab and it is also seldom made in the text below. Since *acari* are arachnids and not insects, I used "scab insect" only when directly quoting from primary sources.

The North West does not have clear boundaries. While the Orange River bounds the region to the north, it's southern and western boundaries are less clearly defined. The region is characterised by aridity, sparse vegetation and extreme temperatures. It included the districts of Calvinia, Carnarvon, Ceres, Clanwilliam, Fraserburg, Kenhardt, Namaqualand, Sutherland and Van Rhynsdorp. The Scab Act could be suspended in these districts due to drought. For the purpose of this dissertation, the term "North West" refers mainly to these district and adjoining areas that hosted trek farmers.

Except if stated otherwise the terms "Cape" and "Cape Colony" refer to the Cape Colony Proper, i.e. the historic Cape Colony minus the Transkeian Territories and Bechuanaland. Bechuanaland was only annexed to the colony in 1895 and was only placed under the Scab Act after the South

African War. Few inspectors were appointed and the data they gathered were incomplete. Reasons for excluding the Transkei are mentioned below.

I use the term "class" rather casually in the thesis as a short-hand for people who share the same economic conditions. It is not my intention to discuss to which extent people identified subjectively with their class position. People have various social and political commitments that compete with their awareness of their economic position to shape their identity. It would take a substantial digression away from the main themes of my thesis to untangle the interrelationships of these factors for Cape farmers.

I have followed a similar deflationary approach to the concepts "true" and "belief". "Truth", "true" and their permutations are used in conformity to their everyday spoken usage. Truth is therefore not a transcendent value but a contingent quality of statements of fact. "Belief" does not refer to a hypothetical subjective state but is a short hand for empirical statements or statements of fact. The sentence "It is raining" is analogous to "I believe it is raining."

LIST OF MAPS, ILLUSTRATIONS AND FIGURES

LIST OF ABBREVIATIONS

A – Appendixes to the Cape Parliamentary Papers

AJCCGH – Agricultural Journal of the Colony of the Cape of Good Hope

ARG – Department of Agriculture

C – Council of Policy

CA – Cape Archives

CIS – Chief Inspector of Sheep

CO – Colonial Office

CPP – Cape Parliamentary Papers

CVS – Chief Veterinary Surgeon

DRC – Dutch Reformed Church

G – Cape Government

SAR – South African Reports

UG – Union Government

INTRODUCTION

The implementation of anti-scab measures by the government of the Cape Colony was beset by controversy. Scab, an apparently simple parasitical skin disease, came to demand a great deal of attention. Measures against scab were investigated by parliamentary committees and commissions in 1874, 1884, 1888, 1892-1894, 1898, 1905 and 1909. The first anti-scab legislation was the Scab Act of 1874. This was followed by the Scab Act of 1886 (amended in 1887 and 1888) and the Scab Act of 1894 (amended in 1899). The first scab acts were only applied in selected districts at sheep farmers' request but the 1894 legislation was a colony-wide, compulsory act.

Sheep farmers who protested against the Scab Act of 1894 presented their opinions of the disease in a slew of letters to the press and in testimonies before various scab commissions. Although the farmers' beliefs about scab were heterogeneous, they contained elements of an environmental theory of disease. Progressives ridiculed these ideas: they constructed the struggle surrounding the Act as the struggle between progress and ignorance. While progress was seen as self-explanatory, ignorance was elaborated and the motives of the ignorant 'explained' – negligent farming practices inspired by laziness and a lack of a sense of duty to their neighbours and fellow countrymen; fatalism; geographical isolation and a resultant ignorance and slow adoption of progressive practices. The debate therefore had a clear moral tone – progress was presented as uncomplicatedly good while ignorance was a moral flaw that was excusable to a degree depending on the prejudice of the observer.

It is argued in this thesis that the progressive explanation of the anti-Scab Act movement is not sufficient. The opponents of the Act, if their many letters to the press can be taken as an accurate expression of their position, were sceptical of the scientific explanation offered for scab and completely disbelieved that eradicating scab was in their economic interests. By the time that the

Scab Act of 1894 was promulgated, progressive wool farmers have been trying to implement a general scab act for several decades, as shown by the existence of the Act's many predecessors. The scientific account of scab and the means of curing the disease were published in the press and the *Agricultural Journal*. The Chief Veterinary Surgeon (CVS), Duncan Hutcheon, also traveled the colony with a microscope in 1884 and 1885 to educate the public about scab. Why then were the benefits of the Scab Act not apparent to farmers and why did they remain sceptical of the scientific explanation of the disease? To answer (like late nineteenth and early twentieth century Cape progressives did) by saying that the farmers were ignorant is to engage in a circular argument: farmers' ignorance is proved by their scepticism and resistance to the Scab Act and their supposed ignorance also serves as explanation for their scepticism and resistance.

In order to evaluate the farmers' resistance and scepticism adequately, the progressives' side of the debate has to be examined. Firstly, was the cure for the disease as simple and accessible as claimed by progressives? Secondly, how persuasive and logically coherent was the scientific account of scab? And thirdly, was the Scab Act really economically beneficial in the straightforward manner it was presented to be? These are the questions any account of the Scab Act must ask and try to answer. However, recent secondary sources dealing with settler farmers' resistance against the Scab Act accept the progressive's arguments as correct and try to 'excuse' the farmers' 'backwardness' with varying degrees of sympathy. These excuses boil down to the self-evident fact that trek farmers were not 'scientific'. Neither the scientific explanation for scab nor the trek farmers' own explanation for the disease is thoroughly interrogated. At most, aspects of the farmers' explanation for scab are enumerated and used to motivate ascribing alternate epistemological states to trek farmers. These excuses for trek farmer 'ignorance' inevitably create the impression that trek farmers, despite their self-description as 'practical farmers', were perversely blind to the economic benefits of scab eradication. As a consequence, the progressives' assertions that eradicating scab would benefit the pastoral sector of the Cape

Colony has never been subject to thorough investigation Although various euphemisms are used as disguise, trek farmers are depicted as irrational, essentially echoing the views of nineteenth and early twentieth century progressives.

This dissertation is an attempt to recover the trek farmers' rationality, a project that empathically disowns the progressive discourse that construed trek farmers as traditionalists unfit for modern life. It is maintained that contemporary authors have neglected the Scab Act or approached it in an overly simplistic manner because they are locked into this same dichotomy that positions progress, science and modernism on one side of a divide with conservatism, indigenous knowledge and tradition on the other.

It should be considered that trek farmers' refusal to accept the scientific view as valid was a strategic choice. Disputing that scab was infectious allowed them to deny that they had a civic responsibility to clean their sheep and supported their argument that the Act was an imposition by English progressives. Lance van Sittert (2003) highlights the hypocrisy underlying many of the Cape government agricultural interventions. Since progressives were not negatively impacted by these interventions, they refused to see their victims' economic concerns as valid. When progressives *were* affected by such interventions, namely government efforts to stamp out rabies through the extermination of pedigree dogs, they too vocally protested. Middle class Port Elizabethans even disputed the competency of the local district veterinary surgeon to diagnose rabies. Disputing the validity of science was therefore not only a strategy followed by ignorant trek farmers.[1]

[1] L. van Sittert, 'Class and Canicide in Little Bess: The 1893 Port Elizabeth Rabies Epidemic'(2003), pp. 207-208, 233.

Research in America and Europe suggests that farmers were in general slow to accept veterinary medicine due to economic concerns. Despite the sentimental regard farmers might have for their livestock, saving an individual animal was not always seen as cost effective. Farmers therefore did not always see the benefit of employing a veterinarian.[2] Professional veterinarians' advice often incorporated popular remedies. They therefore struggled initially to differentiate themselves from "…unqualified animal doctors, the 'question-and- answer' pages of agricultural magazines, chemists, patent-medicine vendors, lay 'castrators' and state-funded agricultural and veterinary advisors."[3]

The North West farmers' economic protest against veterinary interventions is also not isolated case. Catherine Strom (2009) has discussed the economic grievances of Southern yeomen farmers against federal tick eradication programs in similar terms. These small holders' cattle were mostly grazing free range on waste municipal land, a strategy that afforded them the opportunity to own more livestock than their own property would sustain. Regulations that required livestock to be fenced and all cattle to be dipped every two weeks during the summer months was a severe economic burden on them and they therefore violently resisted the tick eradication program.[4] Early twentieth century American government prescriptions for dairy hygiene also disadvantaged the farmers with small dairy and urban poor who supplemented their diets by keeping dairy cows and other livestock in garden sheds. New regulations for housing dairy cows and dairy production were prohibitively expensive to apply on such a small scale. These people were therefore forced to rid themselves of their dairy animals.[5] In both cases mentioned above, the interests of large scale agricultural entrepreneurs trumped that of small scale producers. The unwillingness of the

[2] A. Greene, 'The Now-Opprobrious Title of "Horse Doctor": Veterinarians and Professional Identity in Late Nineteenth-Century America' (2010), p. 53.
[3] A. Woods, A. 'Breeding Cows, Maximizing Milk: British Veterinarians and the Livestock Economy, 1930-50' (2010), p. 61.
[4] C. Strom, *"Making Catfish Bait out of Government Boys": The Fight against Cattle Ticks and the Transformation of the Yeoman South* (2009), pp. 3-4.
[5] Ibid, 119-120.

progressives at the Cape to accommodate the trek farmers' economic objections against the Act is a case in point.

The Dutch farmers' position was not one that could be sustained. Saul Dubow (2006) argued that progressive discourse shifted after the South African War from its previous focus on the civilising mission and the patronising depiction of Dutch-speakers as needing to be civilized by their English-speaking country-men, to espouse economic development as the chief public good. A shift also occurred in how technological progress was presented in public discourse. By stripping technological interventions of the ideological baggage of the civilising mission, they could be presented as politically neutral. The representation of technology as politically neutral denied the validity of ethnic-based arguments against the Scab Act, while the political mood surrounding Union gave little space for anti-English sentiments to be expressed or used for political ends.[6]

After Union, opponents of anti-scab legislation based their protests solely on the economic need of trek farmers.[7] This position was equally untenable. There was widespread concern from church groups and welfare organizations about rural poverty and urbanization. But during the sittings of the 1905 select committee on the poor white question these groups and government role players displayed consensus that the rural poor should not be assisted to remain independent producers but rather be accommodated through various work creation schemes. The logic behind this was to concentrate poor families so that their children could be educated.[8] This view was echoed in the Union Parliament were trek farmer advocates could not raise much sympathy for their position.[9]

[6] S. Dubow, *A Commonwealth of Knowledge* (2006), p. 178.
[7] *Debates of the House of Assembly* (3-6 February 1911), pp. 993-994, 1003-1004.
[8] CPP [A. 10 – 1906] *Report of the Select Committee on the Poor White Question*, evidence of F.S. Malan, pp. 100-102.
[9] *Debates of the House of Assembly* (6-7 February 1911), pp. 1005-1006, 1013-1016.

HISTORIOGRAPHY

Since I comment extensively on recent historical literature, a brief overview of the historiography of sheep farming is necessary to contextualize these works. The persistence of scab in Cape flocks exited a great deal of negative commentary in a number of late nineteenth and early twentieth century sources providing historical background on sheep farming practices in the Cape Colony. Tracts like Robert Wallace's 1896 *Farming Industries of Cape Colony*, the veterinary surgeon William Cooper's *The World's Sheep Farming for Fifty Years, 1843-1893* (published to commemorate the fiftieth anniversary of the Cooper's Sheep Dip) and a 1913 sheep farming textbook by William McKee, government wool expert and shearing shed designer, entitled *South African Sheep and Wool*, contained equal parts description and prescription. All of these sources imbued their accounts with the progressive ideology, common at the time, which construed material progress as a moral duty.

In this literature scab was presented as one of a range of stigmas, albeit perhaps the most visible, that afflicted the Cape sheep farming sector. Subsequent historians, however, have largely ignored this contemporary concern with the economic development of sheep farming. Early South African pastoral history was written within the so-called 'frontier tradition'. Martin Legassick's 1980 essay, 'The Frontier Tradition in South African Historiography' provides an excellent critique of this pastoral history. Nigel Penn also discussed it in some detail in *The Forgotten Frontier* (2005).[10] I will therefore merely outline it here. The South African frontier tradition builds on the work of the American historian Frederick Jackson Turner. He argued that key traits of the American national character (democracy, self-reliance, individualism and nationalism) developed during the settlement of the American frontier. Mid-twentieth century liberal historians in South Africa, eager to explain the rise of apartheid and the racism endemic to

[10] M. Legassick, 'The Frontier Tradition in South African Historiography', in S. Marks and A. Atmore (eds.) *Economy and society in pre-industrial South Africa* (London: Longman, 1980), pp. 44-79; N.G. Penn, *The Forgotten Frontier* (Cape Town: Double Story, 2005).

South African society, inverted this frontier theory. Instead of trek farmers civilising the frontier, the frontier brutalised trek farmers. Racism was therefore seen as a product of economic marginality that would disappear gradually as the economy developed, conveniently invalidating serious investigation into the complicity of mining capital with segregation and apartheid. Afrikaner nationalist asserted the organic reality of the Afrikaner volk and needed historians to create historical origins for what was at that stage still a fairly recent ideological construct. Afrikaner nationalists therefore used the frontier theory in a more conventional manner to mythologize frontier pioneers and the Great Trek as exemplifying the Afrikaner nation. Traits they fondly ascribed to themselves, namely physical courage, self-sufficiency and individualism, were celebrated as the trekkers' legacy.[11]

Both the liberal and Afrikaner nationalist variants of the frontier tradition were strongly influenced by environmental determinism. However, the environment was not solely perceived as an economic constraint but as the main factor forging the pioneers' ethnic character. For both camps, the pioneers' main purpose was to open up the interior to civilisation. According to liberal historians, the pioneers conclusively failed in this goal and reverted to barbarism: they are described as adapting to the environment rather than adapting it to their needs.

This early assessment of the agricultural sector of South Africa as underdeveloped was based on an unfairly negative comparison between South Africa and other colonies, especially Australia.[12] Australia, although a younger colony, out-competed the Cape economically. The basis for this

[11] N. G. Penn, *The Forgotten Frontier* (2005), pp. 9-11.
[12] See C. W. de Kiewiet, *A History of South Africa: Social and Economical* (1941), pp. 44-45. "The Australian sheep-farmers came from the England of the Industrial Revolution; their attention and that of their sons remained focused on England. In their new land they strove to relate their activities to the great industrial and commercial metropolis to which their essential loyalty never wavered. The roar of the shuttling looms was never out of their ears, nor were the needs of great industrial towns for food and raw materials out of their minds." In contrast the Dutch settlers South Africa of were lacking: "Against the diseases that ravaged their flocks and the drought that withered their crops, they opposed the habits and outlook of an earlier and more ignorant generation."

economic growth was the large expanse of arable land in Australia, twice the surface area of South Africa. Since land was initially cheap in Australia while the cost of dispossessing the Aboriginal Australians was slight in comparison with the cost of the Cape frontier wars, it was possible for sheep ranchers (or squatters) to carve out vast land holdings in Victoria and New South Wales. [13] These farms could support tens of thousands of sheep and squatters therefore enjoyed the economies of scale in their farming operations.[14] The Cape could not hope to realistically compete with this Australian wool industry, but because of Australian dominance in the international wool market, its wool production practices and technology set the benchmark. Australia, specifically the large wool farms of New South Wales, was idealized in the Cape's agricultural press. Very little real economic information regarding the problems experienced by small scale farmers or wool producers in more arid regions of the continent reached the Cape. This thesis does not aim to give an overview of the wool industry in Australia that details the different economic outcomes experienced by farmers respective to climate or size of their holdings. Australia therefore largely features here as its idealisation by Cape progressives.

As shown in Chapter 4, advocates of anti-scab legislation foreshadowed this frontier tradition. It was commonplace for progressives to blame the persistence of scab in Cape flocks on trek farmer negligence. For progressives, transhumance was not an economic strategy but a habit motivated by laziness that was destined to be cast off as progress gained ground. Such observers conveniently forgot to factor in the adverse impact of reduced wool and mutton prices during the Long Depression of the late nineteenth century; the great capital cost of fencing farms and drilling boreholes for water; the devastating effects of the South African War; the recurrent droughts suffered by the Cape Colony; the adverse effects of land speculation; increased interests rates; and the lack of transportation infrastructure that hampered North West farmers' market

[13] W. Beinart, 'Sheep, Pastures and Demography in Australia' (2007), pp. 99-101.
[14] J. Molony, *The Penguin Bicentennial History of Australia: The Story of 200 Years* (1987), pp. 127-129.

access. Rather, poor farmers were perceived as having failed to meet the challenges of 'modernity'.

In this climate, frontier economic underdevelopment was a well established fact that needed no explication. There was therefore no space in early South African history for detailed analysis of the economic impact of scab and the motivations of the trek farmers who opposed the Scab Act. It is therefore unremarkable that scab does not feature in the early English-language South African historiography. The disease, however, is equally absent from Afrikaans historiography.

H.B. Thom's 1936 *Die Geskiedenis van die Skaapboerdery in Suid-Afrika* is the earliest Afrikaans text on the history of sheep farming and as no historian has since revised his account, it remains the only comprehensive history on the subject in any language. However, Thom ignored scab entirely. The years since Union had witnessed increased government intervention in sheep farming with the introduction of improved sheep breeds and farming methods. The problems complained of by progressive commentators were mostly being resolved. It was therefore possible for Thom to view the high production levels and improved technology employed by the post-First World War sheep farming sector as the result of centuries of progress. As a nationalist, Thom wanted to include 'Afrikaner' sheep farming in this narrative of progress. The refusal of the Dutch-speaking farmers in the Cape Colony to implement anti-scab measures and other symptoms of their supposed resistance to progress could not be incorporated into this narrative and were ignored by Thom.

The other major Afrikaner nationalist historian of the pastoral economy, P.J. van der Merwe, has little in common with Thom as he did not deny trek farmers' lack of economic progress. He sought the roots of poor whiteism in trek farming but his approach differed significantly from that of liberal historians who ascribed the phenomenon to trek farmer's supposed character

deficiencies. In his trilogy on trek farming Van der Merwe elaborated the implicit environmental determinism of the frontier tradition into a detailed discussion of the environmental challenges that faced trek farmers and dictated their patterns of transhumance. In his work, the environment features as a real economic constraint determining the returns on farmers' labour and capital investments. This depiction challenged the common liberal interpretation of trek farmers as nomadic subsistence farmers isolated from the market economy and degenerating into savagery on the backveld without idealising trek farmers like other Afrikaner nationalists.

Van der Merwe's theory of frontier expansion is the default explanation for the phenomenon and its central aspects will be discussed below and in Chapter 4. Van der Merwe's explanation is greatly indebted to the report of the Carnegie Commission on poor whiteism. This report highlighted the impact of new agriculture technologies such as jackal-proof fencing and wind mill water pumps on the rural economy but ultimately concluded that white poverty was caused by certain character deficiencies in the poor.[15] In contrast, Van der Merwe stresses frontier farmers' inability to obtain capital to purchase and improve land. His work provides a theoretical framework for trek farmers' resistance against new agricultural technologies (like anti-scab measures), but he does not discuss farming technologies in any detail and does not mention scab at all.

There are few secondary sources that discus sheep farming at the Cape in any detail. William Beinart explains this historiographical lacuna as being due to historians' efforts to contextualize the history of South Africa by using the historiographies of the transition from feudalism to capitalism in Europe and of slavery as comparative models. These agrarian histories were produced as part of the 1970s and 80s Marxist revision of South Africa's history that sought to

[15] 'Gesamentlike Bevindinge en Aanbevelinge van die Kommissie', *Die Armblanke-vraagstuk in Suid-Afrika: Verslag van die Carnegie-kommissie* (1932), pp. xxx-xxxi.

develop a rigorous analysis of the apartheid era labour market. This led to a focus on the history of maize production on the Highveld and on grain and wine farming in the Western Cape respectively. Pastoralism was only discussed in the context of trek farmer expansion on the eighteenth century frontier, ignoring the economic importance of Cape Colony pastoral exports.[16]

There are only a handful of recent historical sources that mention scab. They can be divided into two groups. Firstly, a number of authors (namely William Beinart, Daniel Gilfoyle and Karen Brown) have touched on scab in works that focus on nineteenth century South African intellectual history, specifically the history of science. The demise of the apartheid state in the early 1990s opened the way for a renewed interest in late nineteenth century and early twentieth century agrarian history that was neglected during the Marxist revision. This body of literature take up concerns raised in the history of science and medicine in the 1970s and 80s and apply it to South African examples. Since South Africa's scientific establishment was largely dependent on the state during this period, authors mainly focus on government interventions. As many of the agricultural policies pursued by the Union Government after 1910 were pioneered in the nineteenth century Cape Colony, these historians take the Cape Colony as their starting point.

Secondly, a number of authors concerned with the development of Afrikaner ethnicity dealt with the Scab Act of 1894 since it precipitated a crisis within the Afrikaner Bond. T. R. H. Davenport discussed the Act in his 1960 doctoral dissertation on the Afrikaner Bond (published in 1966 as *The Afrikaner Bond: the History of a South African Political Party, 1980-1911* with the section on the Scab Act considerably reduced). Herman Gilliomee mentions the anti-Scab Act movement briefly in *The Afrikaners* (2003). The two authors mentioned above are interested in the Afrikaner

[16] W. Beinart, *The Rise of Conservation in South Africa* (2003), pp. 4-5. Works on the eighteenth century frontier economy include: S. D. Newmark, *Economic Influences on the South African Frontier, 1652-1836* (Stanford: Stanford University Press, 1957); L. Guelke, 'Frontier Settlement in Early Dutch South Africa', *Annals of the Association f American Geographers*, 66, 2 (1976), pp. 25-37. This literature is dominated by debates surrounding trek farmers' degree of market contact and responsiveness to economic stimuli.

Bond and the Afrikaners' progress to nationhood respectively and so do not devote much space to discussing the particulars of the Scab Act. Mordechai Tamarkin, however, has recently (2009) published a book on the anti-Scab Act movement called *Volk and Flock*. In it he explicitly denies that class were a motivating factor for opposing the Scab Act. Instead he argues that the opponents of the Act were motivated by their degree of allegiance to a trek farmer ethnic identity.[17] This text will be extensively discussed in the dissertation and has been reviewed elsewhere.[18]

HISTORICAL OVERVIEW OF THE SCAB ACTS OF THE CAPE COLONY

Sheep scab (or psoroptic mange) is probably the oldest known livestock disease. References to it occur in the Bible and in classical sources.[19] In 1894 progressive parliamentarians traced the history of the disease in the Cape back to 1693.[20] The Council of Policy was concerned about the high mortality caused by a disease called *schurvt* amongst Company sheep and ordered that all infected sheep should be slaughtered to prevent the spread of the disease.[21] It is not clear, however, if this disease was psoroptic or sarcoptic mange. In late nineteenth century Cape Dutch, scab was called *brandziekte* while goat scab was called *scurf*.[22] Sarcoptic mange (or goat scab) outbreaks occurred periodically, if rarely, in colonial sheep flocks[23] and it is endemic in the Iberian Peninsula, a region with a climate similar to that of the Cape.[24] Sarcoptic mange is a more serious disease, possibly explaining the Council of Policy's extermination order for sheep infected with *schurvt*. But nineteenth century progressives did not query the identification of

[17] M. Tamarkin, *Volk and Flock* (2009), pp. 54-55.
[18] N. Visser, ' "Ontological Gap" or Political Calculation? A Critique of the Tradition-Modernity Dichotomy in Mordechai Tamarkin's *Volk and Flock*', *Kronos*, 36 (November 2010) pp. 289-298.
[19] A.C. Kirkwood, 'History, Biology and Control of Sheep Scab' (1986), p. 302.
[20] *Debates in the House of Assembly* (22 June 1894), p. 154.
[21] CA C. 22, Resolutions of the Council of Policy, 8 July 1791, pp. 10-13.
[22] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of Henry Hamilton van Breda, p. 674.
[23] See chapter 2.
[24] F. Rodrigues-Cadenas et al., ' Development and Evaluation of an Antibody ELISA for Sarcoptic Mange in Sheep and a Comparison with the Skin-scraping Method' (2010), p. 83.

schurvt as sheep scab. They attempted to contrast their proposed anti-scab legislation favourably with this early legislation and the severe penalties it imposed, arguing that the Scab Act had historical continuity with the earlier Dutch administration and that it was not a harmful English imposition.[25] There is, however, no evidence that the VOC implemented its extermination order.

The prevalence of scab in the eighteenth and early nineteenth century Cape Colony is unknown. When public concern about the disease first arose in the 1870s, the disease was widespread. Witnesses before the 1874 Scab Commission reported that scab had worsened in recent decades. F. L. Liesching, sheep farmer and MP for Uitenhage, speculated that the disease had become more prevalent as farmers invested more in thoroughbred livestock.[26] Another sheep farming MP, William Hockley, also testified that thoroughbred sheep were more vulnerable but he argued that the disease had spread from the Karoo into the grasslands of the Eastern Cape and Midlands.[27]

As discussed in Chapter 2, the Cape fat-tailed sheep was highly resistant to scab. Eastern Cape fat-tailed sheep would have been as scab infected as Karoo sheep but the better grazing in the region would have kept the disease in remission. Such sheep acted as an infection reservoir for the more vulnerable wool sheep. It is therefore not necessary for the disease to have spread from the North West to the Eastern Cape as wool sheep could contract scab from their Cape sheep flock mates. As more farmers turned towards wool production, the prevalence and severity of scab increased.

This increase in scab was simultaneous with increasing competition amongst wool producers in the international wool market. Overproduction caused wool prices to fall and motivated wool

[25] *Debates in the House of Assembly* (22 June 1894), p. 154.
[26] CPP [A. 3 – 1874] *Report of the Select Committee on the Proposed Scab Bill*, evidence of F.L. Liesching, p. 6.
[27] Ibid, evidence of W. Hockley, p. 17.

farmers to increase the yield and quality of their product. The eradication of scab was central to both these aims.

It should be noted that anti-scab legislation was a dubious proposition from the outset. The government could not afford to hire sufficient sheep inspectors to inspect all the whole colonial flock at short intervals. Anti-scab legislation therefore required farmers to police themselves by voluntarily reporting scab outbreaks amongst their flocks, allowing them considerable leeway for passive resistance. The scab acts of the Cape Colony therefore suffered from an inherent flaw: legislation was necessary because some farmers did not clean their sheep but, as long as they did not clean their sheep, the legislation was destined to fail.[28]

In addition, a scab act could not prohibit the removal of sheep. Even progressive farmers had to trek with their sheep to and from stock fairs. A network of outspans were maintained for trekking purposes on crown and private land. Sir John Frost, a progressive Eastern Province MP, had an outspan servitude on his property. Although his farm was fenced he could not legally prohibit trekkers from crossing his property and as consequence his sheep was constantly re-infected. Needless to say, he passionately supported anti-scab legislation since it would give him the ability to save guard his flock.[29] The government could not employ enough inspectors to examine each flock before removal. It was therefore tacitly assumed that farmers were competent to recognise scab and would meet their civic duty by refraining from removing their sheep if these were scabby. Again, the success of anti-scab legislation rested on the goodwill of its opponents.[30]

[28] *Debates in the House of Assembly* (3 May 1886), p. 126.
[29] CPP [A. 5 – 1884] *Report of the Select Committee on the Scab Bill*, evidence of Sir John Frost, p. 5.
[30] *Debates in the House of Assembly* (20 July 1894), p. 323.

The Scab Act of 1874 was a dead letter. Permissive, vaguely worded and imposing an overly long quarantine period of three to six months, even progressives found it unattractive.[31] The latter knew that a new, compulsory, colony-wide scab act was needed but the struggle to obtain it was a drawn-out affair.

Progressive arguments that anti-scab legislation would benefit the Colony as a whole rang hollow. They knew that anti-scab legislation would be very unpopular with a great number of farmers who saw it as an economic burden. Opponents of anti-scab legislation bluntly called it "a class measure."[32] As detailed in Chapter 4, anti-scab legislation essentially required mutton farmers (who were often poor) and wool farmers in arid regions to accept legal and financial sanctions for the benefit of wealthier wool farmers concerned with improving their product. This was acknowledged by progressives but did not sway them. E. Y. Brabant, MP of East London, opinioned the following in 1885:

> Of course in passing an Act of this kind it was impossible to meet every possible case of hardship; it must be expected that certain individuals would suffer some hardship for the general good. But if the Bill were passed very soon all cause of hardship will be removed, for the disease would be stamped out.[33]

Brabant and other progressives wanted a strict act that would eradicate the disease quickly, limit government expenditure on anti-scab regulations and limit the amount of time unwilling farmers would be forced to 'suffer'. In contrast, the opponents of anti-scab legislation wanted to reduce the economic burden that a scab act would place on their constituents so they sought to weaken the proposed Scab Bill.

The permissive Scab Act of 1886 was a compromise aimed at resolving these contradictions. A compulsory, colony-wide scab act was proposed in parliament in 1884 but it was withdrawn due

[31] Ibid. (24 June 1885), p. 248.
[32] Debates in the House of Assembly (22 July 1874), in *Cape Argus*, 25 July 1874.
[33] Ibid. (24 June 1885), p. 245.

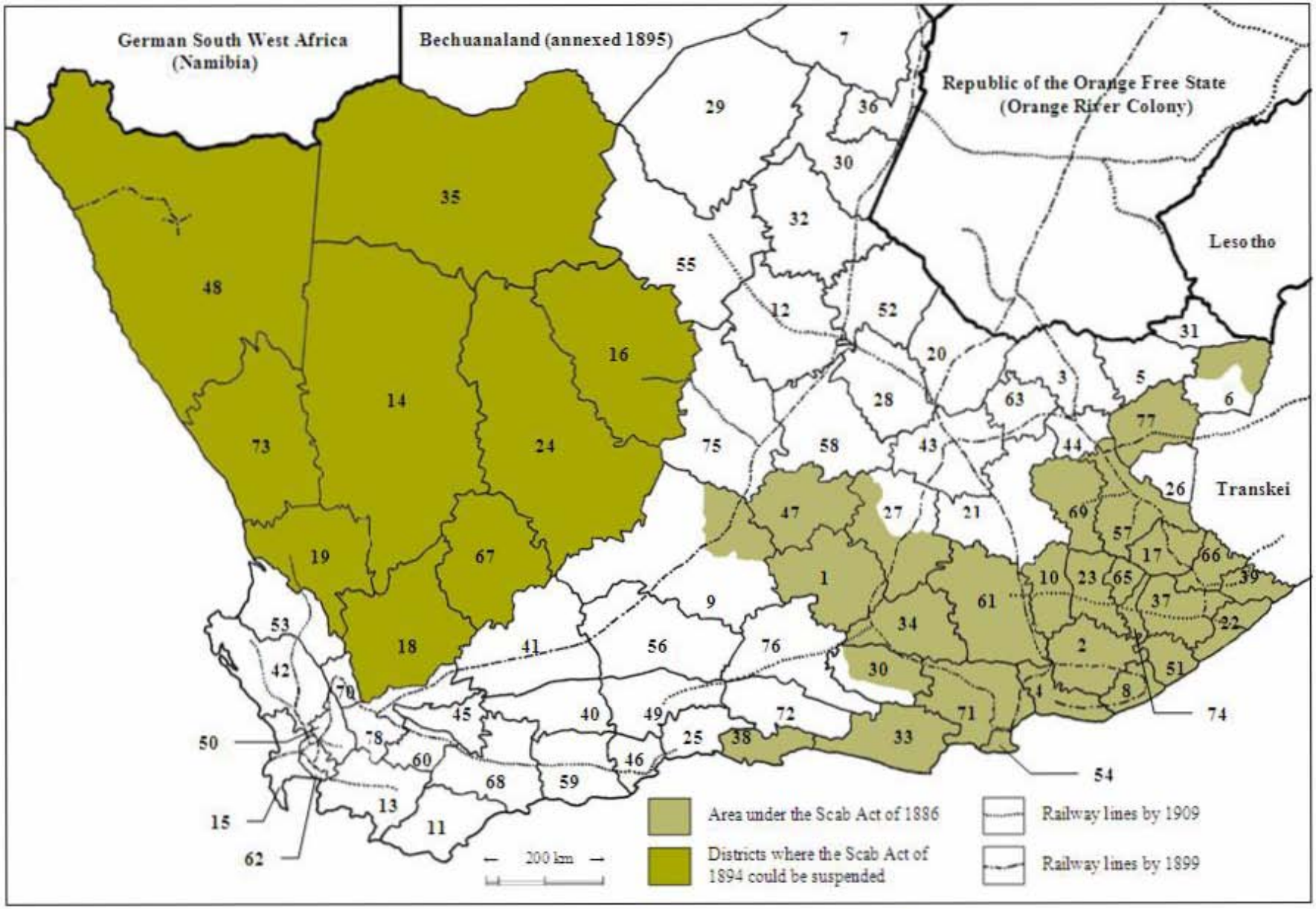
to insufficient support[34] while a revised scab bill was defeated in 1885.[35] A new scab bill was introduced during the 1886 parliamentary sitting, resulting in a reprisal of the debates of the previous two years. Eventually progressives were forced to accept an amendment that made the proposed legislation permissive.[36]

A number of districts had adopted the 1886 Scab Act by 1893 (see Map 1). Limiting it to these areas, however, was not practical. Districts did not have natural boundaries that could inhibit the movement of sheep and the government did not have the funding to fence and patrol districts that have adopted anti-scab legislation. 'Clean' areas were therefore constantly re-infected by the introduction of scabby sheep from elsewhere in the colony.

It was proposed to make the districts containing the trans-Karoo railway line the boundary of a future scab act with no sheep from north and west of the line permitted to cross into the proclaimed area, but such a long boundary was impossible to police effectively. It would also have excluded farmers beyond the boundary from markets.[37] One recalcitrant Fraserburg farmer, Johannes Bernardus Nigrini, actually saw this as a better option than being incorporated under a general scab act, implying that inhabitants of these districts would still have market access for their mutton (presumably through smuggling although he was not willing to elaborate).[38] Other farmers were less sanguine and this option was rejected in Parliament as impractical. Thereafter a colony-wide scab act was seen as the only viable option by progressives.[39]

[34] Ibid. (18 July 1884), p. 373.
[35] Ibid. (15 July 1885), p. 413.
[36] Ibid. (3 May 1886), pp. 126-127.
[37] CPP [A. 5 – 1884] *Report of the Select Committee on the Scab Bill*, evidence of Sir John Frost Frost, pp. 3-5.
[38] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of J.B. Nigrini, p. 584.
[39] *Debates in the House of Assembly* (22 June 1894), p. 154; Ibid (25 June 1894), p. 169.

Map 1: The Cape Colony Proper, showing district boundaries and railway lines



Map prepared by author. Sources: CPP [G. – 1894] *Report of the Scab Commission*, Appendix H; A.M. Talbot and W.J. Talbot, *Atlas of the Union of South Africa* (1960), p. 157.

Districts (in alphabetical order)

1. Aberdeen
2. Albany
3. Albert
4. Alexandria
5. Aliwal North
6. Barkley East
7. Barkley West
8. Bathurst
9. Beaufort West
10. Bedford
11. Bredasdorp
12. Britstown
13. Caledon
14. Calvinia
15. Cape
16. Carnarvon
17. Cathcart
18. Ceres
19. Clanwilliam
20. Colesberg
21. Cradock
22. East London
23. Fort Beaufort
24. Fraserburg
25. George
26. Glen Grey
27. Graaff Reinet
28. Hanover
29. Hay
30. Herbert
31. Herschel
32. Hopetown
33. Humansdorp
34. Jansenville
35. Kenhardt
36. Kimberley
37. King Williamstown
38. Knysna
39. Komgha
40. Ladismith
41. Laingsburg (1907 →)
42. Malmesbury
43. Middelburg
44. Molteno (1903 →)
45. Montagu (1909 →)
46. Mossel Bay
47. Murraysburg
48. Namaqualand
49. Oudtshoorn
50. Paarl
51. Peddie
52. Philipstown
53. Piquetberg
54. Port Elizabeth
55. Prieska
56. Prince Albert
57. Queenstown
58. Richmond
59. Riversdale
60. Robertson
61. Somerset East
62. Stellenbosch
63. Steynsburg
64. Steytlerville (1908 →)
65. Stockenstrom
66. Stutterheim
67. Sutherland
68. Swellendam
69. Tarka
70. Tulbagh
71. Uitenhage
72. Uniondale
73. Van Rhynsdorp
74. Victoria East
75. Victoria West
76. Willowmore
77. Wodehouse
78. Worcester

In the early 1890s the fight to institute such an act broke out anew. In the intervening years the wool price continued to decrease. The colony experienced a severe drought in these years and the resultant influx of trekkers into the Midlands spread scab and intensified progressive's concern with the disease. Progressives finally got colony-wide anti-scab legislation in 1894 but had to be

content with weak regulations providing several loopholes for the removal of scabby sheep. The Act could also be suspended in nine drought-prone North West districts (see Map 1).[40]

The Scab Bill stipulated that all sheep farmers must maintain a dipping tank of specified volume and that sheep inspectors would be authorized to destroy kraals that were considered infected.[41] These measures were tailored to the scientific view of scab: Quarantined sheep should not be removed to a neighbouring property to be dipped as this would spread infection; when sheep was under quarantine, centrums of infection like kraals and sleeping places should be cleansed or scab would return after dipping. Opponents of the Act protested against both these measures.

Opposition against the destruction of kraals was particularly fierce. Many Western Cape farmers practiced mixed farming and kraaled their sheep to obtain manure for fertilizer. A proper stone sheep kraal was an expensive investment and farmers protested their destruction.[42] Farmers were also concerned about giving inspectors the power to demolish kraals and other farm buildings, since this power could conceivable be abused.[43] Frost defended the destruction of kraals by arguing that it was not the intention to get rid of substantial enclosures which could be disinfected but to destroy "those wretched little bush kraals" that were built partly from manure and could not be disinfected.[44] The Act would therefore disproportionately affect poorer farmers who did not own land or who could not afford to construct stone kraals.

The measure that all sheep farmers must construct and maintained dipping tanks simply did not accord with the realities of trek farming. Farmers who survived by squatting on crown land or by

[40] Act 20 of 1894. See appendix C for a summary of the Scab Acts.
[41] Bill to Amend the Laws Relating to Scab in Sheep (Government Notice No. 530, 1894).
[42] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of Frederick Hurling Hopley, Swellendam, p. 657; *Debates in the House of Assembly* (13 July 1894), p. 286.
[43] *Ons Land*, 26 June 1894, correspondence from C.C. Scheepers, Jansenville.
[44] *Debates in the House of Assembly* (11 June 1894), p. 92.

moving between rented pasture had little incentive to make improvements to land that would eventually benefit others. The Bill proposed that farmers could deduct the money spent on constructing a dip tank from their rent[45] but a great deal of land that was rented out to trek farmers or that was used by squatters did not have perennial water. Sheep farmers were often dependent on a few pools of stagnant rainwater run-off to water their sheep and it is doubtful that farmers could afford to reserve some of this water for dipping.[46] If they dipped their sheep, they used a portable wood or metal bath tub. Constructing a permanent dipping tank in the veld would be impractical. Poorer farmers and farmers with small sheep flocks also complained that they simply could not afford to construct a permanent dipping tank.[47]

These measures were widely perceived to place an unfair burden on the poor and they were not included in the final Act. The Scab Act stipulated that farmers should have access to a dipping tank on a neighbouring property while sheep inspectors were not allowed to destroy kraals but only to disinfect kraals with the owner's permission.[48]

The appointment of inspectors was identified by the Scab Commission as a major sticking point as it was clear Dutch-speaking farmers, afraid that English monolingual outsiders would be appointed over them, wanted to elect inspectors locally.[49] Farmers were also concerned about undue expansion of government power in local affairs. Karen Brown (2002) argues that a political tradition of independence and self-sufficiency existed amongst Dutch-speakers, especially in the Western Cape. Farmers protested the interference of central government and rather preferred to resolve problems through local representatives. This can be seen historically in the Western Cape Dutch-speakers' campaigns for the establishment of municipalities,

[45] Bill to Amend the Laws Relating to Scab in Sheep (Government Notice No. 530, 1894).
[46] See Chapter 4 for a full discussion.
[47] *Ons Land*, 19 July 1894, report of a meeting about the Scab Act, Groenberg.
[48] Act 20 of 1894
[49] CPP [G.1 – 1894] *Report of the Scab Commission*, 17-18.

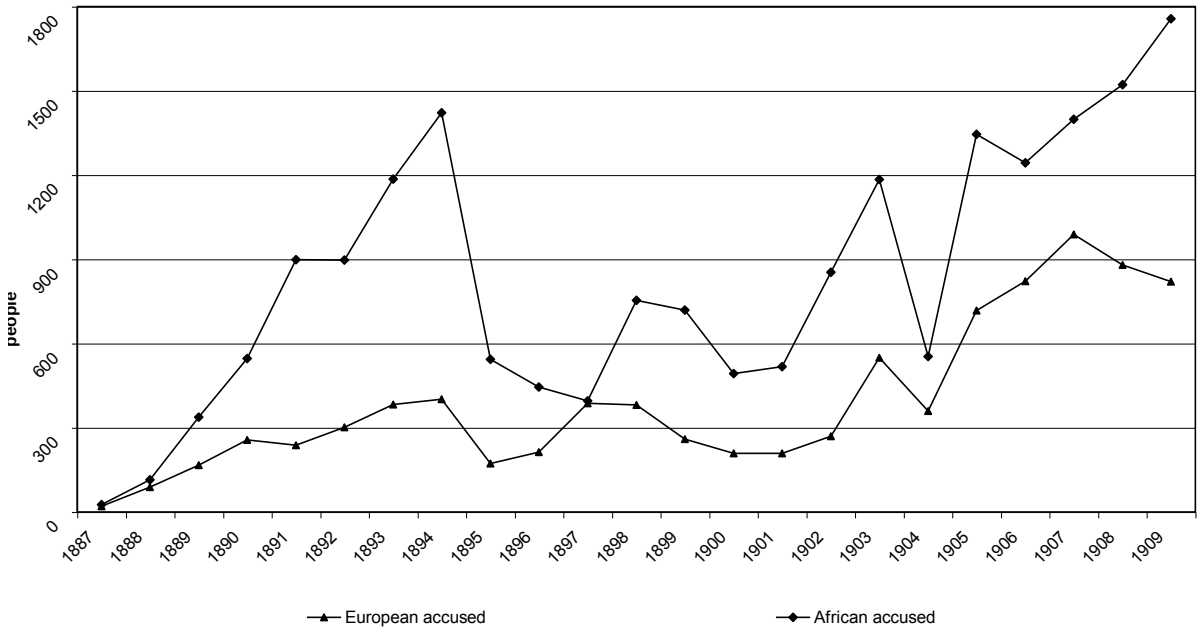
representative rule and responsible rule. According to Brown, these farmers were not anti-progressives as they were pioneers in establishing farming co-operatives.[50] Scab was controlled to a degree in some districts before the Scab Act was promulgated through the locally funded and administered pound system and some farmers believed this system was sufficient.[51]

Political tradition aside, administering legislation through local boards or municipalities was a well-known method of ameliorating the impact of detested central government directives. So, for instance, this strategy was used to weaken the English Public Health Act of 1875. MPs from country boroughs knew that their voters would not appreciate being descended upon by overly zealous Londoners blind to country practicalities and fought to have the proposed legislation administered through local bodies. They were also concerned about allowing a central government, which many believed to be corrupt, to take charge of locally raised funds. As result the legislation was only fully enacted in large cities.[52] The Cape Colony's public hygiene measures suffered a similar fate. The Colonial Office, which oversaw district surgeons and concerned itself with public hygiene, employed Dr. Alfred Gregory to oversee the gathering of the Colony's vital statistics. Gregory, known for his irritable abrasiveness, was precisely the type of central government employee despised in the countryside. He framed the Public Health Act of 1897 but parliamentary opposition caused it to be amended so that the Act gave central government no coercive powers. Public hygiene measures therefore floundered in the countryside as local public health boards were not willing to raise taxes to construct sewage works and storm water run-off systems.[53]

[50] K. Brown, 'Progressivism, Agriculture and Conservation in the Cape Colony, circa 1902-1908' (2002), pp. 74-75, 127.
[51] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of Johannes Bernardus Nigrini, Fraserburg, pp. 583-4; Ibid, evidence of Louis Knoblauch, Swellendam, p. 648; Ibid, evidence of Frederick Hurling Hopley, Swellendam, p. 657; Ibid, evidence of Jan Abraham Nel, Riversdale, p. 662.
[52] F. B. Smith,*The People's Health, 1830-1910* (1979), pp. 199-200.
[53] E. van Heyningen, '"Regularly Licenced and Properly educted Practitioners": Professionalisation 1860-1910', (2004), pp. 205-210.

The appointment of inspectors was also a major point of concern for the supporters of the Act. Experience under the Scab Act of 1886 showed that locally appointed inspectors were ineffective.[54] According to John X. Merriman, the Scab Act of 1886 was a farce. Inspectors were dependent on the divisional council for their position and so curried favour with divisional council members and voters by administering it leniently. To compensate, they prosecuted Africans who could not afford to pay the fines (see figure 1.1 – until 1895, more 'Africans' than 'Europeans' were accused of transgressing anti-scab regulations in the Colony Proper).[55]

Figure 1.1: Africans and Europeans accused of contravening anti-scab regulations in the Colony Proper and in the Transkeian Territories.



Note that figures for 1904 are for the half year. The figures include the small number of women who were also accused of contravening anti-scab legislation. Source: *Statistical Register of the Colony of the Cape of Good Hope*, 1887-1909.

[54] *Debates in the House of Assembly* (22 June 1894), 157.
[55] Ibid. (25 June 1894), 166.

Opponents, however, refused to accept government appointed inspectors and pushed through amendments that resulted in the appointment of locally elected sheep inspectors. In wards where the majority of farmers opposed the Act, inspectors who were opposed to the Act or known incompetents were elected. Allan Gardiner Davison, the Chief Inspector of Sheep (CIS), bitterly complained that some inspectors' knowledge of the Scab Act was limited to how to go about drawing their salaries.[56]

Constant problems were experienced with the caliber of locally elected sheep inspectors and progressives attempted to have the Scab Act amended in 1899. However, they were forced to once again accept a compromise: in return for more lenient provisions for the removal of scabby sheep, sheep inspectors would no longer be locally elected but appointed on the recommendation of locally elected scab boards. As scab boards were often comprised of opponents of the Act, they nominated unsuitable inspectors. In addition, since the new crop of inspectors were supposed to be more efficient, their numbers were reduced and they were required to oversee larger areas.[57]

After the South African War, Davison attempted to circumvent the scab boards. He did not form new scab boards when the incumbent board's term expired. This allowed him to appoint inspectors himself. In districts where the inhabitants constituted scab boards on own initiative, Davison simply ignored their recommendations. A number of North West MPs who opposed the Scab Act kept track of the appointment of sheep inspectors and queried Davison's summary rejection of scab board recommendations. This led to the appointment of a select committee, chaired by Dirk Jacobus Albertus van Zyl, MP of Clanwilliam and member of the Clanwilliam scab board, to investigate the administration of the Scab Act.[58]

[56] CPP [G. 20 – 1899] *Reports of the Chief Inspector of Sheep and of the Superintendent Sheep Inspector, Transkeian Territories, for the Year 1898*, p. 8.
[57] *Debates in the House of Assembly* (24 July 1899), p. 50.
[58] CPP [A. 12 – 1905] *Report of the Select Committee on the Scab Acts*, pp. iii-iv.

The 1905 Select Committee on the Scab Acts found that Davison's appointment practices were in contravention of the Scab Act. Since a number of former sheep inspectors had complained that they were unfairly dismissed by Davison, the committee found that inspectors had the right to ask for a magisterial enquiry into their suspension and dismissal. This made it difficult for the CIS to dismiss incompetent inspectors. He was also instructed to establish scab boards in those districts without one and to only appoint scab board nominees. Henceforth Davison was allowed to institute a practical and written exam on the Scab Act and the diagnosis and treatment of the disease. The minimum performance requirement for this examination gave Davison grounds for declining scab board nominees, thereby preventing scab boards from insisting on the appointment of entirely unsuitable individuals. Conversely, it also prevented him from refusing to appoint known supporters of the anti-Scab Act movement who were knowledgeable on scab. [59] The office of the CIS therefore continued to experience staffing and compliance problems.

The opponents of the Act in parliament also reduced the CIS's budget. The Cape Government suffered serious financial difficulties in the 1900s and passed Special Retrenchment Acts in 1908 and 1909.[60] Despite these measures the Progressive Party which governed the Cape from 1904 to 1908 increased spending on agriculture. The budget for the Agriculture Department grew from £148 350 in 1905-6 (or 1.71% of the total budget)[61] to £279 161 in 1906-7 (3.08% of the total).[62] It continued to increase proportionally in succeeding years: £257 779 (or 3.20% of the total) in

[59] Ibid., pp. iii-v.
[60] Act 3 of 1909.
[61] CPP [G. 29 – 1905] *Estimates of the Expenditure to be Defrayed during the Year ending 30th June, 1906*, pp. 1,12; CPP [A. 3 – 1906] *Schedule of Reductions and Omissions Recommended by the Select Committee on the Estimates of Expenditure, 1906-7 [G. 58 - '06]*, pp. xiii, 4, 16, 17, 166.
[62] CPP [G. 58 – 1906] *Estimates of the Expenditure to be Defrayed during the Year ending 30th June, 1907*, p. 1; CPP [G. 69 – 1906] *Supplementary Estimates of Expenditure to be Defrayed during the Year ending the 30th June, 1907*, pp. 1, 19.

1907-8[63] and £269 981 (3.31% of the total) in 1908-9.[64] During this period, however, the funding for the Scab Act declined. The budget for administering the Scab Act shrunk from £80,248 in the 1906-7 financial year[65] to £75,472 in 1907-8[66] and further to £59,843 in the following year.[67]

As a consequence, the number of sheep inspectors declined. After the scab board system was introduced, the number of sheep inspectors was halved from its 1899 peak of 356 inspectors [68] and fluctuated between 173 and 161 over the following decade before being further reduced in 1909 to 127.[69] The remaining inspectors had much larger areas to oversee and their work, which was already physically demanding, became nearly impossible. Scab could not be eradicated under these circumstances, motivating a frustrated Davison to report that the office of the CIS was "merely marking time" in anticipation of improved legislation under Union.[70]

The Scab Act of 1894 was deemed a failure by progressives. Average scab incidence in the colony, according to the statistics of the CIS, was just over 15% in 1895. In 1911, scab incidence had decreased to 3.6%. Scab was therefore suppressed in the Cape Colony but it was hardly eradicated. In addition, no progress had been made since 1907 as government retrenchment

[63] CPP [A. 5 – 1907] *Schedule of Reductions and Omissions Recommended by the Select Committee on the Estimates of Expenditure, 1907-8 [G. 11 - '07]*, pp. x, xiii; CPP [G 11 - 1907] *Schedule of Reductions and Omissions Recommended by the Select Committee on the Estimates of Expenditure, 1907-8 [G. 11 - '07]*, pp. 16,19; CPP [G. 64 – 1907] *Supplementary Estimates of Expenditure to be Defrayed during the Year ending the 30th June, 1908*, p. 1; CPP [A. 4D – 1908] *Schedule of Reductions and Omissions [Secretary of Agriculture's Division] Recommended by the Select Committee on the Estimates of Expenditure [G. 21 - '08]*, p. 1.
[64] CPP [G. 51- 1908] *Estimates of the Expenditure to be Defrayed during the Year ending 30th June, 1909*, pp. x, xii; CPP [G. 51 – 1908] *Supplementary Estimates of Expenditure to be Defrayed during the Year ending the 30th June, 1909*, p. 1; CPP [A. 5. – 1909] *Schedule of Reductions and Omissions Recommended by the Select Committee on the Estimates of Expenditure [G. 26 - '09*, p. 1.
[65] *Statistical Register* (1907), p. 72.
[66] *Statistical Register* (1908), p. 60.
[67] *Statistical Register* (1909), p. 62.
[68] *Cape of Good Hope Civil Service List* (1900), p. 143.
[69] *Cape of Good Hope Civil Service List* (1909), p. 146.
[70] CA CIS 37/ S216 – Returns for the year ended, 1911.

measures and renewed resistance against the Act saw scab incidence increase.[71] The main legacy of the Scab Act of 1894 was the office of the CIS. Under Union, this body was expanded to provide extension services to sheep farmers such as information on wool classing.

The failure of the Scab Act also served to cement progressives' negative opinion of trek farmers. Their increased frustration was expressed in increasingly vehement correspondence against "scab breeders" in the *Agricultural Journal*. When the 1911 Stock Diseases Act was discussed, few Cape MPs evinced any sympathy for trek farmers. The view of the MP for Beaufort West was representative: notwithstanding the fact that his district contained a large number of trek farmers and he acknowledged that their needs conflicted with anti-scab legislation, his suggested solution was that trek farming should be prohibited.[72]

THE DISSERTATION

Chapter 1 provides my general theoretical approach to the issue of scientific knowledge as opposed to trek farmers' purported traditional knowledge. I draw on debates in anthropology and the sociology of science to argue that the division between veterinary knowledge and trek farmer knowledge on epistemological grounds is misguided.

Chapter 2 provides an overview and critique of nineteenth century veterinary knowledge of scab. This chapter was inspired by the absence of detailed discussions of the aetiology of scab in the historical literature on the Scab Act. It is argued that the official aetiology of scab obscured how difficult it was for farmers to clean their sheep.

[71] See figures 4.2 and 4.3, Chapter 4.
[72] *Debates of the House of Assembly* (7 February 1911), p. 1013.

Chapter 3 provides a close reading of primary source material (the 1884 and 1885 CVS reports and the testimonies before the 1892-4 Scab Commission) in order to critique government efforts to convince trek farmers of the necessity for a general scab act. Proceeding from the conviction that trek farmer views on scab were mistaken, officials believed that proving this to them would automatically convert them to the anti-scab position of progressives. This, it is argued, was naïve. The 'error' of trek farmer views could not be conclusively proven while the scientific explanation for scab was not logically persuasive.

In Chapter 4 the progressives' argument that eradicating scab would benefit the sheep farming sector of the Cape Colony is analysed. It is shown that eradicating scab would only have been beneficial and affordable for wealthier wool farmers of the colony. Mutton farmers had no economic incentive to clean their sheep and therefore did not exert themselves to this end. The practical necessities of trek farming in the arid North West also made complying with the Scab Act arduous for the region's inhabitants. Overall, the Scab Act imposed a normative vision of sheep farming that was at variance with the lived reality of mutton farmers and wool farmers in arid regions. This chapter makes extensive use of the agricultural statistics of the Cape of Good Hope. All the information regarding scab incidence was gleaned from the annual reports of the Chief Inspector of Sheep. These reports contain detailed statistical information for 1895, 1897-1898 and 1902-1911.[73]

The CIS's statistics were often of dubious accuracy. Sheep inspectors were required to provide livestock statistics and the number of sheep under quarantine (or "cleansing order" in CIS parlance) bi-annually in June and December. Davison had to submit his report in the first quarter

[73] During 1896, the CIS occupied itself with organising a colony-wide compulsory dipping campaign and therefore issued no statistics. No statistics was gathered from 1899 to 1901 due to the South African War. The CIS commenced operations in some districts in 1902, but no statistics are available for twenty of the districts.

and, as he was required to provide the latest statistics in it, he published the December returns even though he was of the opinion that the June returns gave a better indication of the real scab incidence in the colony (the disease was worse in winter). However, he was only allowed to publish the mid-year figures in his final annual report.[74]

Another level of inaccuracy is built into the statistics due to the definition of "infected sheep" in the Scab Act. If a few sheep of a particular flock were visibly infected, the whole flock was deemed infected and placed under a four to six week cleansing order, depending on whether it was summer or winter. Similarly, if scabby sheep mixed with goats, the goats were quarantined even though they did not contract scab from sheep. It was possible for a farmer to clean his flock in two weeks but the cleaning order was only lifted after the inspector re-inspected the flock. As inspectors had increasingly large areas to oversee, they often did not manage to re-inspect and lift the cleansing order after the quarantine period had expired. Clean animals were therefore included amongst the statistics of infected sheep. Equally, infected sheep were missed by inspectors and so not recorded in the statistics either.[75]

Some sheep inspectors also underreported scab incidence in their areas to an unknown extent. Davison testified before the 1898 Select Committee on the Scab Act that inspectors were often negligent, did not report scab incidence or sheep numbers correctly, performed only the minimum of work necessary to avoid being dismissed and were often appointed to serve the interest of their families.[76]

[74] SAR [U.G. 54 – 1912] *Annual Report, 1911: Sheep Division*.
[75] CA CIS 1/S/2/697 – Administration of the Scab Acts in Aberdeen – Correspondences from Allan G. Davison, CIS, to the Acting Under Secretary of Agriculture, 21 February 1911.
[76] CPP [A. 21 – 1898] *Report of the Select Committee on the Scab Act*, evidence of A.G. Davison, pp. 5-6.

Even though the CIS data is inaccurate, it is the only quantitative data on scab incidence in the Cape Colony and informed government policy. The office of the CIS supplied the government with statistics for sheep and goat numbers after the Scab Act took effect and these statistics were reproduced in the annual Cape Colony *Statistical Register*. The *Statistical Register* is a major source of data on the pastoral economy. This data is, unfortunately, equally problematic. Since the accuracy of agricultural statistics (excluding export figures) depended on the willingness of the farmers' to provide detailed reports of their economic activities to government employees and given that they feared that the information would be used for taxation purposes, underreporting was rife. In addition, government enumerators had no means of establishing whether information were gathered from transhumant pastoralist or not, who potentially evaded census takers. Hence the Colonial Secretary, J.W. Sauer, apologized for the inaccuracy of the 1891 agricultural census:

> I wish it, however, to be distinctly understood that, in the nature of things especially in this Colony, agricultural statistics are at best but mere approximations. All I can do is to vouch for the absolute accuracy of the tabulation.[77]

These statistics are therefore used to show economic trends and not intended to give accurate quantitative information on the Cape pastoral economy.

The limitations of this dissertation do not allow room for me to offer a complete analysis of the impact of the Scab Act and the socio-economic and environmental factors that impinged on it. This has compelled selection and hence a number of omissions.

Firstly, as Davenport and Tamarkin provide detailed narrative accounts of the activities of the anti-Scab Act movement within the context of the Bond's internal politics, I have not discussed the division caused by anti-scab legislation in the Afrikaner Bond in any detail. Political strife between English and Dutch-speakers certainly inspired the belligerent nature of the trek farmers'

[77] CPP [G. 6 – 1892] *Results of a Census of the Cape of Good Hope, as on the Night of Sunday, the 5th April, 1891*, p. Cx.

opposition against the legislation, but this English-Dutch opposition was complicated by the support of progressive Dutch-speakers, amongst them the leadership of the Afrikaner Bond, for the scab acts. Opposition against the scab acts therefore followed class and occupational, not ethnic, lines. Poorer farmers and mutton producers, however, were mainly Dutch-speakers so ethnic and class lines coincided to a large extent. This made trek farmers, used to suffering the condescension of English progressives, especially touchy about scab.

Secondly, although the archives of the CIS provided me with many colourful examples of farmer intransigence against the Scab Act, the hopeless incompetence or blatant collusion of sheep inspectors and a mounting sense of disillusionment on the part of Davison and his assistants, most of this material could not be used for present purposes. Unfortunately a dearth of source material makes it difficult for a socio-economically nuanced account of the administration of the Scab Acts to move beyond generalities. The archive of the CIS is not properly organized and contains large chronological gaps. Specific individuals can therefore not be traced and sufficient information to create even a rough portrait of specific regions is not available.

Thirdly, the issue of land alienation and rural class divisions is only explored in a peripheral fashion below. The archives of the Chief Inspector of Sheep contain case studies of individual farmers trying to make a living on the margins of the rural economy. Their biographies encompass the full array of rural economic choices from the dependency of *bywoners* to struggling start-up farmers and rural entrepreneurs. Their work as sheep inspectors charged these men with the difficult task of enforcing highly unpopular legislation. Their choice of employment reflects their economic need while the conflicts that surrounded prosecutions under the Scab Act illustrate fault lines in their communities. A study of these individuals could possibly help to provide a more nuanced account of the Cape sheep farming sector and the question of land alienation.

Fourthly, the dissertation does not discuss the working of anti-scab legislation in the Transkei, Tembuland, Griqualand East and Pondoland. The Cape Colony *Statistical Register* shows that the majority of those prosecuted under the Scab Act were African. Figure 1.1 and show the number of Europeans and Africans accused of contravening the anti-scab legislation in the Colony and the Transkeian Territories. [78] Although more Europeans than Africans were prosecuted after 1895 under the Scab Act of 1894 in the Colony Proper, the number of Africans accused of contravening anti-scab regulations in the Transkeian Territories far exceeded the total number of Europeans accused. Africans therefore borne the real brunt of the Scab Act but this fact was not acknowledged by the office of the CIS. Indeed, Davison's focussed most of his attention on the administration of the Scab Act in the Colony Proper, suggesting that 'cleaning' the Transkeian flock was perhaps of lesser importance than preventing the removal of scabby African-owned sheep within the colony.

Since 1889 successive proclamations enlarged the area under anti-scab regulations in the Transkeian Territories until the whole of Tembuland, Pondoland and Griqualand East was placed under regulation with the promulgation of Proclamation 60 of 1903. Under these proclamations, dipping facilities had to be maintained in locations through revenue collected by the Transkeian Territories General Council, African-owned sheep had to be dipped simultaneously by a government appointed sheep inspector at the owner's cost twice a year, and local headmen were held liable and could be fined for their subjects' non-compliance. Davison reports that average fines in the Transkei ranged between £1 and £2 for the period 1889 to 1909 while the maximum

[78] The *Statistical Register* did not differentiate convictions according to race. On average, the convicted numbered just over 80% of the accused.

recommended fine was £10.[79] In *Natures of Colonial Change: Environmental Relations in the Making of the Transkei* (2006) Jacob Tropp argues that colonial environmental intervention in the Transkei, by limiting the community's access to natural resources, threatened their subsistence and served to push individual Africans into the wage labour economy.[80] Fines incurred under the Transkeian Scab Act, the added tax burden to maintain dipping facilities and the cost of biannual simultaneous dipping presented a substantial financial burden on Africans which would similarly have forced them into wage labour.

The extensive historiography of South African peasant agriculture and rural resistance against government interference does not, however, discuss the working of the Transkeian Territories' anti-scab regulations. William Beinart briefly discussed the growing importance of sheep to African peasant producers in his *The Political Economy of Pondoland 1860-1930*.[81] Colin Bundy also briefly comments on the increasing importance of wool as pastoral cash crop in the Transkeian Territories in his *The Rise and Fall of the South African Peasantry*.[82] Neither author, however, discusses how scab and anti-scab regulations affected the region. The historiography focuses mainly on the measures against East Coast fever (a serious tick-borne cattle disease) that caused violent resistance in the Transkeian Territories.[83]

[79] Calculated from information provided in the annual reports of the CIS, 1889-1909. In the Colony Proper, fines ranged between £2 and £4 on average while the maximum fine was £20.
[80] J.A. Tropp, *Natures of Colonial Change: Environmental Relations in the Making of the Transkei* (Athens: Ohio University Press, 2006).
[81] W. Beinart, *The Political Economy of Pondoland 1860-1930* (Johannesburg: Ravan Press, 1982).
[82] C. Bundy, *The Rise and Fall of the South African Peasantry* (London: Heinemann, 1979).
[83] See W. Beinart, 'Conflict in Qumbu: Rural Consciousness, Ethnicity and Violence in Rural Transkei, 1880-1913', *Journal of Southern African Studies*, 8, 1 (1981), pp. 94-122; W. Beinart and C. Bundy, 'State Intervention and Rural Resistance: The Transkei, 1900-1965' in M.A. Klein (ed.) *Peasants in Africa: Historical and Contemporary Perspectives* (Beverly Hills and London: Sage Publications, 1980), pp. 271-315; K. Brown, 'Political Entomology: The Insectile Challenge to Agricultural Development in the Cape Colony, 1895-1910', *Journal of Southern African Studies*, 29, 2 (June 2003), pp. 529-549; C. Bundy, '"We Don't Want your Rain, We Won't Dip": Popular Opposition, Collaboration and Social Control in the Anti-Dipping Movement 1908-1916', in W. Beinart and C. Bundy, *Hidden Struggles in Rural South Africa: Politics and Popular Movements in the Transkei and Eastern Cape 1890-1930* (Johannesburg: Ravan Press, 1987), pp. 191-221; P. Scully, 'The 1914 Dipping Disturbances: An Analysis of the Effects of the

Pamela Scully correctly notes that the 1914 dipping disturbances should be contextualized with reference to "existing divisions in Black society."[84] More capitalist orientated African farmers were in conflict with subsistence peasant producers, a division that echoes the conflict between trek farmers and progressives. She also mentions that increased dissatisfaction with anti-scab regulations in the same period points towards broader dissatisfaction with government interference in peasant pastoral production and agriculture.[85] The Transkeian Territories, like the North West, contained farmers who did not fit the progressives' normative vision for agrarian improvement. Spatial constrains and the decision to focus on the issue of the popularisation of scientific knowledge has, however, resulted in the omission of a detailed discussion of the administration of anti-scab measures in the Transkeien Territories.

The government could and did unilaterally enforce anti-scab regulations on Africans but they could not do so on trek farmers, a fact that progressives apparently regretted.[86] Whites could apparently escape prosecution through a show of "a little red-faced indignity".[87] Progressives therefore had to try and convince their opponents of the benefits of anti-scab legislation and had to convince them of the validity of the scientific view of scab and the economic benefits of eradicating the disease, generating the primary sources employed here. The frustration evinced by progressives at the failure of the Act was worsened by their sense that "retrogressive" farmers were betraying the civilising mission. Thus the adoption of the Scab Act of 1886 by a number of African chieftains was used by progressive parliamentarians to mock trek farmer opposition to

East Coast Fever Regulations on East Griqualand Society' (University of Cape Town, Honours thesis, 1984).

[84] P. Scully, 'The 1914 Dipping Disturbances: An Analysis of the Effects of the East Coast Fever Regulations on East Griqualand Society' (1984) p. 42.

[85] Ibid., p. 34.

[86] CPP [A. 5 – 1884] *Report of the Select Committee on the Scab Bill*, evidence of Sir John Frost, p. 9.

[87] H. Hignell, 'The Eradication of Scab' (1909), p. 267.

anti-scab legislation.[88] Davison would employ the same strategy in his early annual reports, apparently trying to use the relative success[89] of anti-scab regulations in the Transkeian Territories to shame the opponents of the Act into compliance.[90]

Lastly, I do not address the topic of pasture degradation and overgrazing in much detail. The issue is extremely complex and is already the subject of an abundant literature. Beinart (1996) comments that nineteenth century farmers could not have overstocked to the extent progressives accused them of doing since stocking numbers peaked only decades later in the 1930s. The expected Malthusian outcome of overstocking did therefore not occur.[91] Sean Archer (2000) also shows that botanists cannot reach agreement on the extent of damage sheep farming did to Karoo vegetation. Some botanists argue that the Karoo was undergoing progressive desiccating before it was utilized as grazing by Europeans. In this view overstocking did not precipitate vegetation change but merely increased its tempo. Others dispute whether overgrazing did permanent damage or if areas with low bio-diversity will recover naturally.[92] Despite these caveats, progressives generally believed that overstocking and overgrazing were taking place and this governed their impressions of trek farmers' pasture management.

[88] *Debates in the House of Assembly* (6 July 1894), p. 236.
[89] Since sheep inspectors in the Transkeian Territories were obligated to dip all the sheep in native reserves a few weeks before their bi-annual reports were due, reported scab incidence in the Transkeian Territories was lower on average that that of the Colony Proper.
[90] CPP [G. 26 – 1901] *Report of the Chief Inspector of Sheep, with Annexures, for the year 1900*, p. 11.
[91] W. Beinart, 'Environmental Destruction in Southern Africa' (1996), pp. 55, 63.
[92] S. Archer, 'Technology and Ecology in the Karoo: A Century of Windmills, Wire and Changing Farming Practice' (2000), pp. 679-682.

CHAPTER 1: THE RATIONALITY ETHIC

Both the progressives and the Dutch-speaking farmers who opposed the Act accused their opponents of not being able to farm. The progressives insisted that scab eradication was essentially a technical matter and maintained that those farmers who opposed the Act did so out of ignorance. This dichotomy between *trekboer* ignorance and progressives' 'scientific' efficiency led to the stigmatization of those farmers who refused to be educated (i.e. those who resisted the official scientific explanation of scab or were seen as either unwilling or unable to clean their sheep) as "scab breeders"[1] or "the unclean".[2]

The opponents of the Scab Act constructed a dichotomy of their own. They saw the proponents of the Act as being guided by mere book knowledge while they themselves were practical, experienced farmers: "much was said about sheep-farming, but that was farming on paper."[3] This opinion lingered after the Scab Act of 1894 was promulgated. According to Dirk Jacobus Albertus van Zyl, MP of Clanwilliam and a vocal opponent of the Scab Act:

> The farmers did not want and never wanted the Scab Act. It was shopkeepers, doctors, lawyers and English farmers who had placed the Act upon the farmers. He could understand why English farmers were in favour of the Act, for they did not know how to farm with sheep and wanted inspectors to teach them.[4]

Both sides therefore framed the conflict surrounding the Scab Act as a struggle between knowledge and ignorance. This is also how the conflict is presented in the Cape agrarian historiography. In addition, the majority of historians take the point of view of the progressives. In their works on colonial science in the Cape Colony and the Union of South Africa, Beinart, Gilfoyle and Brown focus on the progressives, who campaigned for the establishment a CVS and

[1] CA CIS 2/S8 – Administration of the Scab Act in Albert, 1905-1909. S8/864, undated correspondence from J.A. Kruger to F.P. Fincham, attached to letter dated 3 March 1909 from A.G. Davison to Under Secretary of Agricluture, re matter of Rex vs. Hatting, 23 February 1909.
[2] H. Hignell, 'The Eradication of Scab' (1909), p. 267.
[3] *Debates in the House of Assembly* (24 June 1885), p. 246.
[4] Ibid. (6 September 1899), p. 407.

supported government veterinary policies, rather than on the views of their opponents or on the economic impact these policies had. Government experts are the main focus of their works.

T. R. H. Davenport discusses the Act in his 1960 doctoral dissertation on the Afrikaner Bond. He discusses the chronology of the anti-Scab Act movement in a narrative fashion but also uses it to illustrate the differences between the Western Cape, urban-based Bond leadership and their rural followers. He depicted the farmers who protested against the Scab Act as anti-modern because they maintained "an astonishing degree of ignorance" in their views on scab.[5] In *The Afrikaners*, Herman Gilliomee follows Davenport's lead. He does not interrogate the progressives' arguments that the Scab Act would be beneficial and sees the opposition to it as symptomatic of an aggressive anti-modernism displayed by poorer and less educated Afrikaners.[6]

Dawn D'Arcy Nell and Mordechai Tamarkin are more sympathetic towards the Dutch-speaking farmers who opposed progress. Instead of portraying these farmers as ignorant, they query why the farmers persisted in believing things that progressives considered to be untrue. These efforts to provide reasons for the farmers' resistance against expert knowledge will be the focus of this chapter.

REASONS WHY OPPONENTS OF THE SCAB ACT CONTESTED THE ACT AND VETERINARY KNOWLEDGE

The apparent conflict between farmers' religious explanations for scab and secularization

It is not clear how many farmers had religious objections to the Scab Act of 1894. After the sittings of the Scab Commission were concluded, the *Zuid Afrikaan* expressed relief that no

[5] T.H.R. Davenport, 'The Afrikaner Bond' (1960), p. 333.
[6] H. Gilliomee, *The Afrikaners* (2003), p. 226.

witnesses made religious arguments during the sittings.[7] As no subsequent correspondent to the newspaper based their opposition to the Scab Act on religious grounds, this editorial commentary also seems to have served notice on correspondents not to expect the paper to publish such views.

Contrary to the *Zuid Afrikaan*, one Dutch-speaking farmer who testified before the Commission did motivate his opposition against the Act on religious grounds. Joseph Adriaan Jacobus Coetzee of Burghersdorp stated, "I only believe in blessing from Providence; I don't believe in individual efforts. I believe in keeping the commandments and the law, and the blessing will follow." But he was no example of resigned fatalism. With 7000 sheep Coetzee could indeed believe that he was blessed. Providence had similarly blessed him with sufficient land for his livestock: he linked scab to overstocking, a practice which he could happily avoid.[8]

The *Patriot* did publish religiously inspired protests to the Act. These correspondents argued that as scab was mentioned in the Old Testament, it was God's will that the disease should exist and to want to eradicate it was tantamount to heresy.[9] However, this view was heavily criticised: an anonymous respondent denounced it as an insincere attempt to give lazy and negligent farmers' behaviour a religious gloss. He argued that such a view was an example of 'bad religion' as other diseases mentioned in the Bible were not used to support a religious doctrine advocating fatalism. A farmer who took his children to the doctor when they were sick or who himself took medication was a hypocrite if he argued against doctoring his sheep for scab on religious grounds.[10] Another correspondent wrote that the Biblical arguments against dipping were an

[7] *Zuid Afrikaan* (merged with *Ons Land*), 10 March 1894, editorial.
[8] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of Joseph Adriaan Jacobus Coetzee, p. 422.
[9] *Patriot*, 3 May 1894; *Patriot*, 10 May 1894.
[10] *Patriot*, 17 May 1894.

example of superstition. He opposed the Act on economic grounds and was insulted by progressives who presented opposition to the Act as based solely on religious reasoning.[11]

It is therefore difficult to know what, if anything, to make of such incidences of religious reasoning. It seems that progressives gleefully pounced on such examples of religious fatalism in order to conflate this view with Afrikaner farmers' perceived reluctance to accept new farming technology in order to better depict them as ignorant and irrational.[12]

However, religious arguments did not only rest on whether it was sinful to eradicate scab but also involved the political morality of the Act. A correspondent to *De Volksbode*, a newspaper sponsored by the Dutch Reformed Church, wrote that the Scab Act was immoral as it would punish farmers if their sheep contracted an illness. As scab, whatever its cause may be, was created by God, it was not just to punish farmers if their sheep became infected.[13] The *Volksbode*'s editorial position was broadly similar: farmers' ignorance of scab and inability to effectively cure their sheep were cited as reasons to postpone the implementation of a general Scab Act as it would be unjust to punish farmers for what they could do nothing about. An educational campaign was far preferable.[14] Others argued in parliament that it was sinful to promulgate an Act against the wishes of the people.[15]

For Tamarkin farmers' religiously inspired objections to the Act support his explanatory paradigm by providing one more instance of trek farmers' 'traditionalism'. The farmers' willingness to make use of religious arguments is, like their unwillingness to accept that scab was

[11] *Patriot*, 2 August 1894.
[12] A. G. Davison quoted in D. D'Arcy Nell, '"You Cannot Make the People Scientific by Act of Parliament": Farmers, the State, and Livestock Enumeration in the North-western Cape, c. 1850-1900' (1998), p. 63.
[13] *De Volksbode*, 19 May 1894.
[14] 'Editorial', *De Volksbode*, 22 December 1894.
[15] *Debates in the House of Assembly* (22 June 1894), p. 158.

caused by an arachnid, another symptom of the difference between them and English or Dutch speaking progressives. He argues that these differences were caused by their isolation from modernity in the interior.[16] Giliomee has no trouble describing the trek farmers in the interior as ignorant and obstinate in this ignorance and cites religious arguments against scab in support of this view.[17] He does not blame their ignorance solely on isolation but on their deliberate withdrawal from the modern world. Apparently frustrated with the lack of accessible historical data these farmers generated, he likens them to their German counterparts as described by Karl Marx: according to him they were almost lost to "the idiocy of rural life".[18]

D'Arcy Nell deals with these religious arguments in a different way in her 1998 Masters thesis: in her discussion of religious objections to irrigation works – the attempts of the government to change the 'God-given' flow of rivers – she conceptualizes the conflict as the opposition of two different understandings of knowledge. Primarily concerned with how farmers resisted government efforts to gather statistics, she identifies a conservative position (gleamed from J. du Plessis's work on Van der Lingen and the Paarl conservatives) that was deeply sceptical about the claim that development necessarily indicated progress. Progressives' faith in the ability of human reason and specifically numbers to encompass the world "…was seen as arrogant speculation about the will of God by conservatives."[19] The conservatives' reservations about progress and the potential of scientific rationality is interpreted by D'Arcy Nell as a sign that conservatives and the progressives had different knowledge systems – the former viewed revealed knowledge, like the existence of God, as a valid basis for knowledge while the latter, trusting in empiricism, regarded the former's conception of knowledge as irrational. She suggests further that arguments based on

[16] M. Tamakin, *Volk and Flock* (2009), pp. 34-37.
[17] Gilliomee, *The Afrikaners*, p. 226.
[18] H. Giliomee, 'The Development of Afrikaner Ethnicity, c. 1850-1915' (1984), p. 1.
[19] D'Arcy Nell, '"You Cannot Make the People Scientific by Act of Parliament": Farmers, the State, and Livestock Enumeration in the North-western Cape, c. 1850-1900', p. 63.

religious fatalism, like the religion-based opposition to irrigation and the Scab Act, are further instances of this different, God-cantered epistemology. [20]

Extending the argument this way does not, however, seem plausible as there is a distinction to be made between philosophical arguments regarding the basis of knowledge and arguments regarding the appropriateness of human alteration to 'God-given' natural conditions. D'Arcy Nell's comparison between the North West farmers' opposition to agricultural improvement and the Paarl conservative's opposition against the progressive secularization of Cape society is not persuasive. The Paarl conservatives who were so uneasy about secular, rationalistic, knowledge claims were caricatured as hopelessly unprogressive by their opponents but the conservatives' protests were finely judged: they saw trains as potentially useful technology but did not want them to run on Sundays. This is very different from arguing that people should walk because God equipped them with feet and not wheels.[21]

D'Arcy Nell's argument, coming at the end of a chapter that convincingly defends the farmers of the North West from the charge that they were resistant to progress, strikes an odd note. She defends trek farmers by defending their knowledge of the capabilities of their region and the limits of their own economical resources. The trek farmers' environmental and farming practice is valorised in the process and shown to be superior in some instances than the knowledge of progressive government officials and scientists. To then conclude by proposing that many trek farmers held to a God-centered epistemology and that this is what motivated their resistance to progress undermines her prior argument.

[20] Ibid.
[21] J. Du Plessis, Colonial progress and countryside conservatism: an essay on the legacy of Van der Lingen of Paarl, 1831-1875 (1988), pp. 74-78.

It would also not be helpful to contrast farmers' religious fatalism with secularization since religion did not have a monopoly on fatalism. The doctrine of progress itself is a good example of secular fatalism. In the words of Mary Midgely (2002): "…nineteenth-century thought, fired with the idea of individualistic progress by the Industrial Revolution, the expanding empire and the social-contract model, accepted a quite different dynamic picture of a steadily evolving world, a world in which enlightened self-interest was a sufficient force to lead life all the way from the primal soup to a predictable earthly heaven." This view may seem relatively innocuous, but it was accompanied by a faith in the power of the free market economy that fatalistically (and revealingly) accepted the poverty and misery of those who could not adapt quickly enough to the new system of production as a necessary cost of progress.[22]

To argue like A.G. Davison that the farmers' appeals to religion was a "medieval view", casting religion and science on opposites sides of the well-known dichotomy of tradition and modernity, is also problematic. To conflate religious views with remnants of the medieval denies those views a developmental trajectory. Jürgen Habermas argues that the resurgence of religious fundamentalism in the late 20th century should induce a re-evaluation of the positivist belief that the modern world is on a trajectory towards greater secularization. Instead of religion being replaced with newer ways of thought, religion has renewed itself in response to modernity. In addition, the rise of religious fundamentalism cannot be seen as solely a reaction against secular Western values since religion has recently also re-emerged as a political force in the United States, one of the most 'modern' counties in the world. The religious revival in America can also not convincingly be identified with 'tradition' as it represents a break with the tradition of the country, starting with the founding fathers, of the separation of church and state. Habermas

[22] M. Midgely, *Evolution as a Religion: Strange Hopes and Stranger Fears* (2002), p. 158.

suggests that the secularization of Europe, once presented as the trajectory all nations would follow, has been revealed as an exception.[23]

Habermas emphasises the resilience of religion in the face of challenges from rationalist science to its doctrines. This accommodation is made both by theologians and by lay adherents who may or may not accept the rationalisations of the former. For people believing in the precepts of a particular religion, doctrine is not decided by reference to purely secular arguments. The accommodation between religion and what is commonly called 'modernity' is therefore a matter internal to the religion in question.[24] The problem of religious fatalism seems a similarly internal matter. As discussed above, a respondent to the *Patriot* could argue that it is 'bad religion' by quoting alternative scripture.

This brings the discussion back to Tamarkin: After initially suggesting that the farmers' religious objections to the Scab Act were a sincere expression of their religious beliefs and a symptom of their conservatism, he mentions that the proponents of the Act also appealed to religion as the Bible is a "two edged sword" that can be quoted to substantiate a variety of positions. The opponents of the Act quoted extensively from the Old Testament, stressing that submitting to plagues were a religious duty or that rulers must obey the will of God or else face punishment. The proponents quoted from the New Testament to stress that citizens owed obedience to their rulers.[25]

Scriptural references therefore served as idiom through which both sides outlined their position in relation to progress and the role of the state. Tamarkin then retreats from his earlier position that

[23] J. Habermas, *Between Naturalism and Religion* (2008), pp. 115-118.
[24] Ibid.
[25] Tamarkin, *Volk and Flock*, pp. 117-118.

the use of Biblical quotations is a sign of traditionalism – the divide between tradition and modernity now becomes the divide between the Old and the New Testaments.

But in the light of the above, can any use of scripture to oppose the Scab Act be truly and independently religiously inspired? Rather than sourcing their arguments from scripture, it seems as if scripture was used to give authority to pre-formulated arguments. So the MP of Riversdale, I.W.J. van der Vyver, compared the promulgation of the Scab Act to the oppressive rule of King Rehoboam who plunged his country into civil war because he ignored wise council. His statement was met with derisive laughter by his fellow MPs. Angered, he promised violent retaliation from the Dutch-speaking farming community if the Act was passed.[26] But Van der Vyver's conviction that the government of the Cape should not make laws contrary to the citizenry's wishes was not inspired by the politics of an Old Testament monarchy. Rather, he used the circumstances leading to revolt in pre-historic Israel as the idiom through which he expressed the duties of a government towards its citizens. The substance of his argument was therefore about democratic rights, not religion.

This is not to say that Van der Vyver or others making scripturally-based arguments were not sincerely religious. Religions renew themselves through their adherents interpreting scripture in new ways to address new concerns. Progressives, themselves often the products of a solid Christian upbringing, justified their creed with similar appeals to Biblical authority: by endeavouring to increase economic productivity they were following God's command to mankind to rule the earth.[27] The Bible was therefore a shared reference point that was used for areligious purposes. But appeal to the authority of scripture was indeed a "two-edged sword" as the verse and chapter structure of the Bible makes it easy to find passages (and quote them out of context)

[26] *Debates in the House of Assembly* (22 June 1894), p. 158.
[27] R. Wallace, *Farming Industries of Cape Colony* (1896), p. vi-vii.

to support a range of positions. Hutcheon, the Chief Veterinary Surgeon, was raised by an uncle who was a Calvinist minister and forced to memorise great swaths of scripture as a child. This equipped him with a prodigiously trained memory and he had the ability to recite passages from literature and scientific writing at length. His photographic memory helped him to completely overwhelm the scripture-based arguments against veterinary science proposed by farmers he met on his travels. By bombarding them with contrary verses, he won through volume where logic proved ineffective.[28]

Rationality and ignorance: some reflections on epistemology and the debate on indigenous knowledge

Any discussion of the opposition against the Scab Act must explain why the scientific view of scab was rejected. Progressives, trying to explain farmers' reluctance to accept this explanation, accused them of superstition, ignorance or of holding on to childish ideas in an unreflective manner.[29] However, many of the opponents of the Scab Act were farmers with many years of experience. The many letters they wrote to the press to protest the Act further attests to the fact that a good number of them were literate. Having access to newspapers and being the subjects of a veterinary educational campaign, they were familiar with the scientific explanation of scab by 1894, but apparently chose to reject it. In spite of continued education efforts and public debate on scab, some still rejected the scientific explanation in 1908, many years after the Scab Act was promulgated.[30] Such resistance to the Scab Act and veterinary science is therefore not solely explicable in terms of ignorance.

[28] Ibid., p. vii.
[29] CPP [G. 33 – 1896] *Report of the Chief Inspector of Sheep and of the Superintendent of Scab Inspectors in the Transkeian Territories for the Year 1895*, p. 7; *Midlands News*, 29 December 1909.
[30] CPP [G. 11 – 1909] *Report of the Scab Acts and their administration in the North-western District of the Cape Colony*, p. 5.

Opponents tended to base their rejection of the Scab Act and the scientific explanation of scab on their personal experience of sheep farming. But farmers' insistence on the validity of their experience cannot be taken at face value. Opponents of the Act were quick to argue that the progressives were farming with "book knowledge" and lacked practical farming experience. Their position on scab, however, cannot be contrasted with the scientific view by seeing the difference between the two positions as the difference between theory and practice. As will be discussed in Chapter 3, some farmers also developed theories to explain scab and conducted experiments to test them. What was at stake was therefore not ignorance opposed to knowledge but how practical experience and scientific experiment were to be interpreted.

Tamarkin, taking the farmers' assertion that their opposition was based on 'experience' at face value, argues that farmers had an experienced-based epistemology.[31] He proposes the existence of an epistemological gap between these farmers and the progressives who saw science as authoritative.

The dichotomy between 'science' and 'experience' needs more careful exploration, however. Science is difficult to differentiate from every day sensory experience. Some scientific disciplines use advanced measuring and imaging equipment to reveal hidden complexities in the objects of every day perception which lead scientist working in these disciplines from explaining physical phenomena in counter-intuitive. The practice of scientists to form counter-intuitive explanations for phenomena, however, does not solely depend on their reliance on sophisticated technology. In cases where scientists and non-scientist both depend on their unaided senses, distinguishing

[31] Tamarkin continually uses the word 'ontology' instead of 'epistemology' in his text without offering an explanation for this usage.

between the non-scientific experience and scientific experience of phenomena becomes problematic and requires careful evaluation on a case by case basis.[32]

Historians of medicine has often focused on the history of laboratory science to the exclusion of field practice precisely because laboratory science is easy to differentiate from the science of field practice were medical science often merged with existing popular medical practices: "Laboratories are supposed to be generic spaces with invariable tools and practices that produce universal knowledge, in contrast to work in the field" while field practice are seen as particular, context-based and often consisted of unrepeatable experiences – qualities that conflict with the scientific method and its stress on the repeatability of scientific experiments.[33] This definition of science, that equates science with the scientific method, implies that different scientific practices can be evaluated as more or less scientific according to their methodological rigour. As discussed in Chapter 2, veterinary scientist did not perform technologically advanced and methodologically rigorous experiments on *acari* at the Cape in the nineteenth century. It is therefore unclear whether they had access to scientific data that trek farmers, relying on their experience and the occasional employment of the magnifying glass, lacked. As discussed in the introduction, veterinarians struggled to establish scientific authority for their field precisely for this reason. The trek farmers' description of scab, as expressed before the 1892-1894 Scab Commission, did not greatly differ from Hutcheon's description of the symptoms and course of the disease. The main differences were in their explanations for the causes of scab and the role of *acari* in the progress of the disease. In the case of scab, science could therefore not be clearly defined vis-à-vis non-science.

[32] G. Gutting, Michel Foucault's Archaeology of Scientific Reason (1989), pp. 24, 42-43.
[33] A. Greene, 'The Now-Opprobrious Title of "Horse Doctor": Veterinarians and Professional Identity in Late Nineteenth-Century America' (2010), pp. 42-43.

Instead of possessing a special type of epistemology reliant on personal experience, the opponents of the Act gathered knowledge from a number of sources and evaluated potential sources for trustworthiness. As discussed in Chapter 3, opponents of the Scab Act placed various degrees of trust in Hutcheon's account of scab. Some disputed his empirical claims while others merely disputed the conclusions he drew from these empirical findings. Opponents of the Act went as far as disbelieving the evidence of their own eyes by blankly refusing to accept the existence of the arachnids after being shown *acari* through a microscope. They preferred to believe that they were being tricked.

Tamarkin later retreats from his representation of the Dutch-speaking farmers as having a unique epistemology: apparently they did not apply experience as an arbiter of knowledge in a doctrinal fashion but were "open to new inputs and new ideas as long as they suited their prosperity and survival."[34]

According to Tamarkin the scientific diagnosis and prognosis of scab was simple and straightforward: the disease was caused by an arachnid and was cured by killing the arachnid. This view supposedly had little sympathy for the farmers' assertion that the disease was connected with the condition of the sheep and the pasture. He therefore represents science as decontextualized technical knowledge that can be universally applied and the Scab Act as an environmentally insensitive, ill-framed government intervention.[35]

This echoes a recent debate in the social sciences about the scientific practices underlying development schemes and large-scale state controlled urban planning projects. In *Seeing Like a State*, James Scott (1998) theorizes that such projects normally fail or have unforeseen

[34] Tamarkin, *Volk and Flock*, p. 29.
[35] Ibid., pp. 22, 25, 29.

consequences because they are based on overly simplified explanatory frameworks. The state tends to favour projects that would increase the legibility of a specific economic or cultural terrain in order to make these terrains subject to state control. The state is therefore easily seduced by standardised and simplified explanations and solutions that promise to give it this desired legibility and control. But state schemes based on such standardised, simplified explanations tend to fail because of their abstraction from real world contingencies. An abstract scheme cannot be substituted in place of a complex ecological system or social network and if such a substitution is attempted, the real terrain that the scheme seeks to manipulate is damaged or destroyed.[36]

To prevent such failed state interventions, Scott suggests that governments should take greater notice of the local context and of the local knowledge practices that developed to deal with the issues the state scheme seeks to address. He introduces an epistemological distinction between the idealised abstractions used by the state and the contextualised practical knowledge of local actors, reviving the classical knowledge categories *mētis* and *techne*. The knowledge categories *mētis* and *techne* refer to how knowledge is practiced rather to how the truth of a statement is verified. Rather than defining and demarcating science from non-science, these terms cut through scientific practice. *Mētis* consists of practical skills, the rules of thumb and tricks of the trade that a knowledge practitioner acquires through practical experience. *Techne*, however, is abstract, organised and universally valid knowledge and can be reduced to formula that can be taught in a formal classroom.

Few skills consist purely of *techne*. Certain forms of analytical philosophy and high level mathematics seems to be the only fields of enquiry that do not require either the input of experimental data (which requires technical skill) or for the practitioner to gain experience before he or she can be judged competent. *Techne* and *mētis* are therefore entwined in most knowledge-

[36] J. C. Scott, *Seeing Like a State* (1998), pp. 4, 6-7.

based activities. Formal education can teach rules and methods of dealing with a situation, but only experience tells which rules and methods should be followed in a particular situation. *Techne*, however, is often held up as an ideal since 'proper' scientific methodology is seen to consist of reductionist abstraction from context. Statist schemes that impose standardised frameworks onto real-life situations are a consequence of this mistaken theory regarding the nature of the technical knowledge that governs human activities.[37] This dichotomy echoes the distinction between laboratory science and field practice and explains why the latter has succeeded in claiming cultural authority for scientific endeavour in general.

Characterising Hutcheon's description of scab as *techne* is not persuasive in light of the preceding discussion of the nature of veterinary science, at least so far as it regards scab at the Cape. As discussed in Chapter 2, the explanation offered by veterinary science for scab was also environmentally nuanced and took the effects of drought and malnutrition into account. It can, however, be argued that the Scab Act was context-insensitive. The Act, and Hutcheon's prescriptions to the Scab Commission, focused on eradicating the disease and had no place for scientific nuance or ambiguities. The Act, with the restrictions it placed on certain types of trekking, was therefore perceived by its opponents as a 'one-type-fits' all solution devised for the ecological conditions prevailing in the Eastern Cape.[38] In contrast, A. G. Davison, the Chief Inspector of Sheep, argued that the Act was too lenient in order to accommodate the North West and that it was possible to implement much more stringent anti-scab regulations in the Eastern Cape. Scab eradication was also believed to be easier in the North West due to the lower stock densities and the dry, hot climate that reduced the survival rate of *acari* when separated from their hosts.[39] This argument was born out by the statistics gathered by the CIS. In the arid, thinly populated Clanwilliam, Namaqualand and Van Rhynsdorp districts, scab incidence was

[37] Ibid., pp. 329-334.
[38] *Debates in the House of Assembly* (25 June 1894), p. 167.
[39] A. G. Davison, 'Scab Legislation under Union' (1910), p. 305.

drastically reduced during the period the Scab Act was in effect. The latter two districts were even declared scab free on several occasions.[40] This example served to confirm Davison's conviction that scab persisted in the North West solely due to farmers' apathy regarding scab and their resistance to the Act.[41]

It was difficult to dip sheep in the North West and transhumant pastoralism made complying with the Scab Act burdensome. However progressives were not blind to these environmental realities, rather they believed the environmental difficulties suffered by trek farmers were caused by their farming practices and could be overcome by sedentarisation and better pasture management. This is fully discussed in Chapter 4.

More problematically, Tamarkin explicitly frames his discussion of the Scab Act and farmers' resistance against it in terms of the struggle between tradition and modernity. This conception of trek farmer knowledge as in some way 'traditional' and of veterinary science as a 'modern' imposition cannot be sustained. There is currently a debate in the social sciences on the nature of so-called 'indigenous' or 'traditional' knowledge but this debate is largely politically motivated. In an essay on the topic, Arun Agrawal (1995) summarizes the core issue succinctly:

> Where 'western' social science, technological might, and institutional models – reified in monolithic ways – seem to have failed, local knowledge and technology – reified as 'indigenous' – are often viewed as the latest and the best strategy in the old fight against hunger, poverty and underdevelopment. Because indigenous knowledge has permitted its holders to exist in 'harmony' with nature, allowing them to use it sustainably, it is seen as especially pivotal in discussions of sustainable resource use.[42]

Agrawal sympathises with this attempt to promote indigenous knowledge but he argues persuasively that a clear distinction cannot be made between indigenous knowledge and 'western' knowledge. Rather, social scientists who attempt to do so replicate definitions of indigenous

[40] See Appendixes B and C.
[41] Davison, 'Scab Legislation under Union' (1910), pp. 295 - 297.
[42] A. Agrawal, 'Dismantling the Divide Between Indigenous and Scientific Knowledge' (1995), p. 413.

knowledge originally formulated by structuralist anthropology and contrast these definitions with outdated, idealised definitions of science.

So 'indigenistas', for instance, argue that indigenous knowledge is deeply imbedded in local contexts and practicalities while science is abstracted from everyday life and practical concerns. But the very fact that 'western' science could not be successfully imposed on indigenous societies indicates that such science is imbedded in unacknowledged western cultural contexts, a point these same social scientists are eager to make elsewhere. Also, there are few aspects of western life that are not impacted in some way by technological change, so science cannot be abstracted from the practicalities of ordinary life.[43]

Underlying the attempts to define indigenous knowledge and to contrast it with western science is the assumption that these categories can be fixed in time and place. But it is implausible that an indigenous society subject to development programs possesses a body of knowledge that is somehow innocent of outside influences and uniquely its own. The indigenistas also seek to group completely heterogeneous bodies of beliefs and practices together. Under western knowledge counts, for example, the work of Derrida and Foucault, particle physics, agricultural science and western medicine; while witchcraft beliefs, indigenous pasture management, West African agroforestry, complex theories on the origins of disease and oral histories are all supposed to possess some essential quality that make them 'indigenous'.[44]

A better avenue of explanation is to investigate how knowledge is produced and new ideas incorporated by a cultural group. But this seems to lead to analyses that characterise indigenous societies as being 'closed' while western scientific thinking is said to be 'open'. 'Closed'

[43] Ibid., pp. 421-423.
[44] Ibid., pp. 420-424.

knowledge systems protect existing theories and practices at the expense of new facts while 'open' systems welcome contrary facts as a challenge that helps improve theories. This characterisation is equally problematic as it cannot account for how indigenous thinkers develop and incorporate new theories and techniques. It also assumes that the characterisation of science as 'open' is valid. However, scientific methodology cannot simply be seen as the proving of hypotheses by experimental data because the relationship between experiments and theory is a complex one. This point is more fully explored below, for now it must suffice that philosophers of science have not as yet developed a satisfactory account for scientific methodology.[45]

As discussed above, Scott avoids using the terms 'indigenous knowledge' or 'traditional knowledge' and so avoids the problematic political content of these terms. Commenting on the problematic dichotomy between 'modernity' and 'tradition', he argues that "…a certain understanding of science, modernity, and development has so successfully structured the dominant discourse that all other kinds of knowledge are regarded as backwards, static traditions, as old wife's tales and superstition. High modernism has needed this 'other,' this dark twin, in order to rhetorically present itself as the antidote to backwardness."[46] The indigenistas' program is born from this problematic dichotomy and cannot escape validating it.

Tamarkin's description of trek farmer knowledge as 'traditional' is therefore theoretically flawed. In addition, his attempts to demarcate the Dutch-speaking farmer's 'traditional' knowledge from the 'scientific' knowledge of the progressives through exemplification suffer from factual errors. He claims that dipping sheep in tobacco extract was a 'traditional remedy' while the government experts advocated the use of patent dips.[47] The use of tobacco extract as general insecticide was widespread, however, and dipping in tobacco extract was commonly used to cure scab in

[45] Ibid., p. 424.
[46] Scott, *Seeing Like a State*, p. 331.
[47] Tamarkin, *Volk and Flock*, p. 30.

Australia. It was therefore neither a local nor a traditional remedy.[48] In addition, the Agricultural Department advocated the use of lime and sulphur dips rather that the use of patented dips that often contained arsenic and carbolic acid that could poison sheep. The lime and sulphur dip had a longer lasting residual effect than these dips and it was safer to use, but it needed to be prepared according to an exact and lengthy process that required the ingredients to be boiled. Using patented dips was therefore easier and did not consume scarce wood fuel. [49]

Tobacco extract was used at the Cape together with a host of herbal remedies before the introduction of patent dip. Tamarkin mentions the use of infusions of wormwood, mint, valerian and cannabis as dips[50] while *kruidjie roer my niet*, *melkbos* and *stinkblad* were also used if tobacco and patent dips were not available. According to one farmer's testimony in 1874, these were only "partial remedies". He considered tobacco extract as the surest remedy but complained that it was too expensive and, as it had to be imported, it was not always available. He deemed lime and sulphur to be the best alternative.[51] The scientific view of scab and prescriptions for dipping sheep were first publicised in Dutch at the Cape in the bilingual newspaper, *De Zuid Afrikaan*, in 1835. The article advocated a dip made of tobacco water, spirits of turpentine, corrosive sublimate and salamoniac. Treatment was to be repeated after 14 days and visibly infected sheep were to be hand dressed with turpentine until completely cured.[52] Dipping was therefore not a 'new' technology that the Agriculture Department tried to impose on the farming community. Rather, as discussed in Chapter 4, farmers did not see combating the disease as cost effective.

[48] H. R. Seddon, 'Eradication of Sheep Scab from New South Wales' (1964), p. 420.
[49] *Debates in the House of Assembly* (21 July 1899), pp. 44-46.
[50] Tamarkin, *Volk and Flock*, p. 31.
[51] CPP [A. 3 – 1874] *Report of the Select Committee on the Proposed Scab Bill*, evidence of J.A. Burger, pp. 12, 14.
[52] *Zuid Afrikaan*, 21 August 1835.

Shearing sheep bi-annually or even more often together with hand dressing visibly infected sheep with mixtures of fat, herbs and minerals such as mercury or sulphur (as practiced by Dutch-speaking Cape farmers during the 19th century) was 'traditional' in the sense that these were age-old European remedies for scab commonly used since at least the Medieval period.[53] In the nineteenth century, arsenic replaced mercury as the medicinal poison of choice, at least where veterinary science was concerned, while turpentine replaced lard. Cooper's Dipping Powder became widely used as part of 'traditional' remedies due to the arsenic it contained. Feeding sheep a mixture of Cooper's Powder and salt or sulphur was a popular and effective remedy for parasitical infections and it was endorsed by Hutcheon who gave farmers precise dosage instructions so that they could avoid inadvertently poisoning their livestock.[54] Such "internal cures" could also cure individual sheep of scab and confirmed farmers' theory that scab was an internal disease.[55]

Dutch-speaking farmers' often expressed view that scab was caused by environmental poverty – i.e. malnutrition – seems to be derived from the mid-nineteenth century environmental and nutritional explanations for illnesses like cholera, tuberculosis, typhoid, typhus, measles and diphtheria that decimated Europe's industrial centers.[56] This malnutrition theory was therefore neither particularly old nor of local origin. In contrast, progressives' insistence that kraals, resting places and pasture frequented by infected sheep retained the ability to re-infect sheep months and even years after the infected flock was cured and removed was not supported by adequate scientific evidence[57] and dated from early Medieval Europe.[58] Progressive nomenclature of for

[53] M. J. Stephenson, 'Wool Yields in the Medieval Economy' (1988), pp. 381, 383.
[54] *AJCCGH*, 5, 12 (1892), p. 178.
[55] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of J. C. de Klerk, p. 536.
[56] Porter, R. *The Greatest Benefit to Mankind: A Medical History of Humanity from Antiquity to the Present* (1997), pp. 399-402.
[57] A. W. Shilston, 'Sheep Scab: Observations on the Life-history of *Psoroptes communis*, var. *ovis* and some points connected with the Epizootiology of the Disease in South Africa' (1915), p. 71.
[58] A. C. Kirkwood, 'History, Biology and Control of Sheep Scab' (1986), p. 303.

the disease like describe scabby sheep as “unclean” and referring to quarantine periods as “cleansing orders” suggests the infectability of kraals were stressed in progressive accounts of scab due to the influence of the mid-nineteenth century hygiene theory for diseases and the ideological impact of public hygiene campaigns.

Illustration 1.1: A contemporary advertisement for the ubiquitous Cooper’s Dip

Source: *Ons Land*, 6 November 1894. “Cooper’s is the boss. Cooper’s is the dip to kill the scab devil. It shall kill the monster. Try it.”

The Dutch-speaking farmers' practice can therefore not be seen as purely 'traditional' while the progressives' aetiology is not purely 'modern' and neither side therefore neatly fits the labels 'traditional' or 'modern'. As it is apparent that the demarcation of knowledge as 'traditional', 'indigenous' or 'modern' cannot be supported in practice, there must be an underlying reason for the insistence of both historians and indigenistas in doing so. In this regard Tamarkin and the indigenistas' efforts to promote what they have defined as 'traditional' or 'indigenous' is particular revealing. The debate regarding the validity of indigenous knowledge rephrases a fundamental problem in anthropology, namely how to understand people who are apparently clinging to beliefs judged to be false and irrational according to western criteria of truth and rationality.

Partha Chatterjee (1986) provides an overview of the main solutions offered by anthropologists. Political conservatives see the matter in simplistic terms: false beliefs are errors so people maintaining these 'errors' in the face of the 'correct' explanations are irrational. This neatly supports conservative prejudice against the developing world. Liberals cannot accept this pejorative conclusion and they have therefore developed a number of alternative approaches to the question that enable them to attribute coherence to apparently irrational beliefs and practices. One option (Chatterjee calls such theorists 'rationalists') is to argue that all people are equally rational in the conventional sense of the word – their actions are consistent with their beliefs and they believe they have sufficient motivation to consider their beliefs to be true. Also called the principle of charity, this theory maintains that if an action or belief seems irrational or inconsistent, it is because the outside observer it is not fully aware of the underlying motives for the action or belief. Critics of this position think it is implausible that a full description of a community's social circumstances and the motivations of individual actors in such a community

are possible. Anthropologist would therefore rarely have sufficient evidence for claiming that beliefs and practices previously deemed irrational are rational.[59]

A second approach is to avoid the debate entirely by following a functionalist or structuralist approach. Both were popular in the middle decades of the twentieth century. Functionalism maintains that apparently inexplicable practices and beliefs have a hidden political or material function in a community that ensures its survival. Structuralists argue that such practices and beliefs form part of an underlying symbolic network that is logically consistent. Both approaches are profoundly patronising: western observers, maintaining the image of themselves as objective and rational, are able to discern the hidden meanings and motivations of indigenous cultural practices while the people studied remain unaware of the 'real' meaning and motivations of their actions and beliefs. Functionalism and structuralism also beg the question: why are the people studied not aware of the 'real' meaning and motivations of their actions? Is it perhaps because they are irrational?[60]

Thirdly, the 'relativists' (as Chatterjee names them) argue that no universal rationality exists, but that different cultures have different concepts of rationality. In practice, however, different conceptions of rationality are difficult to define and demarcate from each other. How, for instance, would an observer know if an individual is an irrational member of group x or a rational member of group y? How can observers determine if a certain action or behaviour is 'rational' in terms of a particular culture while at the same time having to construct a definition of rationality for that culture? It is therefore unclear how relativists will go about identifying alternative rationalities and in practice they seek to escape it by also adopting a principle of charity: the

[59] P. Chatterjee, *Nationalist Thought and the Colonial World* (1986), pp. 10-12.
[60] Ibid., p. 12.

cultural practices of the 'other' are seen to be rational even though this evaluation cannot be motivated.[61]

Rationalist and relativist theorists therefore arrive at the same impasse. Chatterjee argues that the problem with the debate on rationality lies not in the solutions proposed but in the question posed. The latter is derived from the habit of the west to appropriate the prestige of science for itself as a central characteristic of its culture. Chatterjee argues that deciding whether a particular group of people are rational or not is not simply a matter of enquiring whether their beliefs are scientifically valid or not. He points out that few statements are unambiguously true.[62] An illustration of this is easy to find in the account of the scab disease. Hutcheon and nineteenth century veterinarians believed the disease was simply the effect of the bite of the *acari*. Some farmers, however, believed that the disease was a blood borne ailment that expressed itself if the sheep became malnourished. As discussed in Chapter 2, scab does have an effect on the blood of sheep as bacteria borne by *acari* causes an immune response in the sheep that is detectable through blood tests. Was Hutcheon's version of the disease then untrue? Can one argue that the farmers' beliefs were true in some way, even if they did not understand the disease to be caused by bacteria? The epistemological status of beliefs (or statements of fact) can seldom be conclusively determined and even then this status may be limited in space and time. Truth, it seems, has degrees and is context dependent.

In the discipline of epistemology, people are credited with knowledge it they have "true" beliefs and if they meet some sort of justification principle, i.e. they must know their beliefs are true and have valid reasons for this purported knowledge. This academic formulation is relevant here because both the criteria determining whether a statement or belief is true or not and what counts

[61] Ibid., pp. 12-14.
[62] Ibid., p. 14.

as sufficient justification is socially mediated. After immediate sensory experience has been exhausted as a source of knowledge, knowledge ascription becomes dependent on social relationships. In everyday practice people therefore rank sources of information according to their reliability and trustworthiness.[63] This returns the discussion back to Scott's characterisation of the dichotomy between 'traditional' and 'modern' knowledge: 'Traditional' knowledge does not meet modern criteria for what counts as knowledge. Science has increasingly been granted the cultural authority to adjudicate on knowledge claims.

Chatterjee calls this the "rationality ethic". Rationality is not merely a matter of having true beliefs: "It is seen as incorporating a certain way of looking at the properties of nature, of ordering our knowledge of those properties in a certain consistent and coherent way, of using this knowledge for adaptive advantage vis-à-vis nature."[64] To attribute a group of people with rationality implies that they use natural resources to their optimal material advantage. The knowledge that enables this exploitation is then labelled as scientifically valid. Rationality is an ethic, a way of living in the world, which is said to promote scientific thinking. Chatterjee phrases his argument with exceptional clarity:

> It is important to note, however, that the stricter definition of scientific truth is now contained within the wider notion of rationality as an ethic. So much so that the ethic of rationality is now seen to be characteristic of 'scientifically-orientated' or 'theoretically-orientated' cultures. And thus, by a conceptual sleight of hand, the epistemic privilege which is due to 'scientific truth' is appropriated by entire cultures. What results is an *essentialism*: certain historically specific correspondences between certain elements in the structure of beliefs in European society and certain, albeit spectacular, changes in techno-economic conditions of production are attributed the quality of essences which are said to characterize Western cultures as a whole. It is an essentialism which, when imposed on historical time, divides up the history of Western society into pre-scientific and scientific, and casts every other culture in the world into the darkness of unscientific traditionalism. Initially, this essentialism enjoys a straightforward ethnic privilege: the superiority of the European people. Later it is given a moral privilege, encompassing as in the post-Enlightenment theories of progress – positivism, utilitarianism, Weberian sociology – a historically progressive philosophy of life. And finally, when all of these privileged positions are challenged with the spread of anti-colonial movements, it is the epistemic privilege which has become the last bastion of global supremacy for the cultural values of

[63] 'Interview with Simon Blackwell', *Conversations On Truth* (2009), pp. 3-4.
[64] Ibid., p. 16.

> Western industrial societies. It is a privilege which sanctions the assertion of cultural supremacy while assiduously denying at the same time that it has anything to do with cultural evaluations. Relativist or rationalist, each one is keen to outdo the other in the radicalness of his stand against ethnocentric bias.[65]

Western academic disciplines, through an implied appeal to the authority of science, appropriate the right to 'explain' other cultures in ways that makes sense in terms of the rationality ethic.[66]

The project of defining and preserving indigenous knowledge suffers under the assumptions of this rationality ethic and its implied appeal to the authority of science. The promotion of indigenous knowledge is an effort to attribute rationality to indigenous knowledge practices. As indigenous people have not relinquished their knowledge practices, indigenistas now seek to find a constructive, bounded role for these practices in the developmental process with the implied assumption that development will eventually invalidate these practices. Agrawal reports that the advocates of indigenous knowledge aim to gather and archive such knowledge, presumably organised according to its use. Such a project then essentially amounts to evaluating indigenous knowledge for its 'correctness', a process requiring that it be compared with 'scientific truth'.[67]

This ethic was also visible in the progressive's assumption that their way of farming was 'correct' as it was the most efficient. Because to be rational was seen as synonymous with economic efficiency, Dutch-speaking farmers' refusal or neglect to adopt progressive farming measures was seen as a sign of their irrationality and justified perceptions of them as inferior to Englishmen.[68] Hutcheon therefore initially had no reservations in grading responses to the scab act and the scientific explanation of the disease according to the level of intelligence he assumed farmers possessed. As can be imagined, progressives and those receptive to his gospel were judged to be

[65] Ibid., pp. 16-17.
[66] Ibid., p. 17.
[67] Agrawal, 'Dismantling the Divide Between Indigenous and Scientific Knowledge', p. 26.
[68] D'Arcy Nell, '"You Cannot Make the People Scientific by Act of Parliament": Farmers, the State, and Livestock Enumeration in the North-western Cape, c. 1850-1900', pp. 2-3.

more intelligent than everyone else.[69] In this climate, farmers' contrary beliefs were not credited as being knowledge.

But the efforts of historians to explain the farmers' actions are also based on this rationality ethic. Therefore D'Arcy Nell argues that the farmers were hesitant to adopt improvements (of which the scab act was one) out of self interest. Where this explanation falls short, elements of 'unscientific' or irrational belief structures are called in to take up the slack, i.e. they had religiously grounded objections to scientific positivism. Religious beliefs or alternative epistemological traditions then function as the relativists' alternative rationality or can be read as a hold-over from 'tradition' and judged to be irrational. Tamarkin's explanation is similarly mixed: the farmers' experiential epistemology placed them on a "different cognitive planet" from the English farmers and Dutch-speaking progressives. [70]

According to Tamarkin, opponents of the Act professed an alternate rationality – a "moral economy" or "ethno-morality". This serves to redefine their economic interests to encompass the communal level and so individualistic market rationality is replaced with communal economic rationality.[71] Trek farmers, however, were not self-sufficient and had to interact with the market to acquire, for instance, wagons, firearms, clothing, worked metal and tobacco. There is therefore no evidence for the existence of a trek farmer moral economy that withstood market pressures during a purported 'pre-capitalist' period at the Cape.[72] Such a system also did not exist towards the end of the nineteenth century, as evidenced by rural enclosure and the increased pace of

[69] CPP [G.14 – 1887] *Report by the Colonial Veterinary Surgeon for the Year 1886*, p. 5.
[70] Tamarkin, *Volk and Flock*, p. 16.
[71] Ibid., pp. 37-38.
[72] S. Newton-King, *Masters and Servants on the Cape Eastern Frontier, 1760-1803* (1999), pp. 151, 164-167, 170-171.

urbanisation after 1880.[73] During droughts, landowners retrenched their *bywoner* dependents and these men, their families and livestock had to subsist on waterless land. They therefore disproportionately suffered the effects of drought, often losing the draught oxen which were their main source of income. Some of these *bywoners* were rehired at the end of the drought but each drought swelled the number of poor whites and the government struggled to employ them on public works projects. [74]

Both Tamarkin and D'Arcy Nell therefore follow a duel strategy of ascribing rationality and irrationality to Dutch-speaking farmers' practice by turn. Accordingly, the farmers were largely rational and the irrationality they exhibited was due to remnants of their traditional, pre-modern world view. Tamarkin and D'Arcy Nell therefore essentially return to the practice of ascribing character deficiencies to the rural poor. These character deficiencies are then excused by way of their rural isolation, lack of formal education and distrust of English-speakers, instilling in them a reluctance to accept 'modern' innovations.[75] In contrast, as argued above and in Chapters 3 and 4, this thesis stresses that farmers who protested against the Scab Act via testimonies before the Scab Commission and letters to the press did not appear to be insensible to the possible benefits of technological innovations; rather they argued that they could not afford to improve their land. Even if the farmers were as ignorant as nineteenth century progressives claimed, exposing them to 'modern' farming practices would not solve their greatest problem, i.e. their lack of capital.

[73] 'Gesamentlike Bevindinge en Aanbevelinge van die Kommissie', *Die Armblanke-vraagstuk in Suid-Afrika: Verslag van die Carnegie-kommissie* (1932), p. viii.
[74] CPP [G 68 – 1899] *Reports by the Special Commissioner appointed to inquire into the Agricultural Distress and Land Matters in the Divisions of Clanwilliam, Van Rhyn's Dorp, Calvinia, Fraserburg, Carnarvon, Kenhardt, Gordonia, Prieska and Hope Town*, pp. 8-10.
[75] Tamarkin, *Volk and Flock*, p. 130.

THE CHALLENGE OF RELATIVITY

Chatterjee is pessimistic about the ability of western academic disciplines to transcend the rationality ethic as it is based on the reality of western material wealth and technological power.[76] This is a familiar relativist conclusion: observers cannot escape their subject position as there is no neutral ground. This creates an impasse: by not admitting to the validity of universal standards of evaluation, relativism offers no guidelines for choosing between competing, mutually exclusive points of view. Some of these choices are prosaic but others are morally urgent.[77] Such choices are then made by reverting to the rationality ethic (and the universal Enlightenment values it presupposes) as a standard of evaluation and the 'other' is again presented as either irrational (sometimes 'traditional' acts as euphemism here) or are charitably described as acting according to an alternative or hidden rationality. As this alternative rationality can seldom be explained in terms western observers will recognise as rational, 'alternative rationality' also functions as synonym for 'irrationality'.

Given that western academics cannot escape their subject positions, the anthropologist Stanley J. Tambiah (1990) suggests a deflationary approach for anthropology. Rather than seeking to describe and explain other cultures, anthropologists should aim at translating these cultures into terms understandable to a western audience. Such translation would be a dialectical process that does not aim at establishing a one-to-one correspondence between elements of different cultures, but approaches translation as an exercise in mapping – the degree by which concepts overlap or not informs the anthropologist about the culture studied and about the assumptions and ready-made categories held by the west. Some elements of foreign cultures will have a one-on-one correspondence with elements in western culture while other concepts will prove to be too

[76] Chatterjee, *Nationalist Thought and the Colonial World*, p. 17.
[77] 'Interview with Simon Blackwell', *Conversations On Truth* (2009), p. 9.

context bound to be translated. Anthropologists are therefore tasked with identifying western parallels for the cultural practices they study while being cautious not to force comparisons. [78]

Tambiah's proposal seemingly ignores how anthropologists gain the necessary cultural and linguistic fluency to effect such translations. There is not sufficient space to give an overview of the theoretical complexities involved here. Since sufficient theoretical grounds for assessing the accuracy of a translation have not yet been developed, the problem of translation remains theoretically unresolved.[79] In practice, however, regular and confident translations between languages and different cultural contexts are made on a daily basis. Tambiah therefore proposes that the problem of translation should be solved on a case by case basis. If a translation proves difficult or impossible, it is evidence for cultural incommensurability. Individual 'translation projects' would also be open to continuous re-evaluation. This too is evident in practice: the re-examination and analyses of texts are the lifeblood of academic disciplines. Historians, for example, constantly reinvent the past by offering new 'translations' of primary sources.

Tambiah identifies three comparative categories for this translation project. If a base of agreement (such as a common aim) exists between two phenomena or systems to be compared and the two systems are mutually exclusive, one of two situations pertains: Firstly, relativism can be avoided if "a straightforward decision procedure" exists by which to judge the truth or efficacy of the solution or explanation which are being compared. The winning theory can then be declared correct while entertaining the losing position becomes a sign of irrationality. Secondly, if the two phenomena or systems compared are true alternatives to the same problem, relativism truly pertains. The solutions offered by the two systems are then context dependent and neither position has to be abandoned or judged inferior. Lastly, anthropologists should consider whether

[78] S. J. Tambiah, *Magic, Science, Religion, and the Scope of Rationality* (1990), p. 123.
[79] D. Turnball, *Masons, Tricksters and Cartographers* (2000), pp. 219-221.

two phenomena should be compared at all. If their presuppositions are different and a comparison will result in an untenable imposition of principles from one phenomenon onto the other, the two phenomena do not have shared aims or a base of agreement and cannot be compared in a profitable manner. Certain concepts will prove to be untranslatable.[80]

According to Tambiah's suggested framework, the Dutch-speaking farmers' alternative views on scab falls in the first category described above. Their views and treatment regimes had the same aim as those of progressives but it was mutually exclusive. The opponents of the Scab Act were eventually persuaded of the validity of the progressives' views of scab. There is therefore no need to explain away their temporary 'error' (or irrationality) by theorising that they possessed alternative epistemological or ontological frameworks. As discussed above, both sides presented their views as based on empirical evidence.

While Tambiah acknowledges that deciding between alternatives in the social and moral realms is a complex matter, he appeals to science to act as arbiter between different systems for explaining physical phenomena. However, such a judgment can only be made if the relativist critique of science can be defused. It is a common strategy for social scientists like Tambiah to reject the relativist critique of science by limiting its application. He argues that science may play different roles in different societies but that "a single science" exists as "all practitioners of a discipline in question share concepts, rules of the game, notions of relevant evidence and proof, and strive for unified consistent theories which are in principle correct for the time being." Relativity encroaches on science in "what claims 'scientific' knowledge makes in regards to matters outside its special provenance […] and what alliances scientists make with interest groups and wielders

[80] Tambiah, *Magic, Science, Religion, and the Scope of Rationality*, pp. 131-133.

of power and affluence." [81] The scientific method itself is therefore immune from the relativist critique.

Even when it is acknowledged that social factors impinge on scientific methodology, the threat is contained: it is well established that experiments do not produce evidence in a transparent, mechanical manner. Discussing this fact with relevance to new scientific equipment and procedures, William Bechtel (1990) argues:

> Rather than judging a theory by empirical evidence, which is either taken as a given or independently established, the claim here is that the evidence and the procedures for procuring it are evaluated at least in part by how sharply defined and replicable the evidence seemed to be and by the degree to which the evidence fits with emerging theoretical views. The latter criterion might be thought to undercut the objectivity of scientific knowledge and generate a vicious circularity: Knowledge claims are judged relative to the available evidence, which is given credit by the support it lends to the knowledge claim.[82]

But Bechtel quickly finds a way of restoring objectivity: experiments are designed to study real objects and 'reality' therefore constrains the possible and plausible interpretations that can be given for experimental data.[83]

The philosopher and anthropologist David Turnball (2000) groups attempts by theorists to escape the impact of social relativism on science into two categories: Firstly, there is what he calls the "long-run argument". This approach claims that although knowledge is indeed socially constructed, it is only trivially so. In the long-run, social circumstances and other contaminants in the production process of any theory that is accepted as correct will disappear under the burden of evidence and positive predictive results. The influence of social factors is therefore located in the rate and direction of scientific progress but does not affect the form and content of scientific ideas, a view shared by Tambiah above. Secondly, some appeal to the progress of science. As

[81] Ibid., p. 130.
[82] W. Bechtel, 'Scientific evidence: creating and evaluating experimental instruments and research techniques' (1990), p. 568.
[83] Ibid.

science has greatly increased humanity's ability to predict and control nature, the scientific method patently works. There is therefore no need for a critique. [84]

These two arguments are both problematic. As Tambiah stated, a particular scientific theory is only "correct for the time being." The reason for this is that the "vicious circularity" of the scientific method cannot be escaped by reference to reality as adjudicator. Tambiah's phrase "the rules of the game" broaches an important philosophical argument regarding the nature of rule following originally proposed by Wittgenstein: no body of rules can encompass the rules governing their application. Rules would have to be devised to govern the application of the initial set of rules and another set of rules would be needed to govern the application of the second set of rules until the process is repeated *ad infinitum*. 'Players' can only escape this infinite regress through the possibility of a vantage point external to the game being played. Scientists do not have such a vantage point; appealing to reality does not suffice since they claim it can only be reached through the methodology of science. On a purely philosophical level one therefore cannot determine when a scientific statement is correct. Although material efficacy strongly suggests fidelity between a scientific theory and the phenomenon it describes, such fidelity is not logically necessary. It can therefore not be determined at which point in the lifetime of a particular scientific theory 'social contaminants' have finally been expunged to leave behind unvarnished scientific truth.[85]

Beinart, Brown and Gilfoyle, the main proponents of the historiography of progressivism in the Cape Colony and the Union of South Africa, appear to deny the applicability of the relativist critique of the scientific method. Their recent review article of Africanist critiques of colonial science explained their interest in European colonial experts, government sponsored science and

[84] Turnball, *Masons, Tricksters and Cartographers*, pp. 219, 225-226.
[85] Ibid., pp. 213, 226.

government ecological and veterinary interventions. According to them, "colonial scientists and technical officers in Africa have received a bad academic press" as part of the post-modern critique of science as an instrument of colonial power. They want to detach science and technology from its colonial context to rather focus on the colonial experts as scientists first and as colonial bureaucrats second. This entails the reading of these experts' reports "through their own eyes, for their own logic" and situating them and their knowledge in the world of scientific research and discovery before the world of political power.[86]

In his doctorate thesis, Gilfoyle wrote that previous authors have been interested in the "ideological and political significance of science rather than on its content or material effects on the economy."[87] However his and his co-authors' work do not give a detailed analysis of the effects science had on the economy, nor do they critically examine the scientific methodology of the various colonial experts they purport to study. Rather, they produce what has been criticised as a form of neo-liberal revisionism - mere inventories of scientific, agricultural and environmental knowledge in accounts that focus on the professional careers of experts, but neglect social context.[88]

Reading the reports of government experts 'through the experts' own eyes' have caused these authors to view their areas of enquiry in the terms set by the various progressively minded colonial experts they study. The focus remains on what these experts saw as worthy of scientific study and presents the success or failure of such study in the experts' own terms. In an as yet unpublished volume on the history of veterinary science in South Africa, Gilfoyle and Brown were careful to state that their account of South African veterinary science "consists [not] of an

[86] W. Beinart et al, 'Experts and Expertise in Colonial Africa Reconsidered: Science and the Interpretation of Knowledge' (2009), p. 432.
[87] D. Gilfoyle, 'Veterinary Science and Public Policy at the Cape Colony, 1877-1910' (2002), p. 15.
[88] L. van Sittert, 'Nation-Building Knowledge: Dutch Indigenous Knowledge and the Invention of White South Africanism, 1890-1909' (2009), p. 2.

analysis or description of an orderly, rational progress towards the revelation of biological reality." [89] They acknowledge the influence of social contingencies on the process of scientific discovery but deny this at the end of the same paragraph: "Nevertheless, a 'social constuctivist' approach is avoided, because this would imply that outcomes [of scientific studies and debates between the experts and the farming public] were the result of social forces, whereas the present writers maintain the centrality of biological reality to the production of knowledge and policy."[90]

Gilfoyle and Brown do not elaborate this theoretical position further but, given the theoretical problems inherent to efforts to limit the applicability of relativism to science, it is incumbent upon them to explain how they know when 'biological reality' has been reached. In practice they seem to take the doubt a particular government scientist had about the particulars of his discipline as the degree of correspondence a particular theory had achieved with reality. Gilfoyle's study of the office of the Chief Veterinary Surgeon's scientific practice in the Cape Colony between 1877 and 1910 is a case in point. Since the CVS considered the scientific explanation of scab to be complete (see Chapter 2 for a detailed discussion of this claim), Gilfoyle does not interrogate his aetiology of scab further.[91] He is content with sketching the viewpoints of the progressives and their opponents in broad strokes and, together with Hutcheon, he abandons the field before the Scab Act of 1894 was promulgated and the anti-Scab Act movement gained momentum. In contrast, Gilfoyle's treatment of the redwater and rinderpest epizootics is much more detailed because the aetiology of these diseases had not yet been established and Hutcheon showed considerable professional interest in them.

[89] Gilfoyle, D. and Brown, K. 'Veterinary Science, Environment and the State in South Africa c1900-1950' (2009), p. 20.
[90] Ibid., p. 21.
[91] Gilfoyle, 'Veterinary Science and Public Policy at the Cape Colony, 1877-1910', pp. 100-103.

As will be discussed extensively below, the scientific account of scab was not complete. In addition, the omissions in the account made it prejudicial to trek farmer interests. The Africanist critique of colonial science can therefore not be dismissed in the case of scab.

THE WAY FORWARD

As discussed, the tradition/modernity dichotomy is inchoate since what is traditional and what is modern cannot be adequately defined. The Dutch-speaking farmers' resistance to progress has to be explained without assuming that developing and adopting new technologies is the normative projection of history and without assuming that the farmers' resistance to progress therefore needs a special explanation based in their possessing alternate epistemological or moral frameworks that can then be attributed to either alternate rationalities or 'tradition'.

It is maintained here that Tambiah's framework is more or less applicable. Progressives and the Dutch-speaking opponents to the Scab Act did not employ different epistemological frameworks and neither party possessed alternative forms of rationality. The conflict over scab and the scab acts consisted of opponents and proponents offering mutually exclusive explanations and solutions for what was largely a material problem. However, this does not mean that the coherence of the eventually hegemonic progressive view can be accepted. Tambiah's analysis needs to incorporate the consequences of scientific relativity.

Turnball's critique of efforts to insulate science from relativism may be overly simplistic. Despite his philosophical reservations, certain scientific theories are supported by such a large weight of evidence that doubting their truth is absurd. To paraphrase Bertrand Russell: although scientists accept that a great deal of scientific theories and facts are not logically necessary like mathematical theorems and may be disproved by future scientists, a great deal of science is taken as true in the common sense usage of the term and for some scientific facts to be invalidated

would require the intermediacy of some supernatural entity that played a massive confidence trick on humanity.[92] Turnball's critique can therefore not be plausibly applied to all scientific theories but nineteenth century veterinary science does not number among the exempt.

Tambiah's formulation theorises a particular, time-bound social space in which contrasting explanations for material phenomena could be evaluated before one side had to either acknowledge defeat or embrace irrationality. It will be argued in the next three chapters that space still existed in the late nineteenth century Cape Colony to question the scientific explanation for scab and the benefits of scab eradication. In addition, deciding which side was correct about scab and the scab acts was not a matter that could simply be referred to science for arbitration. The progressive's view of scab was not clearly scientifically 'correct'. Scab science was not complete, but it obtained material efficacy in eradicating scab and this efficacy seduced scientists into believing that the disease was fully understood.

The scientific view of scab was also not presented in a manner that made its superiority a logically necessary conclusion. Scab science was used by the government at the Cape to convince farmers of the need for a Scab Act, but outside of the milieu of veterinary practice and the discourse of progressive farming, this science was reduced to a largely unconvincing public rhetoric that enabled farmers who were previously unfamiliar with scientific methodology to dispute scientific findings and to offer evidence that countered the scientific view.

[92] Discussed in R. Dawkins, *The Greatest Show on Earth* (2009), p. 13.

CHAPTER 2: SCIENCE AND CHANGING PERCEPTIONS OF PSOROPTIC MANGE

As this thesis is essentially concerned with scientific practice and resistance to science in a politically polarized social environment, the conflict between the everyday practical experience of farmers and the scientifically acceptable explanations for these same experiences is of central importance. But historians investigating the political conflict surrounding the Cape Colony scab legislation and their implementation have constructed a simplistic discourse reducing the conflict over scab to a confrontation between progressive farmers and officials on the one hand and unscientific 'Afrikaner' farmers on the other, ignoring the uncertainties in the progressives' position. A review of the scientific literature on scab, however, illustrates just how much uncertainty remained and still exists regarding the nature of the disease. As discussed below, there was and still is uncertainty as to how host specific the scab mites are and how long pastures and sleeping places can remain infective. Recent research also caused the scientific understanding of the disease and methods of controlling it to alter substantially.

Of the authors who have investigated veterinary practice in the Cape Colony, Beinart and Gilfoyle are the only ones who have discussed the scientific practice of veterinary and government officials as regards scab. Beinart does not devote much space to how veterinary surgeons of the period conceived of scab as he saw the central difficulty in the implementation of the Scab Acts as the conflict surrounding transhumance and farmers' resistance to increasing government surveillance. William Catton Branford, the first CVS of the colony (1876 to 1879), confirmed that scab in the Colony was the same disease as elsewhere. The role of Duncan Hutcheon (CVS from 1880 until 1906) regarding scab is therefore described by Beinart as being mainly educational.[1]

[1] W. Beinart, *The Rise of Conservation in South Africa* (2003), pp. 132-3, 142, 152-155.

Gilfoyle describes anti-progressive farmers' views on scab and outlines Hutcheon's perspective but he does not evaluate Hutcheon's scientific claims or discuss whether these were consistently implemented. Like Beinart, Gilfoyle does not problematise scab science since there was little professional veterinary interest in the disease in the late nineteenth century. Like Beinart, Gilfoyle focuses on Hutcheon's educational aims.[2]

In contrast, this chapter will not only report on colonial veterinary practice but also evaluate its scientific claims. However, it is not the aim to adjudicate between the rival empirical claims of farmers and scientists. Rather, this chapter will test whether incomplete understanding of the nature of scab contributed to the failure of efforts to eradicate the disease or not. The argument is based on the evaluation of conflicting scientific findings. This is a fairly uncomplicated task as the scientific publications on scab are brief and experimental findings are presented concisely without being jargon-laden. The body of scientific literature available in English on scab is also not very extensive. Literature on scab published in South Africa is very limited, as evidenced by the few South African sources cited in both the South African and international veterinary science literature. It can therefore be stated with a fair amount of confidence that the scientific articles referenced in this chapter are a representative sample of the available literature on the subject. This convenient dearth of literature is due to economic factors that will be discussed later in the chapter. Before the 1980s researchers largely focussed on *acari* taxonomy, lifecycle and infectability. More detailed research regarding mite feeding behaviour, chemical analysis of the blood of infected sheep and immunological and genetic studies were only conducted in the last few decades.

Hutcheon's views on scab were published in his annual reports of 1885 and 1886 and also as an addendum to the report of the Scab Commission of 1894. Full descriptions of the disease penned

[2] D. Gilfoyle, 'Veterinary Science and Public policy at the Cape Colony, 1877-1910' (2002), pp. 100-103.

by him were also published in the *Agricultural Journal of the Cape of Good Hope*. So regularly did he have to answer questions on scab that he later refused to discuss scab at length: stating that he and the readers of the *Agricultural Journal* are "quite tired of the subject", he referred enquiries to the above-mentioned annual reports.[3] But Hutcheon also faced enquiries from farmers disputing that scab was caused by *acari* mites and perhaps his 'weariness' with scab derived from the irksome necessity of replying to such farmers "without appearing rude".[4] As mentioned above, he also believed that the scientific knowledge of scab was complete:

> With the exception, perhaps, of stock thefts, no subject has been so frequently discussed at farmers' meetings and in editorial columns as scab; while lecturers and essayists have also endeavoured to instruct the public respecting its originating cause, its effects, and the desirability of getting rid of it by proper remedial measures and wise legislative enactments. In fact, so much has been written and spoken upon this subject, both practically and scientifically, that very little that is new and true can be added to it.[5]

In contrast, A.W. Shilston (1915), a veterinary researcher employed at Onderstepoort, introducing his own research on the disease, wrote that "there are, however, certain features of the disease which the generally accepted account of the life of the causal parasite fails to explain, and until exact information on these points is available the result of repressive measures must be very uncertain."[6] He claimed that his own research in the literature available on scab showed that authors on scab have been content to quote authorities on the disease who published their findings in the 1830s and 1850s. Claims had also been made by these authors about the lifecycle of the mites that were not supported by sufficient evidence. The result was the circulation of certain popular beliefs which have since been disproved.[7]

The following will outline Shilston's research findings in broad terms and trace how these and other research conflicted with the views of Hutcheon and Davison. There are five main areas of

[3] *AJCGH*, 3, 7 (1890), p. 82.
[4] *AJCGH*, 4, 13 (1891), p. 149.
[5] D. Hutcheon, 'Scab: its Nature, Cause, Symptoms and Treatment' (1908), p. 432.
[6] A. W. Shilston, 'Sheep Scab: Observations on the Life-history of *Psoroptes communis*, var. *ovis* and some points connected with the Epizootiology of the Disease in South Africa' (1915), p. 71.
[7] Ibid.

enquiry: difficulties with diagnosing scab; host specificity of *acari* mites; confusion regarding the lifecycle of *acari* mites and how this effected the eradication of the disease; the duration of the infectivity of mite populations if separated from sheep; mite feeding and changing perception of the disease.

THE CLINICAL SIGNS OF SCAB AND ITS DIAGNOSIS

Hutcheon's clinical description of scab is similar to that of modern authors. Scab (or psoroptic mange) in sheep is characterised by intense skin irritation caused by the activity of the *acari* mite, *Psoroptes ovis*. The affected sheep rubs itself against trees, fence posts and other surfaces and bites and scratches itself to relieve this irritation, causing wool to hang from the fleece in tufts. An examination of the sheep's skin where the fleece is disturbed by such unraveling wool tufts shows redness and the formation of small purplish-yellow pimples. These pimples exude serous fluid that dries to form a crust on the skin. The *acari*, which feed on the serous fluid, then multiply; causing the itching and scratching to increase. Increased exudation then takes place and the crusts enlarge. Eventually wool is shed or pulled from such areas and in severe cases the greater part of the affected sheep's skin may be bare and covered in scab crusts.[8]

A careful farmer was expected to recognize the disease in its early stages when crust formation had only occurred to a limited degree by noticing the behavioural changes in the affected sheep and the resultant disturbance in its fleece caused by its efforts to relieve the irritation. This assumption of the easy recognisability of the disease, as discussed below, formed the basis of the sheep inspectors' efforts to prosecute contraventions of the Scab Act. Even today the disease is considered easily recognisable by some sources: an article previously published in the *Landbou Weekblad* and taken up in the publication called *Kleinvee Siektes* in 1994, is illustrated with photographs of sheep suffering the early stages of scab. These photographs are accompanied by a

[8] Hutcheon, 'Scab: its Nature, Cause, Symptoms and Treatment', pp. 433, 439-440.

caption stating that signs of scab on a wool sheep cannot be missed as "the smallest disturbance in the fleece is immediately noticeable."[9]

Although a disturbance in the fleece of a wool sheep is noticeable, not all such disturbances will be due to scab and not only wool sheep are susceptible to the disease. The beginning stages of the disease in hairy sheep will be much less noticeable than in wool sheep and farmers might only notice scab lesions on such sheep when the disease was already at an advanced stage. In addition to the characteristic scab lesions, however, scab was also visible in the behaviour of the sheep. G. Flemming (1875), a nineteenth century authority on livestock diseases, wrote that for an "experienced shepherd or stockman" scab is readily recognisable due to the infected animal's behaviour – "a few minutes' watching being sufficient to discover the existence of the disease in the animal's movements, while the condition of the fleece affords corroborative evidence."[10] Flemming therefore described diagnosing scab in field conditions as being dependent on previous observation of the habits and movement of sheep. Diagnosis was therefore based on a series of visual cues – the sheep's movements, its lack of appetite, the resultant loss of condition, the disturbance of the fleece and the scab lesions itself. A modern Karoo sheep farmer, Mr. Botes from Merweville, diagnoses scab precisely as Flemming described almost a century and a half ago: according to him, scab is immediately noticeable through the restless motion of the sheep. Mr. Botes knows his Dorpers have scab if "they cannot stand still".[11]

In the early stages of the disease before multiple scab lesions were formed and especially if only a single sheep in a flock was infected, scab lesions could be mistaken for ulcers or *steekgras*

[9] J. De Wet, 'Skaapbrandsiekte' (1994), p. 96.
[10] G. Flemming, *A Manual of Veterinary Sanitary Science and Police*, Vol. 2 (1875), p. 430.
[11] Personal conversation with Mr. Botes at Merweville, 2 May 2009. Botes is in his sixties, grew up on a sheep farm and farmed for his whole adult life. Like most farmers in the area he studied at an agricultural college. He farms with his brother and together they have about 1200 sheep, an amount he considers to be average for farmers in the region.

abscesses while the sheep's restless movement was ascribed to ticks.[12] The former was a common complaint in the north western areas of the Cape Colony where the spiky seedpods of *Aristidae* grasses caused great damage. The seedpods stuck into the fleece at the throat and chest area as the sheep grazed and the sheep's efforts to dislodge the seedpod drove it into the skin were it formed an encrusted ulcer that could be confused with a scab lesion. Fleeces containing *steekgras* had low value and the afflicted sheep could die of infection.[13] As the disease progressed and more lesions formed, a mistaken diagnosis became less likely. Mistaking scab lesions for *steekgras* abscesses was also not very plausible as the former generally started appearing on an infected sheep's shoulders and then spread down its back and flanks while the latter occurred on the chest or front legs.[14]

Another unidentified sheep disease also caused wool loss in sheep and farmers feared inexperienced sheep inspectors might mistake it for scab. [15] The disease caused fever, the swelling of the infected animal's lymph nodes and slight wool loss over the swellings but no crusts formed and dipping was not an effective cure. Some farmers testified that this relatively rare disease could not be mistaken for scab. A small number, however, were uncertain about the distinction between it and scab, calling it "fever scab." To such farmers fever scab and scab proper were caused by malnutrition – scab lesions, fever and wool loss all being outward expressions of the same condition.[16] The Scab Commission therefore had to explain to farmers that the Scab Act was solely aimed at the kind caused by the *acari*.[17]

[12] CCP [G. 28 – 1904] *Report of the Chief Inspector of Sheep for the Year 1903*, p. 3. Davison was not impressed with such excuses.
[13] P. MacOwan, '*Steekgras* in Wool', (1890), pp. 83-84.
[14] De Wet, 'Skaapbrandsiekte', p. 96.
[15] Farmers who testified about this disease before the Scab Commission did not mention its name. The Commission thought it was bluetongue (or catarrhal fever), but they could not confirm their suspicion. See CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of Alfred Ross Biggs, p. 193; evidence of Hendrik Johannes de Jager, p. 526.
[16] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of Barend Moolman, p. 387.
[17] Ibid., evidence of Douw Gerhrondt Steyn, p. 664.

To reassure farmers that they would not be prosecuted for *steekgras* abscesses or fever scab and to ensure that farmers could not claim that they were falsely prosecuted for scab when their animals really suffered from the former conditions, sheep inspectors were required to produce *acari* from the infected sheep in order to 'prove scab' in court. But finding *acari* on visibly infected sheep was sometimes difficult, especially under field conditions.[18] Hutcheon admitted to embarrassing himself in public by not always being able to produce the *acari*. As the mites fed on the serous fluid, they congregated around the edges of the crusts and were therefore more likely to be found in skin samples taken from crust edges. However, they could also abandon heavily encrusted areas completely so that samples taken from the edges of scab lesions might contain no scab mites.[19] The legal and political necessity of 'proving scab' by isolating *acari* specimens therefore enabled farmers to escape prosecution. [20]

Today a positive diagnosis does not require that *acari* be found on the infected animal as the clinical signs of the disease are judged to be sufficiently distinct to confirm a diagnosis. A much bigger diagnostic problem is that sheep may be sub-clinically infected with scab for months

[18] CPP [A. 12 – 1905] *Report of the Select Committee on the Scab Acts*, evidence of Sheep Inspector D.C. van der Merwe, pp. 52-54; Ibid., evidence of W. B. Magennis, p. 79. Sheep Inspector D. C. van der Merwe of Aberdeen, accompanied by the Assistant Chief Inspector John Nash, had to inspect approximately 22 000 sheep at a stock fair in January, 1904. Some sheep belonging to a certain D. Voster were scratching in a suspicious manner but he could not find scab on them, only ticks. Van der Merwe, pressed for time, moved on. Nash remained behind and with the aid of a magnifying glass and local scab expert, Sheep Inspector Robert Cope Manley, found some *acari* on one of Voster's sheep after several hours. Nash did not tell Van der Merwe of this nor did he place the sheep under quarantine. Van der Merwe, told of the scab by Voster, assumed that Nash placed the sheep under quarantine so he did not do it himself. This was taken as proof of negligence by Nash who (according to Van der Merwe) wanted to manufacture an excuse for Van der Merwe's dismissal.

[19] Hutcheon, 'Scab: its Nature, Cause, Symptoms and Treatment', p. 435.

[20] As example, see CA CIS 49/ 51 – Procedure in cases of prosecution for contravention of the Scab Acts, 1906. A certain C. Vermeulen brought sixty scab infected rams to the Victoria West stock fair in June 1906. The local sheep inspector, C. J. van der Merwe, told Vermeulen his rams were scabby after which Vermeulen made some comments regarding the oppressive nature of the Scab Act and returned home to Prieska with his sheep. When Van der Merwe attempted to prosecute Vermeulen, he was told he had no proof of scab – Van der Merwe did not take *acari* off the sheep at the fair and Vermeulen's sheep were subsequently dipped so live *acari* could not be taken from them later. Although Van der Merwe produced a number of sworn statements from fair goers who swore all sixty of Vermeulen's sheep were scabby, the court did not accept this as proof of scab and Van der Merwe was publicly humiliated. This and similar cases prompted Davison to again urge his inspectors to make isolating *acari* specimens common practice.

before showing symptoms and can spread the infection to other sheep during this period. Hutcheon mentioned this phenomenon with scab in cattle, remarking that "it is very evident that these *acari* may live for a very indefinite time on the animal body, although no visible disease of the skin may become manifest on any part of the skin."[21] Sub-clinical scab led farmers to conclude that sheep recovered completely from the disease in good seasons and that the resumption of the disease in sheep thought to be scab-free occurred spontaneously. But Hutcheon insisted that the *acari* mites were opportunists who waited for the sheep to loose condition before "recommencing operations" – the disease was not spontaneous since the mites were never absent.[22]

The long dormancy of *acari* on their hosts means that the duration of an *acari* infection cannot be determined, but sheep inspectors regularly testified to a particular scab infection being of a specific duration based on lesion size.[23] This practice of dating the infection depended on the belief that the scab lesions grew bigger and that new lesions appeared at a more or less steady rate. This view is echoed by De Wet (1994) who claimed that scab lesions grow concentrically at an average of 2.5 cm^2 per month.[24]

But recent research confirms a long, variable incubation period for scab. D.J. O'Brien (1999) conducted research in Ireland and Britain. He found that the incubation period of scab depends on the health of the sheep, if the sheep had previously been exposed to the disease and on the length and density of the fleece. Sheep can be infested for weeks or months before showing symptoms.

[21] Ibid., p. 439.
[22] Ibid.
[23] CA CIS 47/33 – Administration of the Scab Act in Paarl and Stellenbosch, 1907. The failed prosecution of Adrian Jacobus Louw for neglecting to report scab in his flock provides an example. At the trial, held on 25 January 1907 in the Paarl, the sheep inspector testified that the infection was at least three weeks old. Louw claimed that he saw his sheep on a regular basis and knew how to diagnose scab. He argued that his sheep were not visibly infected until shortly before the inspector visited his farm and that the seven day grace period for reporting a scab outbreak had not yet passed.
[24] De Wet, 'Skaapbrandsiekte', p. 95.

According to him some sheep are resistant to mange and never developed symptoms. Clinical examination of the sheep and wool samples cannot detect scab if the disease is not overt. An ELISA test was developed for scab in the 1970s to overcome this difficulty but the test is not sufficiently sensitive as sheep recovering from scab also test positive for some months after successful treatment.[25]

Studies conducted in South Africa in the 1990s compared the response of Merino and Dorper sheep to scab infestation. Teresa Meintjies (1999) found that the disease has a longer incubation period on Dorpers than Merinos. Dorpers also show less signs of irritation than Merinos, their appetites are less affected and the lesions grow slower. She found that Dorper weight loss due to scab is statistically irrelevant while the Merinos in her study lost between twenty per cent and twenty-five per cent of body weight on average over a thirteen week period. Average lesion growth and wool loss were calculated for Dorpers and Merinos but she stressed that the disease progressed at varying rates on individual sheep in the two test groups so lesion size and wool loss could not be used to determine the duration of infection. The most badly infected sheep in a flock are therefore not necessarily the longest infected and are not necessarily the sheep that introduced scab into a flock.[26]

L.J. Fourie and I.H. Horak (2000) do not credit reports that some sheep are totally immune to scab, but confirm the long dormancy of the disease. They found that the disease in Dorper sheep often remains sub-clinical and confirm Meintjies' finding of differentiated weight loss for Dorpers and Merinos. Dorpers were therefore identified as an infection reservoir for other sheep breeds.[27]

[25] D. J. O'Brien, 'Treatment of Psoroptic Mange with Reference to Epidemiology and History' (1999), pp. 180-182.
[26] T. Meintjes, 'The Bio-ecology of the Sheep Scab Mite *Psoroptes ovis*' (1999), pp. 47-61.
[27] L. J. Fourie and I. G. Horak, 'Status of Dorper Sheep as Hosts of Ectoparasites' (2000), pp. 159-160.

The varying incubation period of scab presents a particular challenge to researchers. If, in experiments, scab mites are artificially transmitted from one animal to another researchers need to decide on a cut-off date after which they can claim scab infection was not induced in the new host. On average, visible scab symptoms occur between twelve to fifty-one days when scab is artificially transmitted and between fifty-four to 154 days when naturally transmitted. However, the incubation period of the disease can vary widely in the same test conditions in different sheep. One sheep in an experiment conducted in the 1930s only became visibly infected after 176 days. There is therefore a risk that researchers terminate experiments too early, but the longer they wait the greater the chance that the experimental animals may have acquired the infection from elsewhere. As discussed above, in sub-clinical infections scab mites will only be detected if the mite population increases rapidly and the researchers are particularly vigilant and thorough in inspecting the experimental sheep.[28] The development of the ELISA test for scab was therefore of great benefit to researchers as sheep show a change in blood chemistry indicating the presence of scab soon after mites are placed on them and long before any clinical signs become visible.[29]

The different responses of individual sheep and different sheep breeds to scab mites are not only significant because they problematise accurate diagnosis and make tracing when and where the disease was introduced to a flock difficult. Different disease outcomes for different sheep breeds in different environmental conditions mean that the economic importance of scab may differ greatly between wool and mutton farming. The anti-scab legislation was based on the dogged insistence that scab eradication would be economically beneficial to all sheep farmers and Giliomee also bases his discussion of the anti-scab law agitation on this premise. Afrikaner

[28] G. I. Wilson et al, 'The Infectivity of Scabies (mange) Mites, *Psoroptes ovis* (Acarina: Psoroptidae), to Sheep in Naturally Contaminated Enclosures' (1977), pp. 295-296.
[29] Meintjies, 'The Bio-ecology of the Sheep Scab Mite *Psoroptes ovis'*, pp. 48-52.

farmer's resistance to the law therefore becomes a sign of obdurate irrationality in the face of a clear scientific and economic reality.[30]

HOST SPECIFICITY OF *ACARI*

Hutcheon divided scab mites into three genera on the basis of their feeding patterns. The *Sarcoptes* burrows under the epidermis, the *Psoroptes* or *Dermatodectes* bites or pricks the skin but does not burrow and the *Symbiotes* burrows in the epidermis but does not pierce other skin levels. He identified seven sub-species of *Sarcoptes*, three species of *Psoroptes* (namely *P. equi*, *P. bovis* and *P. ovis*) and four species of *Symbiotes*. However, he was apparently uncertain as to whether these species were host specific and precisely which *acari* caused scab in which species of livestock.

According to Hutcheon, Scabby Angora goats were infected with *Symbiotes caprae* and scabby Boer goats with *Sarcoptes caprae*. Boer goats were susceptible to catching *Symbiotes caprae* from Angoras and the reverse was also suspected. Horses in the colony suffered from scab caused by *P. equi* and *Sarcoptes equi* (the crusts of the latter infection was drier than those of the former). Calves were infected with *Sarcoptes bovis* and mature cattle by *P. bovis.* Pigs were infested by *Sarcoptes suis. Sarcoptes ovis* and *Symbiotes ovis* also infected sheep and caused scab, but he reported they were rare in the Cape Colony and did not explain how infection with these varieties differed from infection with *P. ovis,* the common sheep scab mite.[31]

The officials serving on the Scab Commission also believed it was possible that springboks could transmit scab to goats but doubted reports of springboks transmitting scab to sheep.[32] However, the belief that springboks could infect sheep was promoted in the print media by North West

[30] H. Giliomee, *The Afrikaners* (2003), p. 226.
[31] Hutcheon, 'Scab: its Nature, Cause, Symptoms and Treatment'**,** pp. 434-435.
[32] CPP [G. 1 – 1894] *Report of the Scab Commission*, evidence of Sydney Fryer, Afrikaner Bond representative for Calvinia, p. 575.

farmers as a valid reason for opposition to the Act. [33] It is not clear if they really believed this was possible or if they subscribed to this view for strategic reasons. No farmer who testified before the Scab Commission proposed such views and the three farmers who mentioned springboks as a possible source of goat scab were not greatly concerned about this source.[34]

Although Hutcheon apparently did not conduct experiments to determine if different species of scab mites could be transmitted between different species of livestock, he found that goat scab sometimes spread to calves but not to sheep.[35] Although farmers generally found that goats and sheep did not infect each other with scab, progressive farmers (like Davison) normally dipped any goats that ran with infected sheep and vice versa, tacitly admitting the possibility of cross-infection.[36]

Several cases of what were referred to as goat scab were reported in sheep in the 1890s: A sheep inspector reported finding scab lesions on a sheep's legs and about the mouth. Apparently the disease resisted treatment by dipping and Hutcheon advised the inspector that it was probably a goat scab infection best treated by hand dressing.[37] Similar treatment-resistant cases were included in the 1897 annual report of the Chief Inspector of Sheep, where it was described as caused by a mite that burrowed under the skin.[38] This apparently caused some confusion regarding the host specificy of scab mites. Although Davison dismissed claims that springbok could transmit scab to sheep, the transmission of goat scab to sheep in these cases coupled with the successful experimental transmission of scab from a pig to a goat seemed to convince him that

[33] *Ons Land*, 1 November 1894.
[34] CPP [G. 1 – 1894] *Report of the Scab Commission*, evidence of Cornelius Jansen de Jager, p. 562; evidence of Jacobus Nicolaas Moolman, p. 597; evidence of Sydney Fryer, p. 575.
[35] *AJCGH*, 3, 9 (1890), p. 69.
[36] *AJCGH*, 2, 25 (1889), p. 209.
[37] *AJCGH*, 5, 12 (1892), p. 173.
[38] CPP [G. 35 – 1898] *Reports of the Chief Inspector of Sheep and of the Superintendent Sheep Inspector in the Transkeian Territories for the Year 1897*, p. 8.

psoroptic mange could be generally transmitted among livestock. Therefore farmers were advised that they should not "…be too particular to carefully examine all animals on the farm and to promptly treat every case of infection, whether the same appears on cattle, horses, pigs, sheep or goats, and if clean sheep are running with infected goats, or vice versa, the farmer should not be guided by a spirit of false economy, but make up his mind to put every animal through the tank."[39]

Fears that scab could be transmitted between domestic livestock persisted, apparently fueled by reports of scab infected sheep and goats running together. The return of sheep scab after often prolonged absences was also explained by suggestions that the *acari* were being harboured by animals other than sheep. Shilston therefore tried to artificially transmit scab between goats, sheep and rabbits to settle the matter once and for all. Common goat scab is caused by a *Sarcoptes* mite and Shilston found *Sarcoptes* mites generally less host specific than *Psoroptes* subspecies. He therefore readily transmitted *Sarcoptes caprae* from goats to sheep, pigs and cattle and back to goats again while similar tests with *Psoroptes* mites failed.[40]

He also managed to transmit goat ear scab onto sheep; pustules and crusts formed like with sheep scab and adult *acari* even mated and some eggs hatched and some of the successive generation mated, but they died off before laying eggs. The infection in all trials died out quickly. Curiously, although goat ear *acari* were described by Shilston as being a bit bigger and darker in colour than sheep scab *acari*, the generation of goat ear *acari* born on the sheep was morphologically identical to sheep scab *acari*. Goat ear *acari* placed in sheep ears also quickly died off and sheep penned with scab infected goats (i.e. goats infected with *Sarcoptes caprae*) did not develop scab. Sheep *acari* placed on goats also died off or disappeared without establishing scab infection.

[39] Ibid, p. 9.
[40] Shilston, 'Sheep Scab: Observations on the Life-history of *Psoroptes communis*, var. *ovis* and some points connected with the Epizootiology of the Disease in South Africa', pp. 87-92.

The same set of results was found when *P. cuniculi* was transmitted to sheep – scab infection resulted but the second generation of *acari* could not reproduce and the *acari* died out. Efforts to transmit common sheep scab to rabbits and rats also failed. Shilston therefore concluded that domestic animals like horses, pigs and cattle cannot transmit psoroptic mange to sheep and that sheep cannot transmit psoroptic mange to them.[41] Meinjies transmitted scab mites from a sheep to both Boer and Angora goats but the animals did not develop scab while a flock of control sheep infected from the same sample did. She therefore concluded that the particular strain of scab she used was host-specific, confirming Shilston's findings.[42]

The Scab Act defined the term "sheep" to include goats.[43] This conflation of goat and sheep scab as one disease to be treated with the same quarantine measures was problematic as it caused the unnecessary quarantining of healthy sheep that happened to graze with infected goats and vice versa. When the Scab Act was debated in Parliament, the MP for Riverdale, I.W.J. van der Vyver, protested the inclusion of goats in the Act as "the scab insects which infected goats were entirely different to those which infected sheep, and scabby sheep were not infected by scabby goats and vice versa." D.J.A. van Zyl, MP for Clanwilliam, sarcastically suggested that springboks should be included in the definition of sheep in the Act.[44] Instituting measures against goat scab without comparable measures against the disease in other domestic animals was futile in areas were horse mange was common. In the Transkeian Territories infected horses continually re-infected goats, which necessitated that all the sheep in contact with the goats also had to be treated. However, sheep inspectors working in the region did not have any power under the Scab Act to order the

[41] Ibid.
[42] Meinjies, The Bio-ecology of the Sheep Scab Mite *Psoroptes ovis*, pp. 76-82.
[43] Act 20 of 1894.
[44] *Debates in the House of Assembly* (20 July 1894), p. 325.

dipping of horses.[45] The Stock Diseases Act of 1911 sought to close this loophole by including horse mange in its schedule of reportable infectious diseases.[46]

The entomologist attached to Onderstepoort, G.A.H. Bedford (1915), identified five *Psoroptes* subspecies on the basis of morphological differences and their different hosts. They were *P. communis*, var. *ovis* (common sheep scab mite), *P. communis*, var. *caprae* (goat ear scab mite), *P. communis*, var. *bovis* (cattle scab mite), P. *communis*, var. *equi* (horse scab mite) and *P. communis*, var. *cuniculi* (rabbit ear mites). Only one incidence of a var. *bovis* infection on cattle was recorded in South Africa and contrary to Hutcheon's findings, no infections of *P. communis*, var. *equi* on horses were found. Scab in goats was believed to be caused by *Sarcoptes caprae* and no infections of *Symbiotes* mite subspecies (in contrast to Hutcheon's findings) were reported.[47]

Hutcheon reported that the three groups of *acari* and their different subspecies looked very similar under the microscope and were mainly identified according to which host species they infected, where scab lesions were formed on the animal and how they spread. He insisted that these characteristics were due to the nature of the *acari* and not the nature of the host animals or qualities of their skin.[48] The identification of mites by such a method is problematically circular. Because Hutcheon was unable to identify *Psoroptes* mites independently from their hosts, his conclusions about host specificy are unreliable. Shilston and Bedford, however, both claimed morphological differences between *acari* mites could be used to identify different subspecies, but subsequent researchers have disputed this claim.

[45] CPP [G. 31 – 1909] *Report of the Chief Inspector of Sheep for the Year 1908*, p. 49.
[46] Act 14 of 1911.
[47] G.A.H. Bedford, 'Experiments and Observations carried out with *Psoroptes communis* at Onderstepoort' (1915), pp. 101, 106-107.
[48] D. Hutcheon, 'Scab: What is it?' (1894), pp. 507-508.

The results of scab transmission tests were sometimes confounded by the inability of researchers to differentiate between different *Psoroptes* subspecies. So G.F. Van der Merwe (1949), who conducted transmission experiments using ear mites between sheep and goats, was told by the Director of Veterinary Services at Onderstepoort (Van der Merwe did not identify him by name), that the mite sample he sent for identification could not be positively identified as either *P. communis*, var. *ovis* or *P. communis*, var. *caprae* as the two subspecies were morphologically identical. It was concluded that the sample was probably *P. com. var. caprae* since Van der Merwe found the mites in the infra-orbital fossae of a sheep.[49] All experiments conducted to see if sheep ear scab mites could spread to cause psoroptic mange and body scab mites could spread to infect ears were therefore always inconclusive. The *acari* causing ear and body scab are identical and most cases of ear mite infestation are sub-clinical and can only be detected by slaughtering the animal in question. It is therefore impossible to determine if the mites were present in the animal's ears before the animal contracted body mites or not. [50]

In 1958, G.K. Sweatman reviewed and simplified the classification of *Psoroptes* subspecies to five as he found that many of the subspecies were synonymic. The new classification scheme was not host specific but based on the general location of the mites on their hosts. The only taxonomical method of identifying the different subspecies established by Sweatman was by measuring the length of the outer opisthosomal setae (or bristles) of male mites (see illustration 2. 1). Large samples of mites were examined by him and statistically significant differences in bristle length were reportedly found.[51] The species currently recognised by science are *Psoroptes*

[49] G.F. Van der Merwe, 'Ear Scab in Sheep and Goats' (1949), p. 95.
[50] Ibid.
[51] F. C. Wright, 'Cross-mating Studies with *Psoroptes ovis* (Hering) and *Psoroptes cuniculi* Delafond (*Acarina: Psoroptidae*)' (1983), p. 696.

ovis (the common sheep and cattle scab mite), *Psoroptes cuniculi*, *Psoroptes natalensis*, *Psoroptes cervinus* and *Psoroptes equi*.[52]

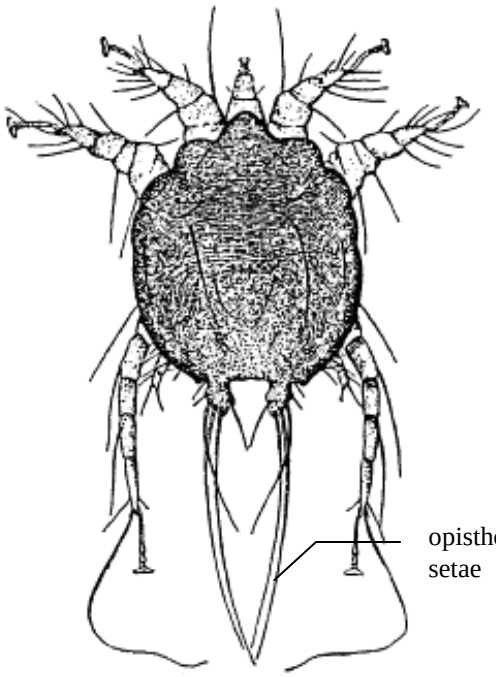
However, this classification scheme is of dubious validity. A.C. Kirkwood (1986) wrote that sheep scab mites "invariably" spread to the ears and that mites found on the bodies of sheep have successfully been transmitted to the ears of rabbits. In contradiction to Hutcheon's certainty that mites on different hosts were different species, Kirkwood concluded that the host animal governs the behavior of the mites.[53] F.C. Wright et al (1983) interbred *P. ovis* taken from cattle with *P. cuniculi* from rabbits in the laboratory. These hybrids proved fertile, caused scab when placed on new rabbit and calf hosts and established successful breeding populations. Since they did not notice any statistically significant variation in bristle length between their *P. ovis* and *P. cuniculi* samples as proscribed by Sweatman's taxonomy, they concluded that the mites were not separate species.[54]

W. Boyce et al (1990) set out to investigate Sweatman's taxonomical classification scheme for *Psoroptes* mites. They examined a large number of mites taken off mule deer, big horn sheep, cattle and rabbits. In all, they compared nine measurements of 901 adult male mites. However, they found little morphological correspondence between mites based on which host animal the mites were taken from. This was especially noticeable with cattle as the measurements varied as widely in this group as it varied between these mites and the more morphologically similar mite groups taken from the other host animals. Confusingly, the measurements, although varied, placed the mites from all four host animals in the range Sweatman determined for *P. ovis*. However, correspondence was found to exist between mites from the same geographic area and

[52] M. Zahler et al, 'Genetic Evidence Suggests that *Psoroptes* Isolates of Different Phenotypes, Host and Geographic Origins are Conspecific' (1998), p. 1713
[53] A. C. Kirkwood, 'History, Biology and Control of Sheep Scab' (1986), p. 304.
[54] Wright, 'Cross-mating Studies with *Psoroptes ovis* (Hering) and *Psoroptes cuniculi* (Delafond) (*Acarina: Psoroptidae*)', pp. 697-700.

they concluded that morphological examination of mites was more useful to identify different mite breeding populations than identifying mite subspecies.[55]

Illustration 2.1: Male *Psoroptes ovis*, dorsal view.



Source: Reproduced from *US Bulletin*, No. 21 in Hutcheon, 'Scab: its Nature, Cause, Symptoms and Treatment'**,** p. 442.

M. Zahler et al (1998) solicited *Psoroptes* samples from different countries and different hosts, used Sweatman's guidelines to divide them according to different species, and then conducted genotype testing on the mites. They found that the genetic differences between individuals identified as belonging to the same species exceeded the genetic differences between purported species and that none of the genetic differences were statistically relevant. They therefore suggested that the classification of *Psoroptes* into five species should be challenged.[56]

In general, researchers consider the *Psoroptes* subspecies to be conspecific. But different breeding populations or strains seem to maintain a level of host specifity as shown by Shilston and Meintjies. This host specificity is confirmed by the fact that the United States, Canada, Australia and New Zealand managed to eradicate sheep scab while *Psoroptes* populations persist

[55] W. Boyce et al, 'Morphometric Analysis of *Psoroptes* spp. Mites from Bighorn Sheep, Mule Deer, Cattle, and Rabbits' (1990), pp. 823,827-8.
[56] Zahler et al., 'Genetic Evidence Suggests that *Psoroptes* Isolates of Different Phenotypes, Host and Geographic Origins are Conspecific', pp. 1716-9.

in cattle, rabbits and wild animals that may share range with sheep. The only scientist to propose an explanation for this phenomenon is Kirkwood who reports that tests to establish *P. ovis* from sheep on rabbits, calves and goats were successfully conducted in Britain. But the transmission of mites from these hosts to sheep has never been successfully performed. He speculates that this was a result of the differences in the serous exudation of different hosts. So cattle can support greater populations of *P. ovis* since scab crusts on cattle do not dry out and mites can therefore live under the crusts while mites generally cannot live underneath scab crusts on sheep. A mite population used to living in and feeding on serous exudation with a higher fat content can therefore not adapt successfully to the conditions on sheep, explaining why different *Psoroptes* hosts do not act as sheep scab reservoirs.[57]

CONFUSION REGARDING THE LIFECYCLE OF *ACARI* MITES AND HOW THIS AFFECTS THE ERADICATION OF THE DISEASE

Accurate information on the life-cycle of *Psoroptes ovis* was vital to successful scab eradication as the nineteenth century dipping preparations generally used at the Cape did not kill *acari* eggs and had limited residual activity. A second dipping after the eggs hatched and before a new batch of eggs could be laid was therefore essential to successfully clean a flock. However, official advice on the proper interval between first and second dipping was contradictory.

Hutcheon did not report the incubation time for *acari* eggs, merely testifying before the Scab Commission that it took a few days. He initially advocated a ten day interval between dipping: any *acari* hatching within three days of the first dipping should die due to the lingering effects of the dip. Any *acari* hatching thereafter will start mating on the seventh day after hatching and lay eggs a day or so later. A ten day interval should therefore ensure that all the eggs remaining on

[57] Kirkwood, 'History, Biology and Control of Sheep Scab', p. 304.

the sheep hatched while no new eggs could yet be laid.[58] However, the Scab Commission reported that he recommended a ten to fourteen day dipping interval.[59]

This discrepancy can perhaps be explained by the disagreement between Hutcheon's findings and the duration of the mite's lifecycle established in Europe. In 1903 Davison proposed a fourteen to sixteen days dipping interval based on the understanding that eggs hatched from eight to ten days after being laid.[60] Hutcheon was apparently also concerned by the practical difficulty of translating a scientific finding into law: he later criticised Davison's recommended fourteen to sixteen day dipping interval because allowing farmers only two days grace was deemed too strict.[61] The Agriculture Department therefore recommended a twelve to sixteen days dipping interval, but this still differed from European standards, allowing one self-proclaimed British sheep dipping expert writing to the *Agricultural Journal*, John MacKenzie, to blame it for the failure of the colony to eradicate scab. According to him, many *acari* eggs hatched more than twelve days after being laid so sheep dipped a second time after twelve days could still be subsequently re-infected by newly hatched larvae.[62]

Shilston, however, found that the *acari*'s lifecycle was nine and ten days for summer and winter respectively. Eggs normally hatched after two days, but if hidden under scab crust, may hatch in four to five days. He found that all eggs that were viable hatched by day nine. This led him to recommend a nine to ten day interval between dipping in contrast to the twelve to sixteen day interval recommended by the Agricultural Department. He claimed the confusion arose because

[58] Hutcheon, 'Scab: its Nature, Cause, Symptoms and Treatment', p. 437.
[59] CPP [G. 1 – 1894] *Report of the Scab Commission*, evidence of B. J. Erasmus, p. 478.
[60] CPP [G. 37 – 1903] *Report of the Chief Inspector of Sheep for the Year 1902*, p. 13.
[61] CA CIS 48/46 – Scab Reports and Draft Acts, 1902-1913.
[62] *AJCGH*, 25, 4 (1904), pp. 393-394.

Gerlach[63], the authority still most often quoted, proposed a fourteen to fifteen day lifecycle for the scab mite. Other European researchers mentioned a lifecycle varying from twelve to sixteen days. A dipping interval of fourteen to eighteen days was therefore recommended at the time. Shilston, who based his findings on two years research, saw his results as justifying the need for research on South African mite populations.[64]

Shilston's research therefore confirmed Hutcheon's disregarded findings. Much more recently De Wet reported the mites' lifecycle as eight to twelve days and recommended a seven to ten day interval between dipping.[65] Kirkwood, following Sweatman, gave a figure of fourteen to nineteen days.[66] Research conducted in South Africa therefore consistently reported shorter lifecycle duration for *Psoroptes ovis* than European sources.

How then did any farmers manage to cure their flocks of scab in nineteenth century South Africa, considering that the dipping interval prescribed by the Agricultural Department was too lenient and that manufactured dips imported from overseas recommended an even longer dipping interval? The answer lies in the dip and dipping method used: dips containing arsenic, sulphur, tobacco and coal tar had a measure of persistence provided the active ingredients were present in suspension so that they could adhere to the fleece. It was therefore essential for farmers to use the correct dip and keep the dip stirred regularly to prevent the suspended ingredients from settling out at the bottom of the dipping tank.[67]

[63] Two researchers are credited with the discovery of *Psoroptes ovis.* Hering named the mite in 1835 but Gerlach rediscovered and described it fully in 1857.
[64] Shilston, 'Sheep Scab: Observations on the Life-history of *Psoroptes communis*, var. *ovis* and some points connected with the Epizootiology of the Disease in South Africa', pp. 73-74, 80-81.
[65] De Wet, 'Skaapbrandsiekte', p. 95.
[66] Kirkwood, 'History, Biology and Control of Sheep Scab', p. 303.
[67] Shilston, 'Sheep Scab: Observations on the Life-history of *Psoroptes communis*, var. *ovis* and some points connected with the Epizootiology of the Disease in South Africa', p. 81.

DURATION OF THE INFECTIVITY OF MITE POPULATIONS IF SEPARATED FROM SHEEP

The longevity of mites when separated from sheep and the duration eggs remained viable determined how long pastures, equipment, fence posts, sleeping places as well as trucks used to transport sheep remained infective. This was vital information in a period when dipping fluids protected sheep against re-infection for only a few days. Misconceptions regarding the duration of scab infectivity, especially kraal infectivity, were, however, widespread.

Hutcheon found that *acari* could survive for three weeks or more if kept warm and moist but that they died after a few days if allowed to dry out. This corresponded with Gerlach's findings.[68] Shilston wrote that Hertwig and Gerlach found *acari* survived from ten to twenty days. Shilston's own research found that the mites had a varying survival rate depending on temperature and humidity. Kept moist at room temperature, they survived on average up to sixteen days with one individual in one trial lasting twenty days. At body temperature the mites died off within six to seven days, at room temperature but with low humidity they lasted six days and at zero degrees centigrade they survived for four days.[69] Other researchers confirmed that temperature and humidity influenced mite survival rate but figures varied widely; one reported a single mite was kept alive at ten degrees centigrade for forty-eight days. In general, however, the survival rate ranged from sixteen days to three weeks. Shilston's average does not differ much from the average mite survival rate obtained from these tests and the survival rate Meintjies established for mites in field conditions (April in the Free State) confirms his results.[70]

[68] Hutcheon, 'Scab: its Nature, Cause, Symptoms and Treatment', p. 438.
[69] Shilston, 'Sheep Scab: Observations on the Life-history of *Psoroptes communis*, var. *ovis* and some points connected with the Epizootiology of the Disease in South Africa', pp. 82-84.
[70] Meintjes, 'The Bio-ecology of the Sheep Scab Mite *Psoroptes ovis*', pp. 122-125.

But mites will become too weak to be re-infective a few days before they die of starvation Shilston quoted the researcher S. Stockman who reported in 1913 that mites remained re-infective for only fourteen days. In the 1970s tests were conducted in Texas in conditions varying from a blizzard in the field to a simulated high summer in the laboratory. It was found that mites stored outside when temperatures reached a low of minus seven degrees centigrade remain infective for five to twelve days although mites survived up to thirteen and fourteen days. At room temperature mites remained infective up to ten days although they survived for thirteen days and mites refrigerated at between minus six and two degrees centigrade remained infective in one case up to seventeen days but on average only until day twelve. As mite survival at thirty-seven degrees centigrade was so poor (five days), no re-infection experiments were deemed necessary.[71]

But the question did not depend solely on the off-host survival of mites. Hutcheon disagreed with Gerlach's recommended four week quarantine period as he believed *acari* eggs could remain viable for years. He reasoned that a good, drenching rainfall soon after the quarantine period began would make the eggs hatch and the *acari* would then all die off during quarantine, but if the weather remained dry or the eggs remained protected in a dry, cool place (like a crevasse in the wall of a stone kraal) they would hatch at a later date when conditions were favourable and so re-infect sheep. He thought some sheds and trucks could be disinfected but wrote that it was "doubtful when an infected kraal could be used for a clean flock with safety in this colony."[72]

The long infectability of kraals was held as gospel by the office of the CIS and the persistence of scab was blamed on farmer's obdurate insistence on continuing to use these old kraals and sleeping places. Three experiments to test the infectability of sheep kraals were therefore conducted by Davison and his assistants in the course of 1906 and 1907: The first was on the

[71] Wilson et al, 'The Infectivity of Scabies (mange) Mites, *Psoroptes ovis* (Acarina: Psoroptidae), to Sheep in Naturally Contaminated Enclosures', pp. 293- 294.
[72]Hutcheon, 'Scab: its Nature, Cause, Symptoms and Treatment'**,** p. 439.

farm Karreepoortje in the Division of Jansenville. In August 1906, an old kraal formerly used for Angora goats was fenced off and divided into five sections. When the kraal was last used, the previous January, a flock of Angora goats placed in it contracted scab within two months. The experiment commenced in March 1907 when one hundred Angoras were separated from a clean flock of six hundred and placed within the kraal. The manure in the kraal was turned over periodically. In May, one of the Angoras in the flock was diagnosed with scab – nine months after the kraal was enclosed. When the experiment was concluded in June, four of the hundred goats were infected while none of the control animals had scab. The goats that slept in the kraal were kept separate from other stock for the duration of the experiment.

The second experiment was conducted on the farm Swart Rivier in the Caledon district. Here a kraal was enclosed and a flock of scabby sheep was held in it during October 1906. The scabby sheep were dipped and removed to another portion of the farm and the kraal was closed on the 15th of November. On 17 May 1907, a flock of 486 sheep and goats was placed in the kraal at night and the dung in the kraal was turned over several times. When Assistant Chief Inspector of Sheep, W.J. Smuts, and the local Sheep Inspector inspected the animals on 29 June 1907, eleven animals were found to be infected. The herd who looked after the flock reported the scab outbreak on the 19th of June. According to Davison, the kraal therefore remained infective for six months. The third experiment was conducted by Assistant Chief Inspector of Sheep W.J. van der Merwe, on the farm Ruigtevlei in the Division of Murraysburg. On the 28th of March 1907, a flock of 110 clean Cape Sheep were allowed to sleep in a kraal that was enclosed for an estimated twelve months. The sheep contracted scab within three weeks and almost all the animals were badly infected when W.J. van der Merwe examined them on the 4th of July. The rest of the animals on the farm remained clean.[73]

[73] CPP [G. 23 – 1908] *Report of the Chief Inspector of Sheep for the Year 1907*, p. 37.

Davison repeated the experiment conducted at Karreepoortje in 1908 and 1909, using the remaining portions of the enclosed kraal with the same results. These experiments showed that the kraal remained infective for two years. As a portion of the presumably still-infected kraal remained unused in 1909, Davison confidently predicted that that kraal would prove infective for three years or even longer after livestock had been kept in it.[74]

Davison therefore proved to his satisfaction that kraals remained infective for years after they housed scabby stock. However, Shilston and Bedford rejected his findings, arguing that since goat scab was caused by *Sarcoptes caprae*, an experiment conducted with Angora goats cannot prove that *Poroptes ovis* could infect kraals for long periods. Shilston found that mites do not survive longer if stored with sheep manure than if they were stored without and this was explained through microscopic analysis of their mouth parts – their funnel shaped mouths are adapted to take in fluids through suction so they cannot ingest solids. Mite populations can therefore not persist in kraals on manure as previously believed.

Also, mite eggs were shown to loose viability quickly. Eggs removed from the sheep and kept at room temperature for up to a maximum of nine days hatched after two days when replaced on sheep. Eggs could be kept in an ice box for up to ten days and hatched after three to five days when replaced on sheep. Eggs incubated at higher temperatures hatched without being placed back on sheep, but the mites in such cases survived for only four days.[75] Bedford found that eggs exposed to direct sunlight shriveled up in hours.[76]

[74] CPP [G. 10 – 1910] *Report of the Chief Inspector of Sheep for the Year 1909*, p. 53.
[75] Shilston, 'Sheep Scab: Observations on the Life-history of *Psoroptes communis*, var. *ovis* and some points connected with the Epizootiology of the Disease in South Africa', p. 84.
[76] Bedford, 'Experiments and Observations carried out with *Psoroptes communis* at Onderstepoort', p. 106.

Hutcheon's belief that *acari* eggs retain their vitality for indefinite periods was not solely based on anecdotal reports of sheep re-infection from old kraals. He also studied *acari* eggs under a light microscope and saw these showed different levels of germination, visible as gradated dark shadows through the egg surface. They hatched after different lengths of time when exposed to warmth and humidity. These eggs all hatched within a matter of days, but those that appeared clear under the microscope he believed to be in a very early stage of germination and, when he failed to hatch them artificially, he concluded that these eggs may remain viable for months or even years, hatching only when suitable conditions coincide with the presence of sheep.[77]

Shilston, in contrast, explained these unhatched eggs as dead, a deduction supported by Bedford's kraal infectivity experiments. Bedford tested how long kraals remained infective by constructing two stone kraals and letting infested sheep stay in them for a period of time. The kraals were then left empty for a number of days after which clean sheep were reintroduced to see if they developed scab. The experiment showed that the kraals remained infective for nine days after the removal of the infected sheep.[78]

Wilston et al, conducting their experiments during a Texas summer, found that sheep pens remained infective for three days. No sheep were infected in a pen left vacant for four days and as this experiment was repeated ten times with the same results, they did not consider it necessary to repeat the experiment in pens left vacant for longer. Reflecting on the difference between their results and those obtained by Stockman (who found pens infective for up to eight days) and Bedford, they proposed that quarantine periods be determined based on temperature and humidity. Some differences in the duration of infectivity may also be due to the different ability

[77] Hutcheon, 'Scab: What is it?' (1894), p. 508.
[78] Bedford, 'Experiments and Observations carried out with *Psoroptes communis* at Onderstepoort', p. 106.

of individual mites to survive adverse conditions.[79] But as the different experiments all discovered a kraal infectivity of a few days, the old progressive shibboleth that kraals retained their infectivity for months and even years has been completely discredited.

Davison's findings were therefore never replicated and it seems likely that they were the result of methodological error. Note that subsequent experiments were conducted using kraals and pens especially constructed for the purpose and that small numbers of stall-fed sheep were used. The researchers thus fully controlled the experimental animals' environment. They could also examine all the animals thoroughly to ensure that they were really scab-free when the experiment started and could also obtain more accurate data about the progression of the disease.

In the three experiments conducted by Davison, the animals were placed under care of a herd and allowed to graze in the veld during the day. They may have come into contact with scabby animals or grazed on pasture used by scabby animals without the herd realising it or reporting it. Also, as examining hundreds of animals thoroughly was too time-consuming to be practical, the sheep and goats used in these experiments were unlikely to have been thoroughly examined before the experiments commenced. Sheep inspectors examined flocks by looking for visibly infected animals. When an animal showing a disturbed fleece or signs of irritation was observed, the animal was captured and the inspector proceeded by attempting to find scab lesions. Scrapings of the lesion were then examined under a magnifying glass and the animal was declared infected if live *acari* were found.[80] This procedure would probably have missed light scab infections, and as discussed above, inspectors were entirely unable to detect sub-clinical

[79] Wilson et al, 'The Infectivity of Scabies (Mange) Mites, *Psoroptes ovis* (Acarina: Psoroptidae), to Sheep in Naturally Contaminated Enclosures', pp. 293-295.
[80] CPP [A. 12 – 1905] , *Report of the Select Committee on the Scab Acts*, evidence of David Christoffel van der Merwe, p. 54.

scab infections. The animals used in Davison's experiments may therefore have been lightly or sub-clinically infected before the experiments started.

The belief that kraals and regular sleeping places could remain infective for years was old and persisted in the scientific literature on scab long after early twentieth century research showed that it was unfounded. Wilson et al argued that its persistence was due to the fact that the variable incubation period of the disease and the sub-clinical survival of mite populations on sheep for long periods were not known nor were the implications readily accepted.[81]

MITE FEEDING AND PERCEPTION OF THE DISEASE

Kirkwood wrote that in South Africa "local husbandry methods make control so difficult that eradication seems unlikely,"[82] but to single out South African husbandry methods as particularly problematic overlooks the fact that the slow progress in South Africa in controlling scab was not unusual. The literature on scab proved useful in placing the problems experienced in South Africa with the eradication of the disease in context. The countries that managed to permanently eradicate sheep scab were in the minority and the reasons why the majority failed are broadly similar.

During the period anti-scab legislation was in force in the Cape, progressive farmers and officials measured themselves against the Australian colonies. Unfavourable comparisons between the livestock and wool industries of the Cape and Australia occurred regularly in the *Agricultural Journal*. Scab eradication in Australia, however, was achieved only after legislation had been in place for decades. Considerable resistance from sheep farmers had to be overcome, legislation was gradually improved and a more efficient bureaucracy to administer the laws developed. The

[81] Wilson et al, 'The Infectivity of Scabies (mange) Mites, *Psoroptes ovis* (Acarina: Psoroptidae), to Sheep in Naturally Contaminated Enclosures', pp. 292-293.
[82] Ibid, p. 303.

first anti-scab legislation was passed in New South Wales in 1832 and it was followed by successive legislation in Victoria and the other Australian colonies. However, New South Wales, South Australia, Queensland and Victoria were only declared scab-free in the 1870s, Tasmania in 1881 and Western Australia in 1896.[83]

In New South Wales, the premier wool producing colony of Australia, large scale progressive wool farmers owned the majority of the sheep flock and had considerable political and economic clout. Even so, they faced opposition in parliament. The 1832 Scab Act merely required the impounding of infected sheep found on public throughways. Later acts required the slaughter of infected animals (dipping infected sheep rather than slaughtering them only featured in legislation adopted in 1864 and after), a measure that was considered a gross breach of sheep owners' right to the enjoyment of their private property. The New South Wales progressives eventually won support for strict anti-scab measures by positioning the legislation as merely a formalisation of existing gentlemen's agreements between pastoralists that entailed the slaughter of infected sheep and compensation for such losses through private insurance schemes. Their case was considerable helped by the fact that they were willing and able to pay for the administration of successive scab acts, including compensation for destroyed animals.[84]

Since Australia is an island for practical purposes and can control the entry of livestock, success could be maintained. But despite similar geographic circumstances, scab eradication could not be maintained in Britain. Initially, strict anti-scab measures like those in place in Australia were rejected as too invasive. Scab was made a reportable disease in 1869 but farmers were only obligated to dip infected sheep in 1905 and scab was only eradicated in 1952, a state of affairs

[83]H. R. Sheddon, 'Eradication of Sheep Scab from New South Wales'(1964), pp. 418-421.
[84] J. Fisher, 'Nineteenth-Century Australian Pastoralists and the Origins of State Veterinary Services' (2010), pp. 185-187.

maintained until 1973.[85] England re-instituted compulsorily annual sheep dipping in 1976, but scab could not be eradicated again.[86] Concern about the risks the highly neurotoxic organophosphate insecticides used for sheep dip posed to the environment and the health of both sheep and sheep handlers finally motivated the British government to abandon compulsory dipping in 1992. Since then scab control has become the responsibility of individual farmers and the incidence of the disease has increased rapidly as a result. Surveys of farming practice showed that since the government stopped specifying which dip should be used, farmers often dip inefficiently. They dip with the wrong dipping compounds for the ectoparasites they want to control and dip at the wrong time of the year.[87]

O'Brien also recognised the use of common pasturage in some areas of Ireland and Scotland and the uncontrolled manner in which sheep are moved by sheep dealers from one area to another as risks factors increasing scab incidence. Farmers were also not prepared to take the precaution of quarantining or dipping newly purchased sheep before mixing them with their flocks. While environmental concerns made them reluctant to dip, false economy prevented them from achieving success with avermectins. These are a safe but expensive range of endectocides developed in the 1970s that are effective for both external and internal parasite infection. In an effort to save money, farmers tend to reduce avermectin dosages below the recommended level, resulting in merely a temporary repression of the disease.[88] In 2004 scab prevalence in Britain was estimated to be nine per cent.[89] Similar difficulties have been experienced in Switzerland

[85] Kirkwood, 'History, Biology and Control of Sheep Scab', pp. 304-305.
[86] Ibid, p. 305.
[87] B. Bisdorff et al, 'Control and Management of Sheep Mange and Pediculosis in Great Britain' (2007), p. 120.
[88] O'Brien, 'Treatment of *Psoroptic* Mange with reference to Epidemiology and History', pp. 179-181.
[89] S. Abolins et al, 'Control of the Sheep Scab Mite *Psoroptes ovis in vivo* and *in virto* using Fungal Pathogens' (2007), p. 310.

where farmers, in spite of compulsorily dipping legislation, persist in dipping inefficiently – a state of affairs that has led to a higher scab incidence in recent years.[90]

Meintjies charts a similar disease eradication profile for South Africa: after a slow start, scab control improved markedly after the First World War and the disease was considered eradicated by the 1930s. However, incidences started to increase and the disease was again seen as uncontrolled by the 1970s. Simultaneous dipping was attempted from October 1979 to June 1985 with mixed results. The government could not make enough person-power available to oversee all dipping therefore some farmers dipped inefficiently or not at all. Some livestock speculators also continued to trade in infected sheep. The incidence of the disease was therefore lowered but it was not eradicated.[91]

Incidentally, the abandonment of compulsory dipping in South Africa in 1985 coincided with the withdrawal of organochlorines from the market. These compounds, the most well-known being DDT and Lindane, were successfully used from the late 1940s as their effect lasted up to 130 days, but they were finally withdrawn after traces of organochlorines were found in mutton. The organophosphates that started to replace them in the 1970s have been shown to be neurotoxic, their residual effect lasts only a few weeks and they are less likely to work effectively if they are not properly diluted or if there is organic material stuck in the wool.[92]

Meintjies also identified an additional obstacle to eradication that, ironically, is caused by the success of previous eradication efforts. Since scab incidence is relatively low, most sheep farmers are no longer familiar with scab. They do not notice the disease in its initial stages, do not know

[90] E. Colebrook and R. Wall, 'Ectoparasites of Livestock in Europe and the Mediterranean Region' (2004), p. 253.
[91] Meintjes, 'The Bio-ecology of the Sheep Scab Mite *Psoroptes ovis*', pp. 2-4.
[92] O'Brien, 'Treatment of *Psoroptic* Mange with reference to Epidemiology and History', p. 180.

how fast it can spread through a flock, do not understand that sheep may be sub-clinically infected and have little personal experience of the severe economic losses uncontrolled scab can cause. They are therefore resistant to compulsorily dipping campaigns that require them to dip sheep they consider to be perfectly healthy and when scab breaks out in their own flock, they tend to try stopping the disease initially by only treating the visibly infected sheep instead of treating the whole flock. Farmers therefore continue to suffer preventable economic losses.[93]

But scab is not the only ectoparasitic disease that has become difficult to control. Years of specialist livestock breeding aimed at higher production yields have decreased sheep's genetic diversity and accordingly lowered their resistance to ectoparasite infections and other diseases. Simultaneously, inefficient use of insecticides has led to increased ectoparasite resistance. The farming industry therefore either has to use increasingly toxic compounds to eradicate ectoparasites or adopt alternative approaches.[94] Should farmers immerse livestock in chemical compounds that people can only safely handle when wearing Hazmat suits? This scenario would seem ridiculous if current British environmental regulations did not make it feasible: regulations already require that people handling organophosphate sheep dip should wear protective clothing and that the used dip should be dealt with according to local toxic waste disposal regulations.[95] The health risks associated with using conventional organophosphate dips contribute to the spread of the disease: in a recent study of Welsh farmers' perceptions of scab, farmers cited their fear of the harmful side effects of sheep dip as a reason for not treating their sheep promptly.[96]

When the disease was under control and economic losses were low, there was little interest among scientists in studying scab or economic motivation for developing alternative strategies to

[93] Meintjes, 'The Bio-ecology of the Sheep Scab Mite *Psoroptes ovis* ', pp. 137-138.
[94] Colebrook and Wall, 'Ectoparasites of Livestock in Europe and the Mediterranean Region', p. 252.
[95] O'Brien, 'Treatment of *Psoroptic* Mange with reference to Epidemiology and History', pp. 180-181.
[96] P. Cross et al., 'Use of Randomized Response Technique to obtain sensitive information on animal disease prevalence', p. 257.

deal with it.[97] Decreased sheep resistance to scab coupled with increased parasite resistance to dip and rising environmental concern have, however, made the traditional pesticide approach increasingly untenable. This has led to scab receiving renewed attention, and a radically altered scientific conception of its *modus operandi*. *Psoroptes ovis*, it was found, do not bite sheep.

Many researchers, apparently quoting Shilston, reported that mites pierce the skin directly. The pathogenesis of the disease was therefore explained as being a result of the trauma of the bite and attendant secondary infection of the wound.[98] Electron microscopy examinations have since shown that the mouth parts of *Psoroptes* subspecies are not adapted to piercing the skin or even to markedly disturbing the epidermis.[99] The mite must therefore secrete antigenic material that causes the irritation but *Psoroptes* subspecies do not come equipped with the type of saliva glands or skin-piercing mandibles possessed by other arthropods whose bites cause skin irritation.[100]

The availability of an ELISA test (that works by detecting enzymes associated with a particular immune system response in the blood) for scab since the 1970s proves scab mites cause an antigenic response in their hosts. However this antigenic response was not studied in detail until recently. Blood work done on infected sheep also confirmed that the disease does more than effect the epidermis. In spite of the fact that the mites cannot pierce the skin and do not suck blood, Meintjies found that the first signs of scab in sheep is anemia and a lower hemoglobin concentration. Mite infestation also directs antibodies to the skin and away from the gastrointestinal and respiratory tracts, leaving sheep open to secondary infection. Meintjies also speculates that infected sheep loose weight not because they are too preoccupied with scratching

[97] O'Brien, 'Treatment of *Psoroptic* Mange with reference to Epidemiology and History', p. 178.
[98] Kirkwood, 'History, Biology and Control of Sheep Scab', p. 304.
[99] D. E. Rafferty and J. S. Gray, 'The Feeding Behaviour of *Psoroptes* spp. Mites on Rabbits and Sheep' (1987), p. 901.
[100] Kirkwood, 'History, Biology and Control of Sheep Scab', p. 304.

to feed, as originally suggested, but because toxins released by secondary infections suppress their appetites.[101]

Recent research in autoimmune diseases has further refined the scientific description of the internal effects of scab on sheep. Scab also causes sheep to develop anaemia in certain antioxidant enzymes (including vitamins A and C) and in minerals such as Zinc and Copper. Without these antioxidants to neutralize the free radicals (or oxidants) produced during cellular metabolism, the free radicals cause cell membranes to break up, resulting in a build-up of metabolic waste products in the affected individual. Significantly, recovery from oxidative stress is hastened with an improved diet, explaining why Cape farmers testified that their animals recovered spontaneously from scab if they were moved to fresh pasture.[102]

A revised description of the pathogenesis of sheep scab therefore reads as follows: the scab mite causes some skin irritation by scraping the surface of the epidermis. The main causes of irritation, however, are enzymes and bacterial allergens present in the mites' feces, in the husks discarded when mites molt, and in their corpses. The enzymes may aid the bacteria to penetrate the skin or the bacteria may be able to do so unaided. This causes the sheep's immune system to produce an anti-body rich serum which is exuded from the skin in the infected parts, causing inflammation that ranges in severity. Scab has therefore been re-defined as an allergic reaction. The differentiated response of individual sheep and different sheep breeds to scab can now be explained in terms of the relative strength and effectiveness of their immune systems. Some sheep

[101] Meintjes, 'The Bio-ecology of the Sheep Scab Mite *Psoroptes ovis*', pp. 44-45, 56.
[102] U. Dimri et al., 'Psoroptic Mange Infestation increases Oxidative Stress and decreases Antioxidant Status in Sheep', p. 318.

apparently recover while others suffering from immune deficiency continue to worsen and may even die. [103]

Researchers following this branch of research now focus on identifying the bacterial allergens in question so that they can develop a vaccine for scab.[104] In the same vein, they are trying to identify the genetic mutation that leads to some sheep being more sensitive to scab than others. The FOXP3 gene, which is expressed in certain T cells commonly found in increased concentration in the skin of scabby sheep, were cautiously identified as the culprit. Mutations of this gene were shown to cause autoimmune diseases and vulnerability to parasitic infection in mice and humans and research has showed that different sheep breeds possess different varieties of FOXP3. The next stage of research is to link different FOXP3 strains with degrees of susceptibility to scab.[105]

This account of scab developed out of blood-work analysis, but the insights gained from experiments on mite survival rates suggest that a more nuanced picture may be closer to the truth. As discussed, mite survival is connected to temperature and humidity. The prevalence of scab infection and increased severity of the disease amongst long wool breeds may therefore not be solely due to the immunological responsiveness of the different breeds. Some researchers view sheep fleeces as complex micro-climates – the thicker the fleece, the more protection it provides against fluctuations in temperature and humidity. Sheep also exude various substances on their skin and their fleeces harbour an assortment of fungi and bacteria. Viewing fleece as a complex micro-environment enables researches to consider what the effects of predation can be on certain micro-organisms and parasites living on sheep. Efforts to develop a strain of fungi that will attack

[103] H. A. Van der Broek and J. F. Huntley, 'Sheep Scab: the Disease, Pathogenesis and Control' (2003), pp. 81-84.
[104] Ibid.
[105] Gou Yang et al., Polymorphism of the Ovine FOXP3 Gene (FOXP3), pp. 3-4.

scab mites but not damage wool quality are therefore also being pursued.[106] More prosaically, the sensitivity to climate explains why mite populations tend to decrease after shearing. Sheep that have just been sheared and short hair breeds also offer less purchase for bacteria-harbouring mite husks and fecal matter and grooming behaviour is more successful in dislodging mites.[107]

How much of this might the veterinary establishment of the Cape Colony had known? Hutcheon, like other scientists and members of the progressive establishment, viewed scab as solely a matter of effective pest eradication. This approach was not necessarily incorrect: a number of countries successfully eradicated scab and others, including South Africa, successfully controlled scab for decades through this approach. New discoveries providing a more complete understanding of the disease are the product of new research technologies. Hutcheon speculated that the more intense irritation caused in some cases of scab may be due to some exudate of the mites. The role of yolk (a fatty substance exuded by sheep that gives the fleece some measure of waterproofing) to suppress the growth of *acari* populations was also discussed in some detail.[108] But the technology needed to fully explore these avenues, the electron microscope and the ultracentrifuge, only became available after the Second World War.[109]

More curious was the failure to prescribe a suitable dipping interval and to propose more accurate quarantine periods for kraals, pastures and various sheep handling equipment. Hutcheon also did not give credence to North West farmers' assertion that Cape fat-tailed sheep were not severely affected by scab although recent research conducted with short fleeced breeds suggests that the farmers' were most likely correct. These aspects of scab eradication did not depend on

[106] Taylor et al, 'Effects of Sheep Fleece Washings on the Germination and Growth of *Beauveria bassiana*' (2009), p. 79.
[107] Meintjes, 'The Bio-ecology of the Sheep Scab Mite *Psoroptes ovis*', pp. 61, 72.
[108] Hutcheon, 'Scab: its Nature, Cause, Symptoms and Treatment', pp. 435-437.
[109] W. Bechtel, 'Scientific Evidence: Creating and Evaluating Experimental Instruments and Research Techniques' (1990), pp. 561-565.

technologically sophisticated equipment, but the replication of scab-related experiments that were conducted in Europe prior to 1880 and the performance of more stringent kraal infectivity tests. This failure suggests that Hutchean's science was influenced by the political and economic demands of progressive wool farmers.

CHAPTER 3: THE GOSPEL OF SCAB: GOVERNMENT EDUCATIONAL PRACTICE

The methods through which the Cape Colonial government tried to spread acceptance of the scientific explanation of scab show that science was used as a rhetorical device in the progressive's campaign to have the Scab Act promulgated. Farmers opposed to the Act reciprocated: disputing veterinary science was seen by the latter as a viable strategy since veterinary science did not yet offer very effective treatments. The aetiology and treatment for a range of livestock diseases common to the Cape Colony were still under investigation in the late nineteenth century. Major challenges were *lamsiekte*, heartwater and redwater and the causes of these diseases were debated in the *Agricultural Journal*.[1] Scab therefore seems to have been one of the few diseases where both the cause and cure were considered to be beyond dispute. Farmers were simply expected to accept that scab was solved while other livestock diseases were not.

In his 1995 review of the historiography of medicine, Warner identified a number of factors that contribute to medical practices and theories gaining cultural authority. The medical profession cannot simply claim authority - the public has to grant this authority under specific socio-economic conditions. New practices and explanations for disease are accepted if they conform to their audience's political, religious and economic interests. It therefore helps the medical and scientific profession if their practices and theories conform to existing social values. The public accepts scientific theories that offer support for their values – in the process science gains authority while certain social values gain more weight because of being underwritten by scientific evidence.[2]

[1] For discussions of these diseases see W. Beinart, *The Rise of Conservation in South Africa* (2003), chapter 4; D. Gilfoyle, 'Veterinary Science and Public Policy at the Cape Colony, 1877-1910' (2002), chapter 3; D. Gilfoyl, 'The Heartwater Mystery: Veterinary and Popular Ideas about Tick-borne Animal Diseases at the Cape, c. 1877-1910'(November 2003), pp. 139-160.
[2] J. H. Warner, 'The History of Science and the Sciences of Medicine'(1995), pp. 169-172.

A similar process can be discerned in Gilfoyle's work on heartwater, a tick-borne livestock disease. This disease mainly affected Eastern Cape farmers. In the absence of an official veterinary aetiology for the disease, they developed several theories to explain the disease that incorporated germ theory and environmental causes. These farmers also strongly identified the disease with the spread of the bont (tortoiseshell) tick, a fairly recent arrival to the area that was introduced from Zululand in the 1830s. Charles Lounsbury, in collaboration with the colonial veterinary department, discovered that heartwater is spread by the bont tick during research conducted in 1900-1902. This discovery was immediately accepted by Eastern Cape farmers: it confirmed their theory that the disease was tick-borne and the tick's preference for bushes over grassland validated the farmers' concern about bush encroachment and environmental degradation. Environmental theories of the disease that focussed on livestock malnutrition could be accommodated in this explanation since the expansion of the ticks' habitat (i.e. bush encroachment) was closely associated with pasture degradation. The farmers were also offered an acceptable solution for the disease – paddocking to prevent livestock from spreading the ticks further and dipping to eradicate the tick. Both technical solutions were already commonly advocated and practiced in the region.[3]

The North West farmers' environmental explanation for scab could be similarly accommodated in the official veterinary account of the disease. Hutcheon had explanations for the long incubation period of the disease and for why malnourished sheep tended to contract the disease only to recover on fresh pasture. These explanations, however, all pointed to the *acari* as the cause of the disease with the implication that the government's proposed anti-scab measures like dipping and quarantine measures was indispensable. These farmers could not accept what they believed would

[3] D. Gilfoyle, 'The Heartwater Mystery: Veterinary and Popular Ideas about Tick-borne Animal Diseases at the Cape, c. 1877-1910'(November 2003), pp. 150-153.

be the economic costs of combating scab and as consequence they refused to concede authority to veterinary surgeons.

Farmers appeared to defend alternative explanations of scab partly out of an attempt to escape anti-scab legislation. Accepting that scab was a curable, infectious disease placed farmers under a moral obligation to protect their neighbours' flocks from re-infection.[4] Alternative explanations for the disease were therefore propagated by the anti-Scab Act movement partly for strategic reasons. As discussed below, some farmers who opposed the Act were willing to blatantly contradict themselves in their testimonies in order to maintain their original position. Confronted with a progressive discourse that presented their skills as ignorance, farmers responded with defensive belligerence.

The opponents of the Act thought that the provisions of the Scab Act cast doubt on their competency as farmers, while the proponents of the Act saw it as an educational opportunity. It was an issue of faith with progressives that if farmers accepted the scientific explanation of the disease, they should logically accept the prescribed cure and also perceive the recommended veterinary measures to eradicate scab as necessary. This proved to be overly optimistic: of the 644 individuals who testified before the Scab Commission, 231 (including eight English-speakers) opposed the Act and an additional 82 were cautiously in favour of legislating but had reservations about its workability. Only forty farmers, however, directly linked their opposition to the Act to their opposition to the scientific account of the disease. A small number of farmers who were not convinced by the scientific account of scab dipped their sheep to good effect and supported the Act, while 73 farmers who opposed the Act believed the scientific account of the disease, believed in the value of keeping their sheep clean and even dipped their sheep when

[4] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of J. Stapelberg, p. 393.

necessary. Opposition to the Act therefore did not correlate with "ignorance" as the supporters of the Act claimed.[5]

There were a range of sources of information on scab, its prevention and treatment and the disease was often discussed in the agricultural press. The rest of this chapter will focus, however, on the three main means through which the government attempted to educate farmers about scab. These were ocular demonstrations by means of microscopy; logical argument; and scientific experiments. These methods were tried by Hutcheon, by the Scab Commission of 1892 to 1894, and by the office of the CIS. All three appealed implicitly and explicitly to the authority of science. What follows is a discussion of these methods organised loosely around each of these three educational agents.

MICROSCOPY IN THE COUNTRYSIDE

At the time of the sittings of the Scab Commission, Hutcheon had already conducted a series of microscopy tours through the sheep farming districts of the Colony. At the request of John X. Merriman, MP for Namaqualand, Hutcheon toured the stock farming areas of the Colony from 1883 to 1886 to study the disease *in situ*. During his first tour, he mostly travelled the prosperous sheep farming districts of the Cape Midlands and Eastern Province. The farmers of this area were those that had campaigned for the appointment of a Colonial Veterinary Surgeon and were receptive to Hutcheon's recommendations to control scab. During 1886 he spent nine months on the road visiting districts generally opposed to anti-scab legislation. He would normally set up his microscope(s)[6] in the town hall over weekends, but during circuit court sittings or on market days

[5] These numbers were obtained from the report of the Scab Commission. Many farmers did not discuss their views of the disease. Both support for and opposition against the scientific explanation for scab was only tallied as such if farmers explicitly discussed their opinions of the causes and nature of scab.
[6] Hutcheon does not indicate how many microscopes he had and which type they were. As he normally travelled alone with three horses, of which one was a spare riding horse, and had to convey camping supplies, his microscopy equipment could not have been elaborate.

he set up shop on weekdays to take advantage of the fact that many farmers visited town on these occasions. On days when there were few farmers in town, he would ride out to farms, usually accompanied by an interested farmer he met over the weekend or by the local Civil Commissioner or Resident Magistrate.[7]

As discussed in Chapter 2, Hutcheon chose to disassociate himself from the administration of the Scab Act. It is clear from his 1886 report that travelling the countryside to show *acari* to sheep farmers bored him. For example, at the hamlet of Modderfontein the farmers arrived one by one for his demonstration and he had to repeat the lecture for each new arrival, which, in his own words was "…about as monotonous a duty as ever [he] experienced."[8] Hutcheon's published report contains long digressions describing his dissection and treatment of sheep and cattle for other diseases in between scab demonstrations and, as the tour progressed, these digressions became longer. Hutcheon was apparently incapable of letting an interesting disease or carcass pass him by. He even stopped to dissect his horse when the animal died shortly after he reached Hope Town.[9] Because administering a scab act "would break a man from professional work", he refused to allow any of his veterinary staff to serve as sheep inspectors. Veterinarians were needed to study new diseases, not for the purely practical matter of inspecting and dipping sheep.[10]

Educating farmers about scab therefore fell to the office of the Chief Inspector of Sheep (CIS). Davison, a failed pastoralist, started working as a sheep inspector in 1887 and was appointed as CIS in 1890.[11] He had no official scientific training, but had fifteen years of experience as a sheep farmer in the Eastern Cape. He was the privately educated son of an English naval captain and

[7] CPP [G.14 – 1887] *Report by the Colonial Veterinary Surgeon for the Year 1886*, pp. 1-19.
[8] Ibid., p. 11.
[9] Ibid, p. 9. Hutcheon found a tumour in the unfortunate animal's stomach.
[10] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of CVS D. Hutcheon, p. 720.
[11] CA AGR 126/520, 1892-1895, Correspondence of Allan Gardiner Davison.

came to the Cape Colony in 1872, aged sixteen, whereupon he served as an apprentice sheep farmer under William Hockley in Bedford for ten years before starting to farm on his own account. He served in the settler militia in various frontier campaigns in the late 1870s and early 1880s and was Sir John Frost's aide-de-camp in what became known as the Tembu War of 1881.[12] He entered government service under Frost's patronage on which he depended for regular salary increases.[13] Together with the practicalities of examining and dipping sheep, he also aped Hockley and Frost's progressive ethos and prejudice against Dutch-speaking farmers. His low opinion of Dutch-speaking farmers was not improved by his work as CIS.

The Scab Act of 1894 was hardly what progressives had hoped for. Davison and his field officers met with widespread opposition to the act due to what he considered to be "misrepresentation and ignorance of the law"[14] and Davison came to see the 1894 Act as an interim measure:

> I make bold to say that no one acquainted with the difficulties to be encountered ever expected at the brightest moments that the provisions of the Act were sufficiently stringent to accomplish the object for which they were framed in the more neglected and backward portions of the Colony, even though years might be expended in the effort. I think the general feeling among progressive farmers was, that, with all its faults and shortcomings, the law as passed in 1894 was rather an educational measure, which it was hoped would so conduce the improvement of wool and stock generally, that it would prove but the forerunner of better things, and the basis upon which to frame more stringent measures.[15]

Davison was initially confident that the Act was a successful education measure and optimistically estimated in 1896 that "another year or two" may be needed for this purpose. This optimism dissipated as continued resistance against the Scab Act delayed promulgation of an improved act until after Union. Davison, like the Scab Commission, saw the conflict over the Scab Act as a struggle between ignorance and superstition on one side and scientific knowledge of the disease on the other. With the battle lines thus drawn, the matter of scab eradication was

[12] *Men of the Times: Old Colonists of the Cape Colony and Orange River Colony* (1906), p. 100.
[13] CA AGR 126/520, 1892-1895, Correspondence of Allan Gardiner Davison.
[14] CPP [G. 33 – 1896] *Report of the Chief Inspector of Sheep and of the Superintendent of Scab Inspectors in the Transkeian Territories for the Year 1895*, p. 7.
[15] CPP [G. 61 – 1897] *Report of the Chief Inspector of Sheep and of the Superintendent of Scab Inspectors in the Transkeian Territories for the Year 1896*, p. 1

defined in purely technical terms. Farmers must be educated that scab is caused by *acari* and that the disease can be cured completely by killing the *acari*. For this reason, "ocular demonstration …that scab is really caused by an insect" was perceived to be the best means to combat resistance to the Act.[16]

From the outset this proved to be a misguided strategy. Farmers were opposed to the Act for a range of reasons and whether the disease was caused by *acari* or not was often not material to their opposition. So Barend Jacobus Erasmus of Hope Town stated clearly that he was not in favour of the Scab Act even if it could be proved that scab was caused by *acari* and could be eradicated.[17] Jacob Johannes du Toit of Fraserburg was of the same opinion[18] as was Martinus Jacobus van Wyk of Calvinia: he was convinced that scab was caused by an insect as he was shown the insect, but held that the expense of dipping was not worth the while.[19] This view was also voiced in Parliament. J. A. D. des Vages, MP for Beaufort West, blamed merchants who flooded the market with Argentine and Australian wool for low wool prices. He reasoned that even if scab could be eradicated, wool prices would still be low due to overproduction and neglect in shearing.[20] They were therefore, as Davison would soon realise, not open to being persuaded to either the scientific view of scab or the consequent need for a scab act. Davison wanted sheep inspectors to pursue "the crusade against scab [in] true missionary spirit"[21] but he was unable to make many converts. He therefore developed the demeanour of a "disappointed

[16] Ibid., p. 7.
[17] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of B. J. Erasmus, p. 480
[18] Ibid., evidence of J. J. du Toit, p. 587.
[19] Ibid., evidence of , M. J. van Wyk, p. 577.
[20] *Debates in the House of Assembly* (25 June 1894), 161.
[21] CPP [G. 10 – 1910] *Report of the Chief Inspector of Sheep for the Year 1909*, p. 55.

prophet"[22], using his annual reports to rant against the "large majority who wished to perpetuate the evil by acting as Freetraders in Scab."[23]

Davison embarked on a microscopy tour in 1896. His aim was to make the acquaintance of the newly appointed sheep inspectors in order to establish "a certain comradeship" with them and to train them, but his microscopy demonstrations were open to the public and used by him as a forum to debate scab. He was given the opportunity to assess the difficulties experienced by his inspectors in the field, to evaluate their performance and to answer questions on the nature of scab that left him without "the least doubt but that much misconception was removed."[24]

Some farmers, however, still did not believe that scab was caused by *acari* in 1909. Commenting on the implementation of the Scab Act in the North West, P. J. du Toit, acting Under-secretary of Agriculture, concluded:

> It is clear now, after the event, that when the Act was enforced in 1894, and for years afterwards, great efforts should have been made to explain thoroughly to them the provisions of the Act and to endeavour to win them over. In my opinion they were not ripe for scab legislation, and I am sorry to say there is an enormous amount of educational work still needed. There are widespread beliefs that scab is due to overheating of the blood, to poverty, to something in the air, and I found it most difficult to get the generally accepted views on the subject believed. There are few now who do not admit the existence of scab insects, but most have their own theories as to the origin of the insect: and their experience is to them a sufficient reply when they are asked to substantiate their views. In saying this, I am speaking generally, of course. The North-West has reason to boast of farmers who are the equals in intelligence, knowledge, and methods of any I have met in other parts of the Colony. [25]

Some farmers were therefore convinced through ocular evidence of the merits of the scientific explanation of scab, while others were not. 'Seeing' was not necessarily 'believing'. Hutcheon

[22] CA CIS 48/46 – Scab Returns and Draft Acts, 1902-1913. Letter from the Veterinary Surgeon, D. Hutcheon, to Took re A.G. Davison's draft act, 6 October 1904.
[23] CA AGR 574/Q58 - Outlines of a scab act proposed by chief inspector of sheep, A. G. Davison, to the Minister of Agriculture, 8 Nov. 1904. This "large majority" was the delegates to a 1903 farmer conference held in Beaufort West that was mainly attended by farmers who opposed the Scab Act.
[24] CPP [G. 61 – 1897] *Report of the Chief Inspector of Sheep and of the Superintendent of Scab Inspectors in the Transkeian Territories for the Year 1896*, p. 10.
[25] CCP [G. 11 – 1909] *Report of the Scab Acts and their administration in the North-western District of the Cape Colony*, p. 5.

and Davison's reports imply that looking through a microscope was simply a matter of seeing what was there to be seen, but the matter was altogether more complex, as evidenced by the lingering disbelief of some farmers in the scientific explanation of scab. As Davison did not provide a detailed account of his tour, Hutcheon's 1886 tour must serve as example to investigate the practice of microscopy further.

In discussing Hutcheon's 1886 tour, Gilfoyle gives the impression that he met with such opposition in the North West that farmers refused him lodgings, forcing him to camp out instead.[26] This was not the case, however. Hutcheon did sleep outside some nights but this was a consequence of his gruelling travel schedule and not due to a lack of hospitality. He tried to visit towns around *Nachtmaal* when farmers would be present and sometimes had to travel through the night to reach his next destination in time. As farms were large and he spent time on the journey examining local farmers' sheep, there was not always a farmhouse at hand when night fell.

Hutcheon in fact often overnighted at the houses of opponents of anti-scab legislation because these men welcomed the opportunity to convert him to their views. For example, he was asked to stay overnight at a certain Mr. Hugo's farm after a microscopy demonstration in Beaufort West to show Hugo and his neighbours *acari* from their own sheep. They spent the whole evening discussing scab. As someone insisted that insects could be found on clean sheep, a clean sheep was caught and wool was taken off it and teased out, but the dust showed no scab even though "the search was kept up with zeal for some considerable time."[27] Hutcheon seems to have had the most success with these house visits as it gave him the opportunity to engage individually with influential farmers. In this way he managed to gain the support of a certain Mr. Vos, a Carnarvon farmer. After an enjoyable argument Vos still refused to believe *acari* caused scab, but Hutcheon

[26] Gilfoyle, 'Veterinary Science and Public Policy at the Cape Colony, 1877-1910' (2002), p. 99.
[27] CPP [G.14 – 1887] *Report by the Colonial Veterinary Surgeon for the Year 1886*, p. 5.

managed to convince Vos to let him artificially infect one of Vos's pet sheep. After the animal contracted scab, Vos was converted.[28]

Since it was not practically possible for Hutcheon to conduct home visits throughout the Karoo, he had to rely on public microscopy demonstrations to convey his educational message. These demonstrations were used by proponents of a compulsory scab act to champion their cause and civil commissioners often arranged public meetings on scab to coincide with his visits. At Victoria West, local wool merchants brought farmers to his demonstration. The local DRC minister, a Mr. Meader, also brought along farmers the whole Saturday until the late evening and made a point of becoming conversant with Hutcheon's demonstration so that he could prompt Hutcheon to explain the disease fully with carefully phrased questions. At Fraserburg farmers who supported anti-scab legislation arrived early to familiarise themselves with Hutcheon's demonstration so that they could serve as translators for those who arrived later and his demonstration became an impromptu public meeting through which proponents and opponents tried to lobby for support for their respective positions. The meeting at Hope Town was similarly lively and Hutcheon was cross-examined for two hours.[29]

At the conclusion of this tour, Hutcheon reported mixed results. In addition to conversion, he identified other responses to his message. Some farmers were apathetic: "[He] was, however, made conscious of a certain feeling that existed in the minds of some, from whom [he] expected some assistance in the way of bringing [him] in contact with their less intelligent brethren, that there was nothing which [he] could tell the farmers about stock or their diseases that they did not know much better themselves; hence they took no interest in [his] visit." At the stock sale in the Carnarvon district, "most of [the farmers] had a look at the insects, but very few of them took any

[28] Ibid., pp. 12, 13.
[29] Ibid., pp. 5-6, 8-10, 13-14.

intelligent interest in the matter." He also reported that "a large percentage of farmers would not entertain [his] doctrine respecting scab at all, and resolutely shut their eyes against the revelations of the microscope." Some farmers, as already discussed, theorised away the existence of *acari* by arguing that the arachnid did not cause scab. As Hutcheon could not follow each of them home to artificially infect their sheep and had to acknowledge that it is impossible to prove a negative (that scab is sometimes not caused by *acari*), he could not do much to convince these farmers.

Some who believed scab was caused by *acari* also proposed a theory of evolution. They reasoned that since the insect came into existence spontaneously sometime in the past, the same could happen again shortly after the *acari* were eradicated. Hutcheon marveled at this:

> From these and similar arguments which I heard daily in my travels, I am persuaded that an unconscious belief in the doctrine of the 'Evolution of Species' is innate to the untrained and unbiased human mind, and yet it is strange that the doctrine should have met with such opposition when it was first formally introduced, when an erroneous and greatly exaggerated representation of it finds such ready acceptance daily amongst the mass of the people. [30]

In addition to the farmers who would not look through the microscope farmers "who were equally sceptical, but a little more curious, would look through the microscope, see the insects moving about amongst the scabs, but solemnly declare that the whole thing was simply a process of legerdemain – that what they saw were not scabs, &c., lying on the slide, but something that [he had] placed in the microscope." [31] Hutcheon, who apparently believed that microscopy was a transparent visual technology, was unable to deal effectively with these farmers as they exhibited mistrust in microscopy that he could not fathom.

Whereas Hutcheon was willing to acknowledge that recent discoveries in entomology were not yet firmly established in the scientific world and were thus unlikely to have been widely accepted

[30] Ibid., pp. 21- 22.
[31] Ibid., p. 20.

in the Cape countryside, he did not exhibit a similar awareness in the case of microscopy. Proponents of microscopy struggled to get their ocular technology accepted as a source of valid scientific knowledge in the early and mid-nineteenth century. Naturalists argued that the proper way to study animals and plants was *in situ* to gain insight into the behaviour of creatures unattainable when studying a preserved specimen and that the process of decay and the methods of preparing samples for study distorted the results of microscopy examinations. Naturalist championing fieldwork and scientists advocating the pre-eminent value of laboratory work waged a battle for precedence through opposing journals and a variety of public appeals. The laboratory scientists won largely due to factors tangential to the debate: the successes and the esteem that the laboratories of Pasteur and Koch garnered and the perceived need to professionalise science. Busying oneself with specialist equipment inside a building was seen as more 'work-like' and was less vulnerable to intrusion by non-specialists while running around in the countryside was seen more akin to recreation and, as anyone could wield a butterfly net or sample jar, more open to intrusion by amateurs.[32]

The correct method of preparing a microscopy sample and how to visually represent it was debated for decades before a set of conventions was established. It was difficult to know initially what was significant in the new visual world revealed by the microscope and how to represent it. Samples were distorted by the methods used to prepare them – they were boiled, flattened, artificially coloured and impregnated with resin and other fixatives. A convention governing the preparation of samples developed slowly in the 1850s and 1860s through comparing different methods with each other.[33] This process implied that scientists had some standard of comparison against which to evaluate the processes and this standard could not be 'nature' as it was the nature

[32] G. Gooday, '"Nature" in the Laboratory: Domestication and Discipline with the Microscope in Victorian Life Science' (1991), pp. 313, 318.
[33] Ibid., p. 332.

of 'nature' that was being queried. In practice, the standard was often a theory that informed scientists' expectations of what the object they wanted to look at would or should look like.[34]

This had implication for how microscopy findings were visually presented: writers of microscopy textbooks like Lionel Beale, professor of Physiology at King's College, London (1853-1869), included rigorous instructions on how to interpret and draw the samples studied. Of crucial import was the need to teach students what was essential in the image and what was not and this could only be determined through prior theorising.[35] This posed another challenge for microscopists as the image produced by this technology could not be considered objective. To overcome this, anatomists sometimes hired non-scientists to make the drawings for them in the hope that such images would be free from distorting bias. This problem was only solved by the development of conventions to govern microscopy photography, which only became possible once conventions for the preparation of microscopy slides were developed. Microscopy photographs could not by themselves show what was significant in a particular sample but they produced standardised representations that could be used to standardise the preparation of slides and critique their visual interpretation.[36] After these debates had been settled, microscopists confidently stated that when they were looking through a microscope they were looking not at a sample that had been artificially prepared but that they were looking at unmediated nature.[37]

Michael Lynch (1985) argues that the objects studied in laboratories are highly artificial and that their visibility depends on complex instruments and complex preparatory procedures. Such

[34] O. Breidbach, 'Representation of the Microcosm: The Claims for Objectivity in 19th Century Scientific Microphotography' (2002), pp. 222-224.
[35] Gooday, '"Nature" in the Laboratory: Domestication and Discipline with the Microscope in Victorian Life Science', p. 332.
[36] Breidbach, 'Representation of the Microcosm: The Claims for Objectivity in 19th Century Scientific Microphotography', pp. 223, 240-241.
[37] Gooday, '"Nature" in the Laboratory: Domestication and Discipline with the Microscope in Victorian Life Science', p. 309.

specimens are modified for purposes of investigation and are then standardised through established laboratory practice.[38] But this was often disingenuously denied by 19th century microscopists: T.H. Huxley, one of the directors at the teacher training college attached to the South Kensington Institute established by Prince Albert in the 1850s, was frustrated by what he considered to be his students' inability to observe directly from 'nature'. When presented with a standardised microscope slide, the students would copy what Huxley drew on the black board and not what they saw. The problem was not that they could not draw from observation, but that they did not know how to interpret what they were looking at. What was required was not that students must see the sample and reproduce it exactly (as Huxley seems to suggest), but that they should master the conventions for themselves and produce their own schematic images. Their drawings should have reproduced Huxley's black board image in its essentials without being identical to it.[39]

The practice of microscopy therefore developed techniques to discipline practitioners' visual faculty. In fact, it had to do so before microscopy could become a useful technique. This is not to say that there is some form of vision that is not influenced by preconceptions or that can be 'objective'. The relationship between an object and a seeing subject is not mediated through the visual apparatus in a transparently mechanical way with the 'self' looking at visual data as if watching a cinematic projection. Rather, the brain orders and interprets the neurological signals from the eyes according to individual mood, expectations, knowledge and desires.[40] If the brain does not order visual information in this manner, human beings would experience everyday vision like Huxley's students confronting a new microscope slide. As a consequence, vision is a form of deductive reasoning and is shaped by the same factors that shape thought.

[38] M. Lynch, 'Discipline and the Material Form of Images: An Analysis of Scientific Visibility' (1985), p. 37.
[39] Gooday, '"Nature" in the Laboratory: Domestication and Discipline with the Microscope in Victorian Life Science', p. 308.
[40] J. Elkins, *The Object Stares Back: On the Nature of Seeing* (1996), p. 33.

When an enthusiastic microscopist set up his equipment in a room at Oxford university in the 1850s, most professors were not interested in his demonstrations and the few who did come did not believe what they were shown. They did not understand how the lenses of the microscope magnified the sample and how the sample was prepared and they did not take the demonstrator's explanation at face value. One of the dons broke one of the microscope lenses through careless handling, another wanted to know if what he was seeing was 'true': "Evidently individuals who had not been inculcated […] in how to procure and interpret microscopical evidence could easily contest the veracity of the microscope..."[41] If Oxford dons could suspect trickery then Cape farmers should not be reviled for accusing Hutcheon of conjury.

As discussed above, microscopy was made scientifically acceptable through the establishment of conventions of preparation, interpretation and representation. Crucially, this process happened in an institutional setting where the teacher's authority could be legitimised by nearly invisible pedagogical techniques. Students were conducted through a series of increasingly complex demonstrations during which their room to question the knowledge imparted by their instructors was carefully prescribed. A teaching laboratory or classroom had expected standards of behaviour and a student was allowed only a limited range of responses. The teacher's authority might be reinforced by a textbook written by a renowned scientist or she might have been a renowned scientist herself. Usually students were not allowed to prepare their own samples or to even adjust the microscope lenses for themselves until they were well into the course. And students came with prior educational experience that predisposed them to act in the required manner and accept

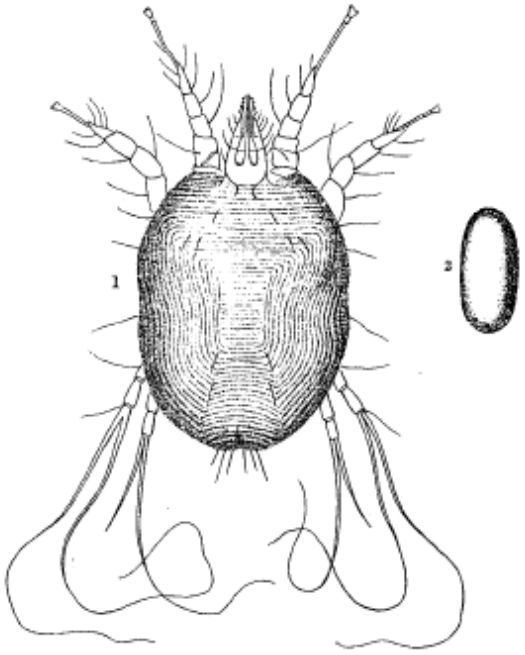
[41] Gooday, '"Nature" in the Laboratory: Domestication and Discipline with the Microscope in Victorian Life Science', p. 327.

the teacher's views as authoritative. The validity of what a microscope reveals was therefore institutionally mediated.[42]

Few (if any) Cape farmers were exposed to the education process necessary to take microscopy at face value. When Hutcheon showed *acari* to Cape farmers, he was therefore met with a response similar to the enthusiastic Oxford microscopist. Hutcheon was used to seeing *acari* under a microscope and was familiar with the conventional microscopy representations of *acari* in circulation in the late nineteenth century. Publications of scab in this period seem to have used the same stock images or else illustrators followed the same conventions. The illustrations of *acari* in Wallace's *Farming Industries of the Cape Colony* were obtained from the 1890 U.S.A. Report *Animal Parasites in Sheep* and Hutcheon's posthumous article on scab in the *Agricultural Journal* was illustrated by similar reproductions from an undated *US Bulletin*. These beautifully detailed illustrations show representational conventions: the mites have fingerprint-like grooves on their backs, they are drawn symmetrically with legs and tentacles evenly distributed and their reproductive organs are symbolized with circular shapes (see illustration 3.1). In Hutcheon's description of how he prepared microscopy samples, he mentions that a 'good' sample could be fixed and preserved with some gum, indicating that he had preconceived notions of what, for instance, a typical mature male *Psoroptes ovis* should look like.[43] Despite Hutcheon's own training in representative conventions, he apparently believed that visual information is immediately accessible in an unproblematic way. Wallace shared this belief: He included ten illustrations of cross sections of hair and wool in *Farming Industries of Cape Colony* (illustration 3.2) since these illustrations would "render elaborate letterpress description unnecessary."[44]

[42] Ibid., pp. 308, 330-334.
[43] D. Hutcheon, 'Scab: its Nature, Cause, Symptoms and Treatment' (1908), p. 438.
[44] R. Wallace, *Farming Industries of Cape Colony* (1896), p. 359.

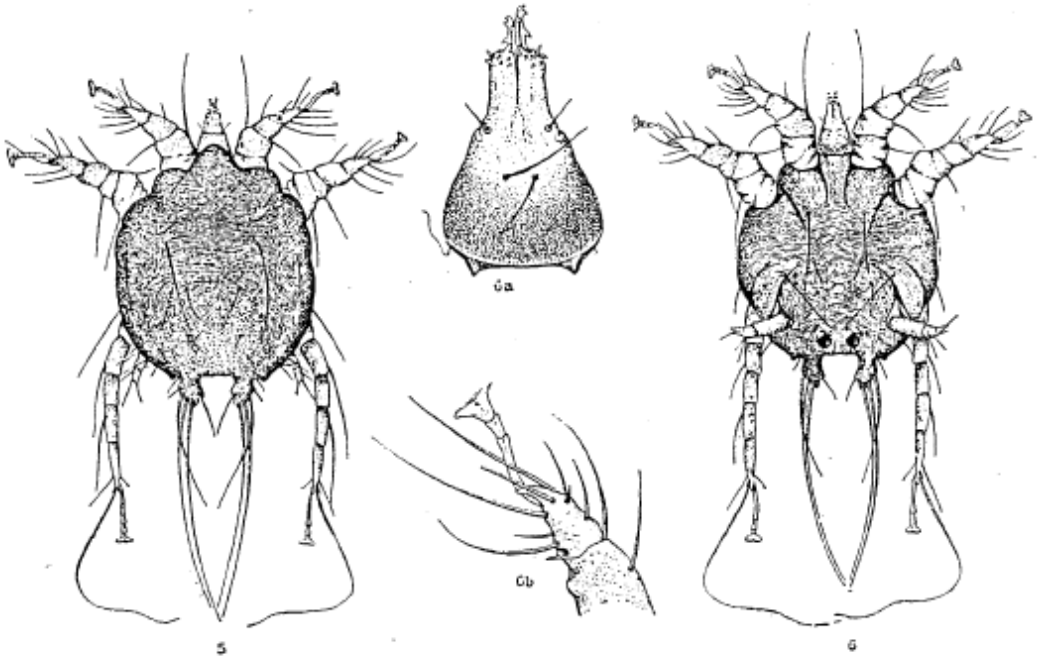
Illustration 3.1: *Psoroptes ovis*



1. Adult Female, dorsal view.
2. *acari* egg

Source: Reproduced from *U.S.A. Report Animal Parasites in Sheep* (1890), in Wallace, *Farming Industries of Cape Colony*, p. 375.

SCAB INSECTS.



Reproduced from *U.S. Bulletin* No. 21.

PSOROPTES OVIS OR COMMON SCAB MITE OF SHEEP.

5. Adult Male, dorsal view. 6. Ventral view of same.
6*a*. Head of Female. 6*b*. Leg of Female.
All greatly enlarged.

Source: Reproduced from *US Bulletin*, No. 21, in Hutcheon, 'Scab: its Nature, Cause, Symptoms and Treatment', p. 442.

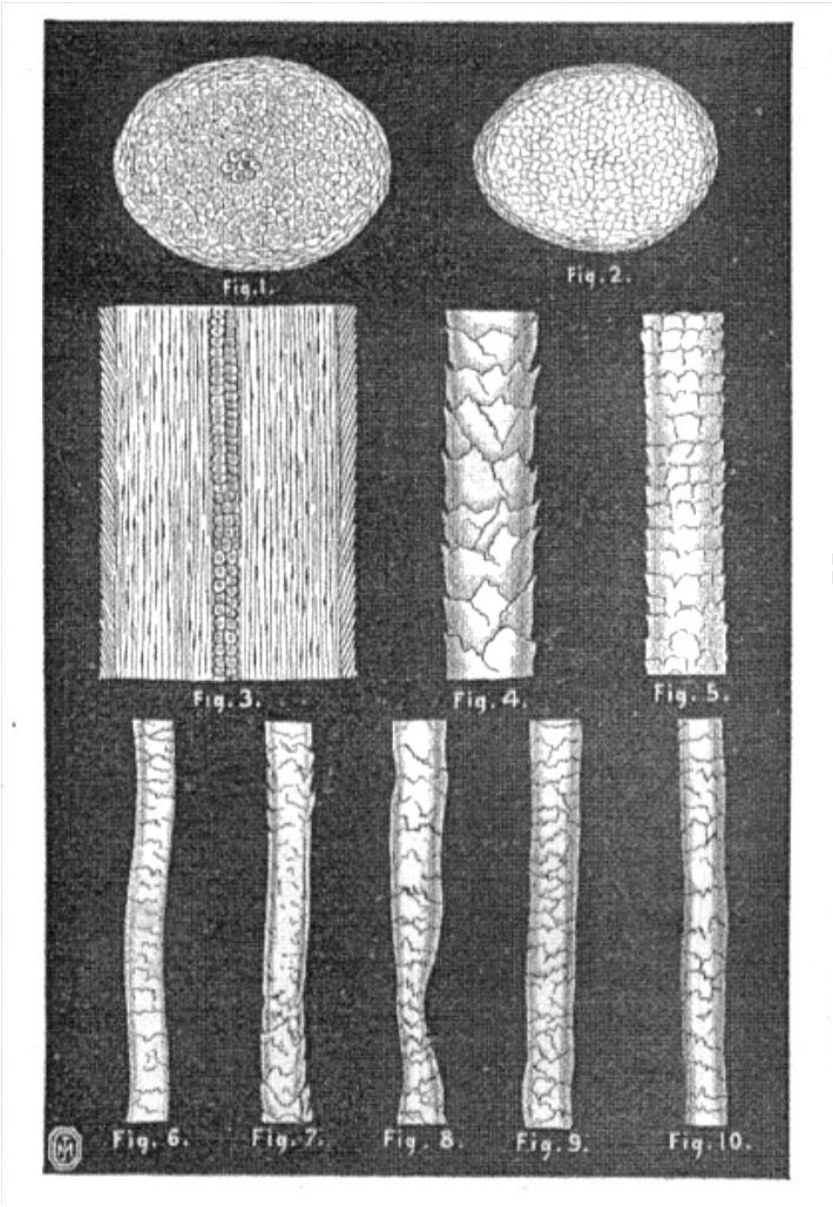


Illustration 3.2: Wool, Hair and Mohair Sections

Figure 8 shows a damaged and weakened wool fiber. This could be the effect of malnutrition, scab or another illness.

Source: Wallace, *Farming Industries of Cape Colony*, p. 360.

He immediately disproved this statement by writing four pages of description to explain the illustrations.[45]

At the magnification *acari* were illustrated they were recognisable as lice-like arachnids. However, the resolution of Hutcheon's travelling microscope was unlikely to have matched the

[45] Ibid., pp. 359-363.

(unknown) magnification of the illustrations. Hutcheon did not show the farmers isolated specimens in fixative but live *acari*. He prepared samples by combing out a piece of wool taken from a scabby sheep over a piece of paper and then transferring some of the dust onto a microscope slide. What farmers saw therefore was bit of matter creeping about stationery bits of matter, either dirt or scab crust, and the creeping oval-shaped bits were then pointed out to them as *acari*. Hutcheon was particularly concerned that the *acari* he showed farmers should move about on the slide and this necessitated him finding fresh samples every few days. The extreme cold of the Karoo winter also drove the mites into hibernation. On a sunny day, he could show farmers the *acari* with the naked eye because they were livelier or he could prod them into motion with a porcupine quill, but in winter this was difficult. When he visited Victoria West during a cold spell he set up his equipment in the hotel parlour where the proprietor graciously kept the fire burning for the duration of his demonstration.[46]

Hutcheon rarely took scab samples from sheep in the presence of farmers. Sheep left their sleeping places or kraals in the early morning and returned (or were herded back) in the evening so Hutcheon either had to ride out to get samples very early or very late in the day. The poor light at these times made it difficult to identify scabby sheep. Indeed on one occasion he had to find a scabby sheep and take samples after dark by feel. Farmers therefore rarely saw Hutcheon gathering samples and preparing them. When they arrived in the meeting hall, the scab was already on the glass. It is therefore not surprising that they disputed that the *acari* Hutcheon showed them had been taken from sheep. They even disputed that the *acari* were real live *acari* and accused Hutcheon of showing them a picture that moves through some form of sleight of hand involving the glass slide of the microscope. Hutcheon was insulted but unable to win them over: "If I argued further, that I have no interest in deceiving them, as I charged nothing for the exhibition, they were equally ready with their reply that the Government wanted to impose a Scab

[46] CPP [G.14 – 1887] *Report by the Colonial Veterinary Surgeon for the Year 1886*, pp. 5, 20.

Act upon them, and sent me round to try to make them believe that the scab were due to an insect, so that the Government might be able to carry it through."[47] And they were correct: Hutcheon had come to town specifically to advocate for a scab act and so did have a vested interest in putting on a good show.

The farmers who disputed the practice of microscopy were not conditioned through formal education to automatically accept the claims of scientists. They were even less disposed to accept statements made by government agents at face value. Similarly, they were not amenable to be converted by 'ocular demonstration'. Farmers were convinced by the microscopy demonstrations if they were predisposed to be convinced. In addition, the demonstrator had no way of knowing if a farmer had been convinced or not. J.R. Leech, a medical doctor, wrote to the *Agricultural Journal* to recount his experience of showing the *acari* to farmers. According to him, many farmers humoured him by seeming to accept his demonstration at face value but despite their response of "Ja Mijnheer" they were in reality as unconvinced by the argument that *acari* caused scab as they had been before.[48] So Tilman Carel Nieuwoudt, a Kenhardt sheep farmer, testified that a microscopy demonstration of *acari* left him unmoved: "The veterinary surgeon once showed it to me, but I cannot say whether it is the cause of scab. I believe very little in it."[49] Davison's initial optimism regarding the success of his educational tour shows that he too was humoured in this fashion. It also explains why such demonstrations had to be conducted on a continuous basis.

THE SCAB COMMISSION

The Scab Commission travelled throughout Cape sheep farming districts during 1892-1894, gathering evidence to use in the design of the Scab Act of 1894. Sir John Frost, sheep farmer and

[47] Ibid., p. 20.
[48] *AJCGH*., 4, 12 (1891), p. 141.
[49] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of T. C. Nieuwoudt , p. 573.

MP for Queenstown, chaired the Commission until his appointment as Minister of Agriculture in September 1893. Another sheep farmer, Dr. Thomas William Smartt, MP for Wodehouse and a future Colonial Secretary and Commissioner of Crown Lands and Public Works, succeeded Frost as chairman. Yet another sheep farmer, William Henry Hockley, the MP for Somerset East, also served on the Commission. Hockley and Frost had been involved with the 1874 and 1886 Scab Acts, giving evidence to the commissions in their capacity as sheep farmers with Frost serving as member of the 1874 commission and Hockley as a member in 1884. All three were well known progressives who dedicated their parliamentary careers to lobby for government support for agricultural improvement.

To create an impression of evenhandedness some Dutch-speakers served on the Commission. However, these men did not significantly alter the findings of the Commission. Pieter Jacobus du Toit, MP for Richmond, chairman of the Afrikaner Bond and self-confessed opponent of a general scab act, served as a member but was swayed by the evidence he heard. He became convinced that scab, although worsened by malnutrition, was caused by the *acari* mite. He also came to realise that farmers who complained that dipping did not work were dipping incorrectly. As scab was a contagious disease, he came to believe that measures against it were justified.[50] Du Toit's defection was characteristic of the position of the Bond's leaders regarding the disease and the political crisis this caused for the Afrikaner Bond is fully discussed by Tamarkin and Davenport. With the Afrikaner Bond members of the Commission convinced of the validity of the scientific explanation for scab, the commissioners' report therefore came out unanimously in favour of a general scab act although not all the commissioners favoured the same anti-scab measures.

[50] *Debates in the House of Assembly* (25 June 1894), p. 160.

The commissioners noted that there was widespread opposition to a scab act but considered the opposition as mainly motivated by ignorance. They remained optimistic about the possibility that once farmers were instructed in the benefits of the Act they would change their minds as in the case of Du Toit:

> In fact almost all over the country some witnesses were found who stated that they believed treatment was useless; that drought, poverty, blood-impurities, and bad shepherding were the causes of the disease; so long as these occurred it was useless doing anything; and that any legislation on the subject simply meant ruination to the farmers. So convinced did some witnesses wish us to be on these matters that they went so far as to state that, not only did their experience prove to them the fallacy of the theory of scab being contagious, but that they had no objection, if their flocks happened to be clean, to have scabby sheep or goats freely mix with theirs, as they knew positively scab never was contagious. From the evidence of a large number of witnesses living outside the area at present under the scab act, it appears that a vast want of knowledge as to the conditions imposed by and the general workings of the present act exist among a large section of the farming community, and that all sorts of vague and unfounded rumours are freely circulated as to the hardships wrought by it, the severity of its penalties, and its inoperativeness in coping with the spread of scab disease, with the results of prejudicing many against the present act or against legislation of any sort on the subject; however, we are pleased to be able to state that numbers who held these erroneous views, when acquainted with the real provisions of the act, at once altered their opinions, and seemed to be in favour of the scab legislation.[51]

The Commission sat in fifty-seven towns scattered throughout the major sheep farming districts of the colony, including the North West districts of Calvinia, Fraserburg, Carnarvon and Kenhardt. It also met in the cities of Cape Town, Port Elizabeth and East London to hear testimonies from merchants. The aim of a sitting was not merely to gather opinions from the farming community, but to provide an educating medium through public debate. Every sitting was therefore widely publicised beforehand and hence well attended and the commissioners took care to give a wide range of ordinary people and delegates from political groups, farmers' associations and merchant firms the chance to speak. They believed that their sittings reflected the full range of opinions in the farming community. In fact, the commissioners cautiously congratulated themselves on their evenhanded method of gathering opinions. They also ensured that the proceedings were fully translated into Dutch if necessary.[52] It is not clear, however, from

[51] CPP [G.1 – 1894] *Report of the Scab Commission*, p. 3.
[52] Ibid., pp. 1-2.

the Commission proceedings whether the translators were able to overcome successfully the language barrier between the probably monolingual English progressives like Frost, Hockley and Smartt and the members of the Dutch-speaking farming community who testified.

To ensure that the correct information about scab was transmitted in any particular sitting, the commissioners asked witnesses leading questions intended to explicitly state the scientific claims regarding the causes and treatment of scab. The published report states that "…it was often found necessary minutely to cross-examine witnesses for the purpose of elucidating statements, often made without sufficient forethought, or to bear out preconceived notions which had no foundation in fact, and which on more minute examination were constantly found to be untenable."[53] The commissioners apparently thought once an opinion was exposed as groundless, the public would change their minds, evidencing a positivist faith in the power of logic.

In practice these situations were more ambiguous. The commissioners erred in assuming their badgering of witnesses into admitting that some method of preventing careless neighbours from infecting clean flocks with scab was an indication that their witnesses had accepted the need for some form of anti-scab regulation. It is not clear that the commissioners' pointed questions convinced farmers and delegates who opposed the Scab Act that their position was untenable. For example Dr Smartt was unsuccessful in making Johannes Bernardus Nigrini, an Afrikaner Bond delegate from Fraserburg, admit that an act compelling people to dip their sheep was the necessary conclusion from his acknowledgment that in his personal experience dipping cured scab and was beneficial.[54] A Bond delegate from Hope Town, Barend Jacobus Erasmus, was similarly resolute. He also acknowledged that he was concerned about the possibility that farmers travelling with scabby sheep could infect his clean flocks and that some farmers in the district

[53] Ibid., p. 2.
[54] Ibid., evidence of J. B. Nigrini, p. 582.

were negligent, but for him the logical conclusion to be drawn from these concerns was not that farmers must be compelled to clean their sheep by government edict, even if scab could be eradicated.[55] Neither of these men offered any alternative solution to the problem.

Opponents of the Scab Act saw the benefit of having clean sheep but opposed compulsory legislation on the basis that it would entail unwanted government interference in their farming practice and that it was unworkable in their areas due to environmental factors. The views of Nicolaas Badenhorst senior, also from Hope Town, provided another example. He went as far as to acknowledge that his negligent neighbours should be compelled by some means to dip their sheep and that a period of simultaneous dipping may be advisable, but he still opposed the act.[56]

Julius Albertus Voskule, a storekeeper and livestock speculator from Kenhardt, testified that he believed that there must be prohibitions against the removal of scab infected goats and that such animals should be quarantined and dipped no matter the condition of the pasture they were on. He also said that infected goats should be slaughtered if they could not be cured. When asked if he was aware of the fact that his testimony was the strongest in favour of a scab act that the commission had heard so far, he retorted: "What I have said I mean, whatever the consequences are, and this is what I say, that the district cannot do with a scab act, and the meaning you draw from my words has nothing to do with me."[57] Even Voskule's own words and opinions regarding scab could not convince him of the benefits of anti-scab legislation. Or in the words of William Diederick Snyman, a progressive Barkley East wool farmer, "there are a good many people who are opposed to a scab act by nature. It is not that they cannot be convinced, but that they are simply opposed to it and nothing can convince them."[58]

[55] Ibid., evidence of B. J. Erasmus , pp. 478-480.
[56] Ibid., evidence of N. Badenhorst, p. 481.
[57] Ibid., evidence of J. A. Voskule, p. 571
[58] Ibid., evidence of W. D. Snyman, p. 396.

From the proceedings of the Scab Commission it appears that the majority of farmers who were convinced that scab was a contagious disease caused by an arachnid that could be cured through dipping were in favour of anti-scab regulations, but they still had deep reservations that the proposed legislation would be suitable. Christoffel Jacobus Liebenberg, Hope Town farmer and Afrikaner Bond delegate, was in favour of a scab act but he was concerned about the cost of dipping and if the legislation would make enough provision for farmers' need to trek.[59] Johannes Fredrikus van Wyk, a farmer and Bond delegate from Fraserburg, wanted the government to protect farmers who dipped from those who did not, but he had deep reservations about the proposed scab legislation. According to him "most people" were against it but "…on all sides the scab act or something in favour of it, is pressed on them…" He was specifically delegated to argue for permissive and lenient anti-scab legislation, reasoning that if farmers did not engage with government to develop an act they thought workable, government might impose a stricter act prejudicial to their interests. He was also concerned about the cost of dipping and that provision should be made for the necessity of trekking.[60]

Both Liebenberg and Van Wyk considered ignorance about the correct dipping procedure and the nature of scab as the main contributory factors to the resistance of farmers in their districts to the Scab Act. Liebenberg even suggested that the sheep inspectors should have magnifying glasses to show the *acari* to doubting farmers. This assurance from more progressive farmers, because it fitted in so neatly with the commissioners' positivist faith in the value of reasoned argument and practical illustration to persuade doubters to their cause, must have confirmed their belief that opposition to the Act was not as deeply entrenched as it would prove to be once their findings

[59] Ibid., evidence of C. J. Liebenberg, p. 483.
[60] Ibid., evidence of J. F. van Wyk, p. 586.

were presented to parliament in the form of a bill. They were therefore surprised by the stridency of the debate that their report unleashed in the press and at public meetings.[61]

The commissioners specifically sought to expose poor dipping practices, firstly to show that farmers' low opinion of the efficacy of dipping was mistaken because they had been dipping incorrectly, secondly to publicly explain the correct dipping method, and lastly to demonstrate that farmers were not doing all they could to clean their sheep. Farmers who indicated they were in favour of the act and dipped regularly were interrogated to establish their impression of their neighbour's dipping practices. The testimony of Johannes Fredrikus van Wyk of Fraserburg provides a good example of the leading questions that were asked in the process: "When a farmer tells you that he has carefully dipped his sheep, but that there are times when dipping will not help, does it not prove to you that he does not understand the system of dipping?" He answered in the affirmative.[62] Would Van Wyk have expressed himself this way if he was simply asked for his opinion on his neighbour's dipping practices? This question emboldened him into stating outright that many farmers were ignorant of the scab disease and that this prejudiced them against dipping. He even expressed himself in favour of supervised dipping.[63] As mentioned above, he came to the sitting to argue for a lenient scab act but as his testimony progressed he increasingly made statements that closely accorded with the official position on scab and the shape that a colony-wide scab act should take.

An example of the opposite kind is the testimony of Barend Jacobus Erasmus, already mentioned above. Through a series of questions Erasmus was first informed that the correct interval between dipping was ten to fourteen days and that dipping a second time after eighteen days as he did was ineffectual and contrary to the instruction of the Department of Agriculture, experience in

[61] T. R. H. Davenport, 'The Afrikaner Bond' (1960), p. 334.
[62] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of J. F. van Wyk, p. 586.
[63] Ibid., evidence of J. F. van Wyk p. 587.

Australia and the opinion of the CVS. His statement that "some say 14 to 18 days" and that he therefore thought an eighteen day interval was still acceptable was not interrogated by the commissioners to ascertain its source, making Erasmus appear to be a man prepared to follow hearsay above professional advice.[64]

When the Commission repeated this line of questioning at Fraserburg during the testimony of Jacob Johannes du Toit, they stated that the dipping interval recommended by the manufacturers of patent dips on their packaging was fourteen to eighteen days and that the CVS's prescription was similar.[65] The object of their interrogation was to stress the need to dip twice within the recommended time period as the dip did not kill the *acari* eggs. The contradiction between the dipping interval they prescribed at Hope Town and that prescribed at Fraserburg illustrates the official confusion that existed regarding dipping in the Cape. Erasmus may therefore have simply been following the instructions on the packaging of the patent dip he used.

It must be noted that Erasmus was a well-established farmer with fourteen years experience and his fellows respected him enough to appoint him as their spokesman. He also mentioned reading about scab in the *Government Gazette* and the *Cape Argus* and presented his own experience in the sitting, outlining the difficulty of dipping sheep while they were infected with internal parasites like wire worm, in a persuasive manner. Being made to look like he dipped inefficiently would have offended a man like Erasmus and other witnesses might have been similarly humiliated.

In spite of priding themselves in being even handed, the Commission refused to hear some testimonies that did not accord with the line of argument it was pursuing. While at Fraserburg, the

[64] Ibid., evidence of B. J. Erasmus , pp. 478-480.
[65] Ibid., evidence of J. J. du Toit, pp. 587-588.

commissioners were looking for a farmer with some experience of dipping in order to clearly state the official position on dipping as they did with Erasmus's testimony at Hope Town. When Hendrik Louwrens van der Westhuizen, a stock owner with forty-five years experience, wanted to testify he was asked if he dipped his sheep. When he responded negatively, Smartt asked: "Consequently, never having dipped, you are not in a position to give an opinion upon dipping?" He had to respond that he had no opinion to offer and was consequently passed over in favour of Jacob Johannes du Toit.[66]

The commissioners routine practice of pressing witnesses into revealing themselves as inefficient farmers who did not know how to dip had the opposite effect to the one intended: instead of farmers realising that their own opinions were untenable and being persuaded by the logic of the official scientific position, the commissioners and specifically Smartt acquired a reputation for arrogance during these sittings. Herman Johan Dempers, MP for Caledon, accused Smartt of not only examining the witnesses, but of cross-examining them and so skewing the findings of the Commission.[67]

The testimony of Martin Hollander provides an example of such hostile cross-examining. Hollander, a successful farmer living near Williston, initially supported anti-scab legislation, but he experienced too many obstacles in keeping his own sheep clean during dry seasons. Smartt therefore saw him as an ideal target and insistently pressed him to divulge the exact concentration of a tobacco dip he used eight years previously. When Hollander could not remember the exact dipping procedure he followed, Smartt called his farming expertise in question. Hollander concluded his testimony with a sarcastic retort in defence of his 'memory lapse': he did not memorise the procedure since he "…did not know then that [he] should be asked to-day to

[66] Ibid., evidence of J. J. du Toit, p. 587.
[67] *Debates in the House of Assembly* (25 June 1894), p. 160.

explain how it was done."[68] The commissioners' hostile interrogation techniques confirmed farmers' opinion that progressives in government were prejudiced against them and wanted to interfere in their farming practice.

In cases where the commissioners decided to pursue a witness's statement that scab was spontaneous, the witness was often exposed as holding opinions that had not been well reasoned. For example Stephan Vermeulen from Hope Town believed that scab was spontaneous and caused the *acari*. When asked whether he knew of "other diseases which will create a living organism" he answered: "I know so little about insects that I cannot say." To the commissioners' minds, he thereby declared his ignorance in public. It is not clear if Vermeulen understood his testimony this way. Nor was he the only witness whose 'ignorance' was exposed in this manner. Voskule testified (perhaps with sarcastic belligerence?) that he believed that it was possible for *acari* to be created by winter dew. When asked if he knew of other animals which were created in this manner he answered in the negative and when pressed on whether scab is therefore an exception "to all rules", he pleaded ignorance in favour of "those who are experienced in it."[69]

But the Commission was selective in which farmers to badger in this way. Nigrini believed scab was caused by drought and malnutrition and that the *acari* was caused by the disease. When asked if he knew of any other insect that came from nothing he cited the well-known phenomenon of an apparently spontaneous flea infestation in a recently cleaned room or in a house that stood empty. The commissioners chose not to pursue the matter by explaining that fleas also hatched from eggs, realising perhaps that Nigrini was not amenable to argument.[70] As a resolute opponent of the Scab Act, he challenged Hutcheon's scientific explanation of scab as discussed below. Indeed, he emerged as one of the leaders of the anti-Scab Act movement,

[68] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of Martin Hollander, p. 581.
[69] Ibid., evidence of J. A. Voskule, p. 571.
[70] Ibid., evidence of J. B. Nigrini, p. 583.

travelling personally to Cape Town to plead for the Scab Act to be scrapped, writing often and at length to the press about the Act and organising petitions to Parliament.[71]

Sometimes the strategy of discrediting the claims of opponents backfired as it exposed contradictions and uncertainties in the scientific view of scab. Jacob Coenraad de Klerk, a Bond delegate for Victoria West who opposed the Scab Act, testified that his sheep were scabby but that Hutcheon could not find the *acari* on them. As he apparently did not want to dispute the validity of the Veterinary Surgeon finding *acari* on other farmers' sheep in his district, he had resolved the contradiction by theorising that there were two types of scab – the one spontaneous, internal and to be cured through dosing sheep with various concoctions, and the other contagious, caused by the *acari* and curable by dipping. As will be discussed below, Hutcheon's answer as to why De Klerk was able to cure individual scabby sheep through internal remedies did not satisfy him. He thought his sheep were liable to contract both types of scab so he occasionally fed them a mixture of sulfur and lime and also dipped them in sulfur and tobacco. He was therefore not in favour of a scab act, even though he believed scab could be cured, since he believed that the spontaneous scab would always return.[72]

Believing scab was caused by an arachnid thus did not automatically convert opponents to the progressives' opinion. Arguing from common sense, Jan Stapelberg, a farmer from Barkley East, was sceptical that scab was contagious and that he needed to refuse his neighbours' scabby sheep entry onto his land: "I have seen the *acarus* and I don't think it would drop to such an extent as to justify me in keeping my neighbour's sheep away from where they can live, and be the cause of them dying."[73]

[71] M. Tamarkin, *Volk and Flock* (2009), pp. 150, 163-164.
[72] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of J. C. de Klerk, pp. 535, 536.
[73] Ibid., evidence of J. Stapelberg, p. 393.

Opponents' lack of scientific credibility was perhaps also not established as clearly as the commission wished. Erasmus, for example, was not convinced that *acari* mites caused scab. He argued that scab was an internal disease that was driven to the surface in the presence of bad water and malnutrition. Dosing the sheep with internal remedies like sulfur and lime drove the disease outwards but weakened the sheep temporarily and this weakness attracted the *acari*. The presence of *acari* on the sheep was therefore a result of the cure and a sign that the sheep was recovering.[74] This account was coherent and had significant explanatory power. It accounted for why scab broke out when the sheep lost condition without having to resort to the belief that scab was somehow spontaneous as many farmers insisted. By stating that scab was 'internal' Erasmus further accounted for its varying and often long incubation period. As discussed in Chapter 2, the scientific account of the disease also acknowledged that *acari* could be present on sheep for months without the animal showing any symptoms, but in practice this fact was obscured by the official focus on kraals and sleeping places as a source of re-infection.

Lastly, Erasmus's theory also explained the occasional success of dipping: when the disease was 'driven out' to manifest as scab lesions, it could be cured externally through dipping. However, as the internal causes of the disease could linger, the disease might return later, especially when the sheep were made vulnerable through drought.

It was a coherent explanation and it closely resembled the prevailing medical theory of disease during the mid-nineteenth century. An illness like measles was seen as an internal malady that was 'driven out' in the form of the characteristic rash through the application of purgatives and other remedies to the patient, the internal malady being a predisposed weakness brought to the

[74] Ibid., evidence of B. J. Erasmus, p. 478.

fore through malnutrition and unhygienic, crowded living conditions.[75] A similar theory, but with added emphasis on the inborn nature of the disease, explained the progress of pulmonary tuberculosis. The argument that a tendency to develop tuberculosis was inborn explained why individuals of the same family were often stricken with the disease and served as convenient justification for arguments that the poor, who suffered disproportionately from the disease, were of inferior breeding stock.[76]

It should also be noted that such explanations of disease were not immediately discarded with the advent of germ theory as older doctors were not trained in the new field of bacteriology and did not automatically accept it. The successes of germ theory in the field of aetiology also did not greatly improve the general practitioner's medicine cabinet. Infectious diseases were still incurable at the beginning of the twentieth century, serious conditions were not treatable and doctors' remedies consisted mostly of purgatives, narcotics and assorted poisons.[77] Erasmus's views on scab therefore did not make him ignorant and unscientific. He would likely have acquired the building blocks of his theory through his literacy. Popular medical texts, in addition to expounding on the causes and cures of particular diseases, were known to disparage the authority of the medical profession. By arguing that doctors were using academic theorising to bamboozle the public into paying often outrageous fees for inefficient and even harmful treatments, they taught their readers a lack of respect for the medical profession and its scientific

[75] *Zuid Afrikaan*, 29 March 1839, unsourced and unsigned article; *Zuid Afrikaan*, 19 April 1839, correspondence from S. N. Havinga, M.D., Cape Town; *Zuid Afrikaan*, 2 May 1839, correspondence from S.N. Havinga, M.D., Cape Town; *Zuid Afrikaan*, 7 June 1839, correspondence from G.T.J., Colesberg. A measles epidemic broke out in Cape Town in March 1839 and spread to outlying districts. Labourers and the urban poor were the most severely effected. Doctor Havinga argued that fever would drive the disease to the surface and that purgatives were not necessary. He appeared to have been alone in this opinion.
[76] *Zuid Afrikaan* , 30 July 1841, 'On Pulmonary Consumption and the Means of Preventing the Same', by Amicus Humanitatis, Paarl. Some decades later similar explanations were given for leprosy and typhoid. See *Zuid Afrikaan*, 3 November 1853, 'The Leprosy'; *Zuid Afrikaan*, 12 September 1867, 'Ziekte in Kaapstad'.
[77] R. Porter, *The Greatest Benefit to Mankind* (1997), pp. 371-2, 674-676.

credentials.[78] If Erasmus had access to such discourse it would have further disinclined him to accept the scientific authority of the CVS and the commissioners.

Philosophers of science recommend that valid scientific theories be differentiated from pseudoscience by employing the principle of 'Occam's razor' (derived from William of Occam's famous dictum that "varieties of entities are not to be multiplied beyond necessity").[79] This principle states that the most elegant or simplest theory is normally closest to the truth since proper scientific method is believed to move theories towards simplicity. Any theory containing apparent ad hoc additions, also known as 'secondary elaboration', is therefore immediately suspect.[80] It is not clear, however, if it is always easy to identify secondary elaboration in practice. Whether a theory possesses 'elegance' and 'simplicity' is a value judgment – a subjective process depending on aesthetic sensibility and past experience as much as on reasoned argument.[81]

Indeed, some opponents of the Scab Act of 1894 believed that the explanation for scab offered by veterinary science contained ad hoc elaborations intended to hide its weaknesses. So farmers believed that the fact that some lambs were born with dry patches of skin was an indication that scab was an inherited disease. Hutcheon explained to them that the dry patches indicated the lambs' skin did not produce enough yolk. Such lambs would contract scab easier and the first scab lesions would naturally appear on these dry patches. Samples of scab mites could also

[78] Ibid., p. 210. *Culpepper's Herbal*, one of the better known of these texts, is still in print and gets regularly updated. An anonymous correspondent to the *Zuid Afrikaan* (7 September 1832) used the *Herbal* to dispute the right of university trained medical doctors to exclude barber surgeons from the colonial medical establishment. The general availability of such texts in the 19th century Cape Colony is, however, unknown.
[79] Quoted in M. Midgeley, *Evolution as a Religion* (2002), p. 143.
[80] R. Horton, *Patterns of thought in Africa and the West* (1993), p. 235.
[81] C.Z. Elgin, 'Creation as Reconfiguration: Art in the Advancement of Science' (2002), pp. 22-23.

readily be taken from these lesions. But the farmers believed that the scab mites were attracted by the scab lesions, not that they caused them and Hutcheon could not convince them otherwise.[82]

There was some evidence for the farmers' hypothesis that scab was an internal, blood-borne disease. Sheep spontaneously recovered from the disease if the pasture improved, simply shearing sheep without dressing the scab lesions cured scab and so did feeding them sulfur. According to Hutcheon, all of these were easy to explain. Any condition that induced debility in an animal made it more susceptible to disease: bad pasture weakened them; cold rain washed out the yolk from the wool; heat caused by thick, long fleeces melted out the yolk from the surface of the skin, leaving it unprotected; lambs being weaned lost condition and became vulnerable to diseases; and young animals were generally more susceptible to parasitic infections. The progression of the disease was naturally arrested if sheep were taken to better pasture or experienced conditions that improved their ability to extrude and maintain yoke.

Ordinary farmers' experience, however, confirmed their theories of scab, not the explanation offered by veterinary science. This did not surprise Hutcheon:

> Taking these facts into consideration, it is not to be wondered at that these farmers, having merely observation and experience to guide them, should arrive at the conclusion that it is the unhealthy condition of the animal which generates and breeds these insects. It is only a few years since the foremost scientific men of the day were fighting out the battle of spontaneous generation; and it is somewhat doubtful whether the matter is finally settled even yet. At any rate, it must take some years before the conquests gained by science in that battle can be known and appreciated in the household of the average stock farmer of this Colony.[83]

PUBLIC AND PRIVATE EXPERIMENTS

As mentioned above, Hutcheon was more successful if he could take the *acari* from sheep in front of farmers and they could witness his method of preparing a microscopy slide. However, the educational tours also had the unforeseen consequence of giving opponents of anti-scab

[82] CPP [G.14 – 1887] *Report by the Colonial Veterinary Surgeon for the Year 1886*, p. 21.
[83] Ibid., p. 21.

legislation a glancing familiarity with the form of scientific experiments. Educated in Hutcheon's method of isolating *acari* samples and armed with magnifying glasses, farmers now had the confidence to design and execute their own experiments. The results of these experiments was aired at sittings of the Scab Commission of 1892 to 1894 and published in the press.

Jacob Coenraad de Klerk of Victoria West believed that scab was partly inherited. He suggested that enclosing a group of infected ewes in good pasture would prove this, because the lambs would be born scabby. De Klerk had met Hutcheon and Hutcheon suffered the embarrassment of not being able to locate *acari* on his infected sheep. Hutcheon was also not able to explain to him to his satisfaction why he had successfully cured his sheep through feeding them a sulfur and lime mixture.[84]

As discussed above, Stapelberg could not believe that the tiny scab mites he was shown were mobile and hardy enough to spread between flocks. Nigrini tested this common sense intuition. He claimed that Hutcheon helped him to design an experiment that convinced him that scab, if it is really caused by *acari*, had low infectability. Armed with his magnifying glass, he removed some *acari* from an infected sheep and, firstly, placed one *acarus* in the sun. The *acarus* died in an hour. Secondly, he placed some *acari* on the ground near where he tied a clean sheep. The sheep did not develop scab and after he sheared the sheep he examined the wool carefully with his magnifying glass but could not discover a single arachnid. He concluded that *acari* are not very mobile and could not survive long when separated from their host and so refused to believe that his sheep would be likely to catch scab by merely sharing pasture with an infected flock. The only necessary restriction was that clean sheep should not mix with an infected flock.[85]

[84] Ibid., evidence of J. C. de Klerk, p. 535.
[85] Ibid., evidence of J. B. Nigrini, p. 585.

Nigrini also challenged Hutcheon in 1886 through the popular press to prove to him that *acari* caused scab and made fifty of his sheep available for infection. When Hutcheon arrived at Fraserburg, they renegotiated the terms of the challenge so that the CVS would have the opportunity to try to infect ten of Nigrini's sheep. Hutcheon carefully gathered and prepared specimens but Nigrini did not allow him to pick the sheep to infect as they had agreed. Instead Nigrini presented him with ten healthy ewes that had recently lambed (ewes that recently lambed were apparently less likely to contract scab). When challenged, Nigrini substituted the ewes with nine of his fattest sheep.

The experiment was also interrupted by Mr. Le Roux, MP for Victoria West and an opponent of anti-scab legislation, who insisted that Hutcheon only be allowed to put two or three *acari* on each sheep on grounds that they could eat through the skin of the sheep. Hutcheon protested to Nigrini that this violated their agreement but he eventually agreed to proceed. He was therefore forced to separate individual *acari* from his sample material under field conditions and could not ensure that he placed a breeding pair on each sheep. Some of the insects might have been maimed during this process. He was also required to place them on opposite ends of the sheep so they had little chance of finding each other and breeding. None of Nigrini's sheep contracted scab, resulting in a complete failure for Hutcheon and giving Nigrini and Le Roux ammunition against the Scab Act. Hutcheon subsequently blamed himself for letting them lure him into performing the experiment on such unfavourable terms.[86] It is unlikely that Le Roux really feared that the *acari* could eat through skin. His intervention was calculated to ensure that the experiment failed and discredited Hutcheon. Hutcheon, perhaps angered by Le Roux's intervention, allowed his opponents to fatally proscribe the methodology to be used.

[86] CPP [G.14 – 1887] *Report by the Colonial Veterinary Surgeon for the Year 1886*, p. 14.

Proponents of the Scab Act also engaged in experiments and came to contrary conclusions. So a certain Mr. W. N. Allen proposed that farmers place some *acari* on a piece of wood under their roof thatching to see how long *acari* survived if separated from their host. However, he complained that the magnifying glasses issued to sheep inspectors were not sufficiently strong to show if *acari* were alive or not. He nonetheless concluded that *acari* did not survive very long when separated from the sheep and so kraals could not remain infective. In his own experience, sheep did not contract scab if placed in kraals previously used by scab-infected sheep.[87] Sheep Inspector F. P. Fincham strongly disagreed with Allen's position. He claimed that he regularly traced scab outbreaks in his area to infected kraals and sleeping places. He also claimed to have found a breeding population of *acari* underneath six inches of manure in a cave used for lambing.[88]

Hutcheon intervened: the magnifying glasses issued to sheep inspectors were not strong enough to differentiate between different *acari* species. The *acari* Fincham found were a type commonly found in sheep dung and not *Psoroptes ovis*. Personally, Hutcheon had only managed to keep *acari* alive for fourteen days, but he acknowledged that his methodology was faulty. He was traveling at the time and to maintain the *acari* at an even temperature he kept the *acari* wrapped in a flannel cloth either in his pocket or under his pillow at night. As discussed in Chapter 2, he believed kraals stayed infective for long periods not due to the survival of *acari* mites but because of the long viability of the eggs.[89]

Allan pointed out that arguing kraals harboured scab made eradication seem too difficult since it added the unnecessary cost of cleaning or destroying infected kraals and sleeping places to the

[87] *AJCGH*, 6, 17 (1893), p. 327.
[88] *AJCGH*, 8, 16 (1895), pp. 405- 406.
[89] *AJCGH*, 8, 23 (1895), pp. 605-606.

burden of dipping.[90] His fears proved justified as at least one sheep farmer based his opposition against the Scab Act on the re-infectability of kraals. Johannes Daniel Naude of Barkley East testified before the Scab Commission that "no-one knows how deep under the ground the louse is, waiting for a suitable time for reappearance, no-one knows how long the louse lives." As a consequence farmers could not keep their sheep clean.[91]

The conflict that arose over the design of scab experiments and the interpretation of experimental data reflects a well-trodden debate in the history and philosophy of science. Experiments do not produce factual evidence in a transparent or mechanical manner nor do experiments determine theory. Experiments are indeterminate because scientists do not evaluate experimental data in a purely objective manner: the philosopher Catherine Z. Elgin (2002) sees the process by which evidence is interpreted as a process of exemplification with the results of the experiment ordered according to the orientation of the investigator.[92] Mary Midgely theorises that scientists are motivated to design a particular experiment and interpret the findings of the experiment from inside a particular world picture. The world picture determines how the evidence is ranked.[93] As discussed above, Bechtel concluded that theories are not judged solely by empirical evidence; instead empirical evidence is often evaluated through the lens of theory.[94]

Experiments conducted by Hutcheon or Davison therefore confirmed to them that *acari* caused scab, dipping worked and scab was infectious because they were predisposed to interpret the experimental data in this way. The presence of the mites on scabby sheep did not, however, prove that *acari* caused scab to the satisfaction of sceptics. They developed alternative theories that

[90] *AJCGH*, 6, 18 (1893), p. 349.
[91] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of J. D. Naude, p. 218.
[92] Elgin, 'Creation as Reconfiguration: Art in the Advancement of Science', p. 19.
[93] Midgely, *Evolution as a Religion: Strange Hopes and Stranger Fears*, p.4.
[94] W. Bechtel, 'Scientific Evidence: Creating and Evaluating Experimental Instruments and Research Techniques' (1990), p. 568.

reversed the causal relationship between the disease and *acari*. Similarly, farmers' beliefs, arising from bitter personal experience, that dipping caused scab infection to worsen could not easily be countered by the scientific explanation offered by Hutcheon and Davison. As explained in Chapter 2, ineffective dipping resulted in some of the *acari* surviving while dipping only once allowed the eggs to hatch and the new generation of *acari* to re-establish the infestation. During the dipping process the protective yolk was also stripped from the fleece and so dipping impacted negatively on the sheep's ability to resist the disease. The *acari* were therefore able to multiply relatively unhindered and the disease was exacerbated instead of cured. For this view to be accepted, however, farmers needed to be convinced that the yolk in wool hindered *acari* from reproducing, that dipping removed the yolk and that they dipped incorrectly.[95]

Ideally in the world of science the apparent vicious circularity (or a regression into relativism) caused by the indeterminacy of experimental results is avoided because science purports to study real phenomena. The particular properties of a phenomenon – be it a microbe, virus or insect – limit the number of plausible interpretations available to scientists.[96] In addition, the practical results achieved by a theory do much to confirm its worth as practical successes are seen by scientists as an indicator of the degree of fidelity between the theory and the phenomena it describes.[97] But in the world of science consensus on the interpretation of experiments occurs through social processes – interchange of ideas within the researchers' own laboratory or institute, exchanges with colleagues, peer reviews and scrutiny from professional rivals. This social mediation of experimental results is not a flawless system and in practice is sometimes accompanied by considerable acrimony. But it seems to proceed smoothly in general and social

[95] *AJCGH*. 8, 23 (1895), pp. 605-606.
[96] Bechtel, 'Scientific Evidence: Creating and Evaluating Experimental Instruments and Research Techniques', p. 568.
[97] C. Z. Elgin, 'True Enough' (2004), p. 114.

scientists seem more excited by how the results of this social process are later presented as the discovery of given naturalistic phenomena, obscuring the process of consensus building.[98]

In the case of scab in the Cape Colony the practical efficacy of government advice on how to cure scab was disputed by farmers or followed only selectively. Political grievances and economic concerns of the farming community were aggravated by the South African War. The office of the CIS also experienced continual difficulties finding sheep inspectors who possessed the necessary skills and respectability. This meant that the social climate in which scab was contested was not conducive to the necessary compromises for the establishment of a consensus. The official discourse surrounding scab positioned veterinary science as a tool for instruction, but as has been suggested, the practice of veterinary science did not lend itself to such usage.

Farmers opposing the Scab Act constantly disputed the official scientific position regarding scab and demanded that experiments be conducted to prove, for instance, that hand-dressing sheep could not cure them completely before they would proceed with dipping. [99] Such demonstrations had to be repeated again and again. As the opponents of the Act became familiar with scientific procedure, they also challenged scientific methodology, as Hutcheon's disastrous experience with Le Roux and Nigrini attests.

Davison contributed to the range of methodologically flawed 'experiments' that were being conducted by both the proponents and opponents of the Act through the dubious kraal experiments described in Chapter 2. He saw the removal of infected sheep in near-apocalyptic terms: "The insidious nature of the evil remains, however, in the fact that any place on which the flock has slept or grazed, as well as any watering place at which the stock has drunk, also

[98] Bechtel, 'Scientific Evidence: Creating and Evaluating Experimental Instruments and Research Techniques', p. 559.
[99] CA CIS 5/S24 – Administration of the Scab Act in Calvinia, 1909-1910.

constitute a means for disseminating the disease, and this accounts for many outbreaks of scab which occur long after the infected stock have passed."[100] Trekking with infected sheep therefore created "a chain of infected centers", with cases of the disease radiating from each. Infected sheep were perceived to render the land infectious for an unspecified length of time. Note that this claim was not based on any scientific explanation regarding the viability of *acari* and their eggs as the "centers of infection" mentioned were not only kraals but also ordinary pasture. Davison therefore did not doubt the results of his kraal experiments as the results were exactly what he expected.

Before the office of the Chief Inspector of Sheep was removed to Cape Town in 1894, Davison shared office space with Hutcheon and Prof. Abraham Fisher, the first Secretary of Agriculture, when they visited Bedford.[101] When Hutcheon was appointed as Under Secretary of Agriculture in 1902 he became Davison's direct superior.[102] There was therefore ample time for Hutcheon to advise Davison on proper scientific method. However, as discussed above, Hutcheon's own experimental design was often lax as neither he nor Davison saw themselves as engaging in scientific experiments. Rather, they were demonstrating what they believed to be well-established facts.

After the unfortunate rumour was spread that ked (or sheep louse) was the natural predator of *acari*, some farmers believed they could infect their sheep with ked as an alternative to dipping. Once again they needed 'ocular demonstration' that ked did not cure scab. The ked experiment was conducted in Cradock and started on the 29th of December 1909. Davison, H. J. van Heerden, progressive MP for Cradock, Mr. Martyn, the Resident Magistrate, Assistant Chief Sheep

[100] CPP [G. 31 – 1909] *Report of the Chief Inspector of Sheep for the Year 1908*, pp. 44- 45.
[101] CA ARG126/520 – Correspondence of Allan Gardiner Davison, 1892-1895. Davison to C. Currie, Under Secretary of Agriculture, 21 November 1893; Davison to J. Frost, Secretary of Agriculture, 30 October 1894.
[102] *Men of the Times: Old Colonists of the Cape Colony and Orange River Colony*, p. 207.

Inspector S. Keightly and Mr. Heathcote, a reporter for the *Midland News* were present, amongst others. The experiment, conducted on the farm of the Sheep Inspector De Wet, consisted of, firstly, placing scab on a ked infected sheep and, secondly, placing ked on a scab infected sheep and leaving these two animals in a pen until the next stock fair thirty-seven days later. As predicted, *acari* and ked flourished on both animals.[103]

The accompanying article in the *Midlands News* opened by clearly stating the terms of the conflict as Davison and progressives saw it: "Superstition died hard, and men often reconstruct and cling to exploded theories with a tenacity which is pathetic." Revealingly the author insisted that the occasion was not an experiment. Rather it was "…a demonstration for the conversion of these who still believe in the efficacy of the sheep louse to keep down scab, and must not be regarded at all as an experiment, for science years ago demonstrated the facts surrounding the natural history of the scab insect and the sheep louse."[104]

The Cape government's educational campaign sought to convince farmers of the necessity for a scab act by appealing to the authority of science. Since veterinary science had not yet gained cultural authority with the intended audience of this campaign, doubts about the official explanation for scab was not laid to rest. As a consequence of these campaigns, the farming community began questioning the veterinary surgeon's authority through independent experimentation. In the process veterinary science became a public performance accompanied by certain elements of showmanship and political rhetoric. While the Cape countryside was filled with eager experimenters, neither progressives nor their opponents were willing to question their beliefs on scab.

[103] CPP [G. 10 – 1910] *Report of the Chief Inspector of Sheep for the Year 1909*, pp. 57-58.
[104] *Midlands News*, 29 December 1909.

CHAPTER 4: ECONOMIC REALITIES OF SHEEP FARMING IN THE LATE NINETEENTH CENTURY CAPE COLONY

This chapter examines the economics of scab eradication. Its arguments are necessarily speculative as the Cape government did not record the kinds of data that would allow historians to discuss the topic with certainty. General export figures and livestock censuses give an impression of how different pastoral activities were spatially distributed, but do not help answer the types of questions raised by the anti-Scab Act movement. Data for the production and prices of pastoral products such as hides, mohair, wool, mutton and fat by district is only available for census years and, as discussed in the introduction, such data is of dubious accuracy. Even if these data sets were complete and trustworthy, they would not indicate how much profit was absorbed by wool merchants, sundry middlemen and transportation costs. Economic evidence is therefore largely derived from the *Agricultural Journal*, debates in the House of Assembly, the few contemporary published sources on sheep farming and farmers' opinion as encapsulated in various government reports.

Many farmers complained that eradicating scab would not increase their profits. I will argue that they were essentially correct. The Cape Colony wool market was organised in such a manner that farmers were not sufficiently rewarded for improving the quality of their clip. Producers of low quality wool might also farm under adverse environmental conditions. These could only be overcome through investment in expensive agricultural technologies. Improving the colonial wool clip therefore entailed much more than simply eradicating scab. In addition, farmers who only raised mutton sheep and Boer goats would derive no monetary benefit at all from scab eradication. They were included in the Act because their livestock were scab reservoirs but anti-scab measures were an economic burden on them.

THE COST OF SCAB

There is no reliable monetary figure for what scab cost the Cape Colony or individual farmers. The wool buyer Thomas Plewman, testifying before the 1884 Scab Commission, estimated the loss to the Cape Colony from scab as one million pounds sterling per annum. Since this figure was a "general computation from [his] knowledge of the wool trade", it is of very dubious accuracy.[1] A number of estimates were floated in parliament in the run-up to the promulgation of the Scab Act of 1886. A Scab Bill was proposed by E. Y. Brabant, MP for East London, in 1884. He initially calculated the cost of scab at £250 000 per annum, the average annual decrease in wool exports suffered by the colony for an unspecified period.[2] In 1885 Brabant resubmitted his Scab Bill but now alleged that scab cost the colony £800 000 per annum, an amount he did not substantiate.[3] In 1884, W. J. Warren, Stutterheim farmer and MP for King Williamstown, calculated the cost of scab at £730 536 10s 8d per annum, a sum derived by calculating the recent decrease in the quantity of the wool exports and adding estimates of decreased wool quality and increased sheep mortality. Since the last livestock census in the Cape Colony was conducted in 1865, Warren admitted his figures were speculative.[4] William Hockley, MP for Somerset East, believed wool lost one pence per pound weight due to scab and therefore calculated the loss suffered by the colony in 1883 at £158 456.[5]

It was pointed out by opponents that the decreased wool exports for the first few years of the 1880s were caused by the severe drought affecting the colony and that lower wool prices were the result of Britain's economic depression.[6] Due to the confusion regarding the cost of scab, Hutcheon was requested by parliament to calculate the annual losses suffered by the colony due

[1] CPP [A. 5 – 1884], *Report of the Select Committee on the Scab Bill*, evidence of Thomas Plewman, p. 31.
[2] *Debates in the House of Assembly* (23 May 1884), p. 44.
[3] Ibid. (8 July 1885), p. 371.
[4] Ibid. (23 May 1884), pp. 45-46.
[5] Ibid., p. 49.
[6] Ibid. (24 June 1885), p. 249.

to the disease. He estimated it at £500 000 per annum in 1886, a figure subsequently treated as authoritative by progressives.[7] The figure most commonly bandied about during the mid-1890s was also a loss of £500 000 per annum, a figure concocted by the president of the East London Chamber of Commerce. The losses per pound for sheepskin and wool were calculated as 1.5d and 0.5d respectively in 1894.[8]

The farmers who opposed anti-scab legislation, however, were not convinced that they were losing significant income due to scab. Thus the Barkley East farmer, Johannes Daniel Naude, estimated his annual losses due to scab as less than £1 and stated that he was not aware that the hides of scabby sheep fetched lower prices. He mainly lost sheep due to cold rains, not scab.[9] Parliamentary opinion was also sceptical. Louis Abrahamson, Somerset East MP, thought that the estimates of scab losses were gross overestimations. If losses due to scab accounted for 20% (in his opinion a liberal figure) of the export prices of wool, skins and mohair it would have amounted to only £80 000, £30 000 and £83 000 respectively – totaling £193 000. In addition, only a small proportion of the sheep and goats that died annually died due to scab. In his opinion, overstocking was the greatest danger that faced the Cape sheep farming industry, not scab. J. Sivewright, MP for Griqualand East, was similarly doubtful. He was concerned about the extra tax burden that the Act would place on farmers. According to his calculations the Scab Act would profit the pastoral sector only £150 000 per annum so the merchants and ordinary tax payers would "have to pay the piper."[10] G. M. Palmer, another Somerset East MP, disputed Abrahamson's conclusions: he asserted that losses for sheep skins at Somerset East ranged from 60% to 70% and thought £500 000 accurate.[11]

[7] *Debates in the House of Assembly* (28 April 1886), p. 100.
[8] Ibid. (22 June 1894), p. 154.
[9] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of Johannes Daniel Naude, p. 391.
[10] *Debates in the House of Assembly* (22 June 1894), p. 167.
[11] Ibid., p. 157.

There is insufficient data to determine what dipping cost farmers. According to Brabant, it was between £50 and £100 per year.[12] John Laing, sheep farmer and Fort Beaufort MP, spent £50 to £60 on dipping per annum. For him dipping was an economic burden that would be removed by a successful scab act.[13] W.J. Warren testified before the 1884 Scab Commission that dipping sheep with lime and sulphur cost 1d per sheep while dipping with manufactured dips cost 2d. Tobacco cost 3d per pound and was considered too expensive to use, although he considered it the best dip available.[14] The wool buyer Thomas Plewman estimated that wool lost between 2.5d and 1.5d in value per fleece. Spending 2 - 4d per sheep on chemicals (sheep had to be dipped twice), excluding the extra labour cost, may therefore not have repaid farmers who produced only average quality clip.[15] Warren revised his dipping estimate downwards in 1885, reporting in parliament that after an initial £12 investment in a dipping tank between 4500 and 4600 sheep could be dipped twice for £4 10s including labour cost. [16] This estimate brought dipping cost down to well below a penny per sheep but the opposition flatly disbelieved it.[17]

Only one estimate for the cost of hand dipping is available. Jacobus Swartz, a Bredasdorp Merino farmer, testified before the 1892-1894 Scab Commission that he spend between £12 and £15 to hand dress his flock of 1800 sheep and that he managed to clean his flock to his satisfaction. This worked out at between 1.6d to 2d per sheep.[18] Progressives claimed hand dressing was false economy since it allowed scab to spread, but if other farmers had the same experience as Swartz, hand dressing only visibly infected sheep could easily have appeared to be more cost effective to farmers than dipping their whole flock.

[12] *Debates in the House of Assembly* (23 May 1884), p. 44.
[13] Ibid., p. 46.
[14] CPP [A. 5 – 1884], *Report of the Select Committee on the Scab Bill*, evidence of W. J. Warren, pp. 33-34.
[15] Ibid., evidence of Thomas Plewman, pp. 26-27.
[16] *Debates in the House of Assembly* (24 June 1885), p. 246.
[17] Ibid.
[18] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of Jacobus Swartz, p. 677.

For many farmers dipping would not have been profitable. In addition, some could simply not afford to dip. Plewman advised the government to provide free dip as dipping was simply too expensive for poorer farmers.[19] Hutcheon also reported that many farmers could not afford to dip their sheep[20] and it was a complaint of the opponents of the Scab Act in parliament. However, the proponents of the Scab Act did not manage to get parliamentarians with no direct interest in sheep farming and already leery of the Act's projected cost to agree to support a motion that Government would supply dip for free.[21]

As a compromise the Scab Act provided that dipping stuff, imported tax free since 1888, would be transported on the railways free of charge and that the government dipping depots would sell dip at cost price.[22] However, pressure from parliamentarians representing merchant interests ensured that the Agricultural Department could not only stock the dips it judged to be most effective. The dip depots therefore had to carry more than twenty scheduled dips in equal quantities. As farmers were brand loyal, great quantities of dip remained unsold annually and the government had to reimburse shop keepers for their outlay on the unwanted stock.[23] The dip depot system was therefore an early victim of the 1908 government retrenchments.[24]

The decision to not supply farmers with free dip was reviewed in 1899 with similar results. Davison testified before the 1898 Select Committee on the Scab Act that although a case could be made that the deserving poor amongst the farming population should be supplied with free dip, this would not help eradicate scab as many farmers who could afford to dip practised false

[19] CPP [A. 5 – 1884], *Report of the Select Committee on the Scab Bill*, evidence of Thomas Plewman, p. 28.
[20] CPP [G.14 – 1887], *Report by the Colonial Veterinary Surgeon for the Year 1886*, p. 22.
[21] *Debates in the House of Assembly* (20 July 1894), pp. 334-336.
[22] Act 20 of 1894.
[23] CA CIS 47/40 – Administration of the Scab Act in Tarka, 1906. J.R. Herselman to A.G. Davison, Tarkastad, 23 August 06.
[24] Act 10 of 1908.

economy and dipped ineffectively as a result. The government also simply did not have sufficient funds to supply free dip.[25]

THE WOOL SECTOR

The wool marketing system

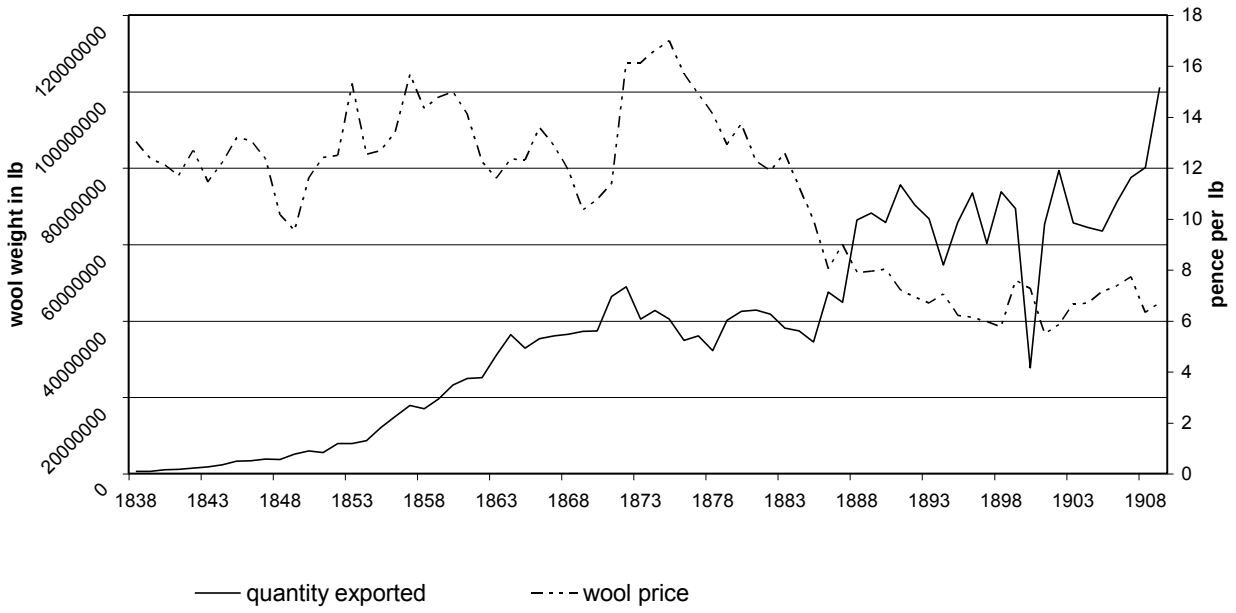
Dr. T.W. Smartt, MP for Wodehouse, regarded the £500 000 purportedly lost annually to scab as money taken directly from farmers' pockets.[26] Opponents of the Scab Act, however, not only disputed the scale of scab losses but doubted the benefits of scab legislation to ordinary farmers. Contemporary commentators on the Cape wool farming sector claimed that merchants did not price wool according to its quality.[27] Indeed, this concern loomed large in the parliamentary debate over the 1884 Scab Bill when its opponents argued that eradicating scab would not improve Cape wool.[28] Fluctuations in price might also negate the quality dividend accruing to careful farmers.

There is evidence that Cape wool producers tried to improve the quality of their product in this period. The estimated wool yield for the Cape Colony in 1888 was 6.36 pounds per fleece and this figure rose steadily over the next two decades, to 10.85 pounds per fleece by 1909.[29] Figure 4.1 shows that the wool production of the Cape Colony increased in the late 1880s and again after the end of South African War in 1902. However, an analysis of the census data for small ruminants between 1888 and 1911 shows that wool sheep declined as a proportion of the total

[25] CPP [A. 21 – 1898] *Report of the Select Committee on the Scab Act*, evidence of A.G. Davison, p. 240.
[26] *Debates in the House of Assembly* (22 June 1894), p. 154.
[27] W. Cooper, *The World's Sheep Farming for Fifty Years, 1843-1893* (1893), p. 43; 'The wool industry' in *Men of the Times: Old Colonist of the Cape Colony and Orange River Colony* (1906), p. 145.
[28] *Debates in the House of Assembly* (23 may 1884), pp. 45-50.
[29] These figures were calculated from statistics in the Cape Colony *Statistical Register* and the annual reports of the Chief Inspector of Sheep. Wool yield was estimated by dividing the amount of wool exported with the number of wool sheep in the Cape Colony. These estimates are highly speculative. It is assumed that the definition of 'wool sheep' stayed constant in this period. The agricultural census of 1891 recorded a total of 12 596 656 wool sheep in the Colony Proper. By 1904, the population of wool sheep had declined to 6 865 171. Numbers recovered and in 1909 the colony had 9 307 149 wool sheep. Cross-bred mutton sheep were not counted as wool sheep but might have produced low quality wool, inflating wool yield.

small stock flock of the colony between 1903 and 1907. The numbers of wool sheep therefore increased slowly in proportion to the increase in wool exports after the end of the South African War, providing further evidence that the colonial wool yield had increased.

Figure 4.1: The wool exports and average wool price of the Cape Colony, 1838-1909.



Source: *Statistical Register* (1909), p. xix. The average wool price per pound weight was calculated by dividing annual wool earnings (converted from pound sterling to pence) with annual wool exports. Farmers generally used this measure as it helped them to calculate their average earnings per sheep sheared and it was also used in parliamentary debates. Wool was sold in bales but the average price of Cape wool per bale is unavailable.

From debates in the *Agricultural Journal* it is also clear that farmers experimented with new sheep breeds to increase their wool yield. They imported Vermont Merinos, a breed known for having a thick greasy fleece, to improve the Cape Merino's yolk as the latter tended to produce throwbacks with the dry, hairy fleeces of its Cape sheep forebears.[30]

[30] *AJCCGH*, 4, 13 (1891), pp. 148-149.

None of these efforts markedly improved the price Cape wool farmers received for their clip. As the international wool price had been in decline due to overproduction for decades by the mid-1890s (see figure 4.1), improved wool quality did not lead to improved prices. The price of wool peaked in 1875 and thereafter lost 60% of its peak value. An opponent of the Scab Act, J.A.D. des Vages, MP for Beaufort West, blamed merchants who flooded the market with Argentine and Australian wool for the low wool prices. The wool price, he bluntly declared, would remain low even if scab was eradicated and no law imposed by "autocrats in Grahamstown" would change it.[31]

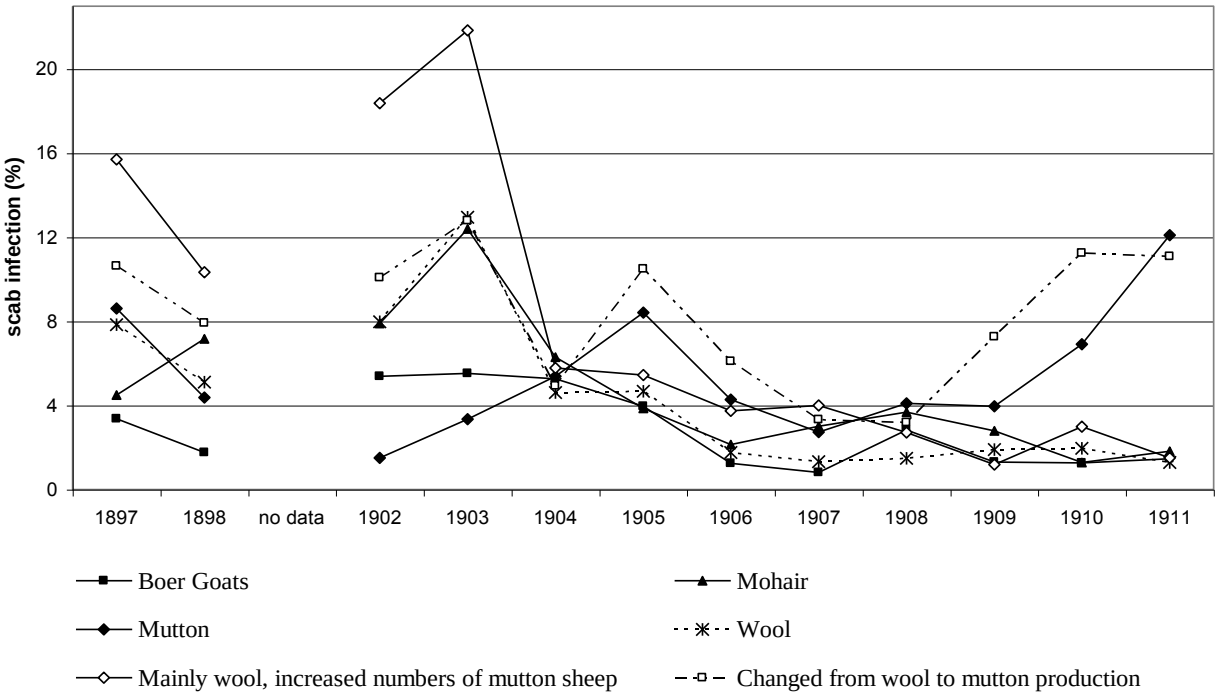
The cost of scab could not be reduced to a simple equation, subtracting the price of scabby from the price of scab free produce and sheep. The presence of scab in Cape flocks gave Cape wool, mohair and skins a bad reputation. Plewman testified that Cape wool fetched lower prices on the London market not because of the quality of individual bales, but because the colony was associated with scab.[32] Dr. Smartt stated that if scab was found in one bale of wool the whole lot was "tabooed".[33] Such arguments were repeated in 1911. General Louis Botha, the first Prime Minister and Minister of Agriculture for the Union of South Africa, complained that South African wool still obtained lower prices than Australian wool due to the persistence of scab in the Union. He claimed that if an Australian sheep were to be imported into the Union and kept in isolation, its wool would still be sold at a lower price in London solely because it was sheared in the Union.[34] Scab legislation was therefore also a marketing effort aimed at improving the image of Cape wool as a brand. Global wool overproduction and increased competition for market share forced wool producers to improve their product. The achievement of the Australian colonies in

[31] *Debates in the House of Assembly* (25 June 1894), p. 161.
[32] CPP [A. 5 – 1884] *Report of the Select Committee on the Scab Bill*, evidence of Thomas Plewman, p. 25.
[33] *Debates in the House of Assembly* (22 June 1894), p. 154.
[34] Ibid. (2 February 1911), p. 911.

eradicating scab set the standard and gave London wool buyers an excuse to discount the Cape product.

Although the incidence of scab decreased in the Cape Colony from an estimated 15% infected in 1894 to below 4% in 1911, the wool price did not recover. Figure 4.2 shows the scab incidence for districts grouped according to their primary holdings of small ruminants, an indication of whether a particular district specialized in wool, mohair or meat production.[35]

Figure 4.2: Scab incidence according to economic activity



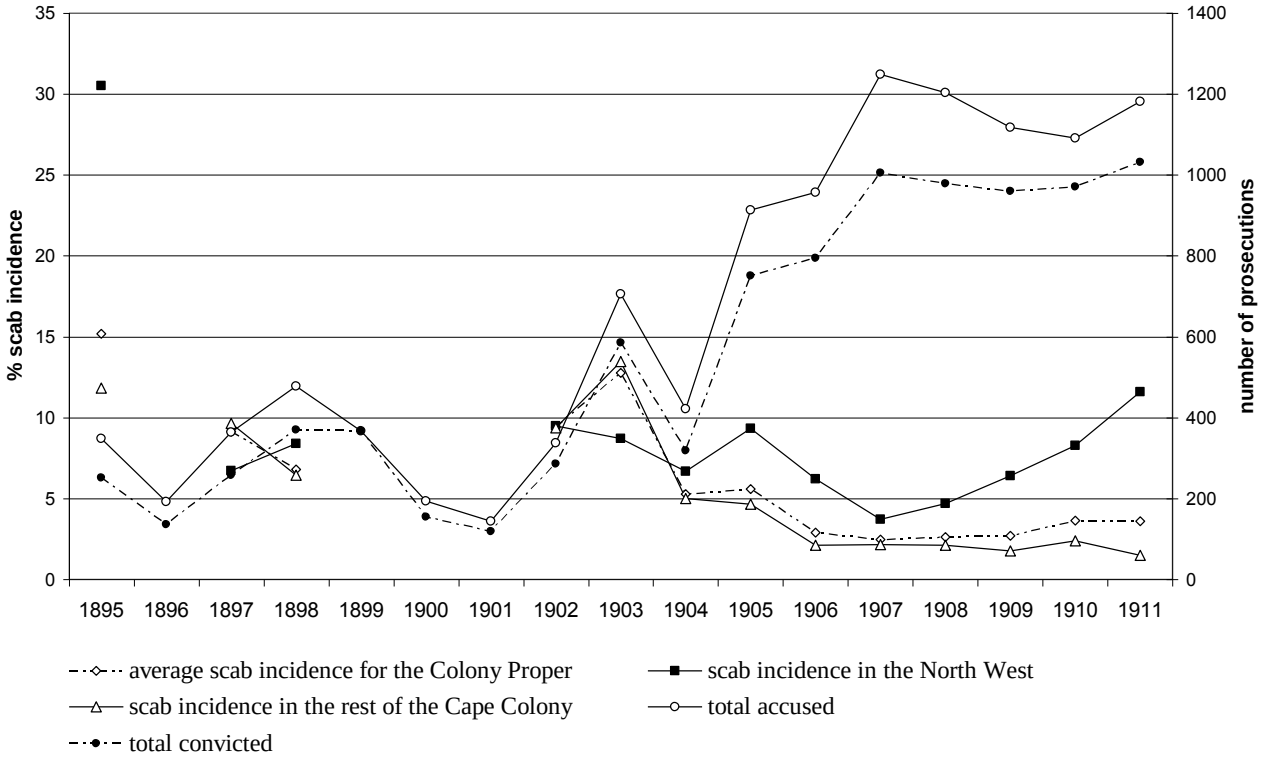
Source: compiled from the annual reports of the CIS, 1897-1911. The Scab Acts did not resume operation after the war in an even manner. The figures for 1902 are therefore incomplete. The high scab incidence in 1903 was caused by the severe 1903/4 drought and accompanied unconstrained trekking.

[35] See Appendix B.

It shows that districts that specialised in wool production, districts that still specialised in wool but with increased mutton production and areas that primarily raised goats had a much lower scab incidence than those that specialised in mutton and those that abandoned wool production after the South African War in favour of mutton.

Districts specialising in mutton production were primarily located in the North West. Figure 4.3 shows the scab incidence of the North West districts against prosecutions under the Scab Act. Although prosecutions increased and conviction rate averaged above 80%, the scab act apparently provided enough loopholes for farmers that they did not feel compelled to clean their sheep.

Figure 4.3: Scab incidence and prosecutions under the Scab Act of 1894



Sources: compiled from the *Statistical Register* (1895-1909) and the annual reports of the CIS (1910-1911). The North West here includes all the districts in which farmers undersigned a 1908 petition protesting against the Scab Act, namely Ceres, Sutherland, Namaqualand, Kenhardt, Fraserburg, Carnarvon, Clanwilliam, Van Rhynsdorp, Calvinia, Beaufort West and Prieska. 1904 prosecution data is for half year ending June 1904.

The districts specialising in Boer goats, mohair and wool therefore achieved a scab incidence of less than 2% while areas specialising in mutton and those that had switched to mutton production had scab incidences of 12.11% and 10.84% respectively. Since wool sheep still made up almost half of the total small ruminant holdings of the colony, the average scab incidence of the colony was therefore considerably lower than that for the mutton-producing regions. These figures indicate that Cape wool, although not scab free, was much closer to that goal than before the Act was passed. But scab was not the only problem of the Cape Colony wool sector.

Thomas Plewman's liberal estimate of the losses suffered by the colony was based on what he considered exports would have been had the Cape "progressed in the ordinary way." According to him, the Cape should have had double the annual wool exports it achieved by 1884 and scab was arbitrarily designated as causing half of this loss. Scab was therefore only one of a range of factors contributing to what was perceived by progressives as underdevelopment in the wool sector.[36] This broader 'underdevelopment' helped make scab eradication unprofitable.

The 'getting up' of wool

Accompanying the discourse about the damage scab did to the reputation of Cape wool was a parallel discourse on the need to increase the professionalism of Cape wool farmers. The production of woollens became increasingly specialized in the late nineteenth century as the machines used became more efficient in dealing with wool of different textures and lengths to create a greater range of woollen cloth. However, the greater specialization in manufacture required a concomitant specialization in preparing top (washed, scoured and combed wool bundled in even lengths). This required that more attention be paid to classing wool according to texture, length and strength. As Australian wool producers were capable of taking up the extra labour cost involved in classing wool, and since Australia produced more than half of the wool of

[36] CPP [A. 5 – 1884] *Report of the Select Committee on the Scab Bill*, evidence of Thomas Plewman, p. 30.

the world, its farmers again set the standard. The cost involved in classifying wool was therefore pushed onto wool producers.[37]

A certain Mr. J.T. Drake described the sheep handling and shearing process at a large Australian sheep station to the Cradock Farmer's Association in 1892: professional sheep classers visited farms annually to sort the young ewes and rams into different flocks according to quality. As most of the large farming operations were paddocked, different classes of sheep were kept and sheared separately. Sheep were branded to denote ownership and their ears were notched to indicate their age. Shearing took place in a purpose-built building that could accommodate 2000 sheep at a time and forty or more shearers were normally employed during the shearing season. For every ten shearers a "picker-up" and a sweeper were employed, the first to take the fleece to a table to be skirted and the second to keep the shearing area clean. At the skirting table, fleece "skirters" pinched off the belly wool lining the edge of the fleece. As the belly wool was often longer than the back and side wool and also often tangled or dirty, the skirtings were classed and baled separately. From the skirters, the fleece was taken to a professional wool classer. There the clip was sorted into about twelve different qualities and distinctions were made between wool that came from wethers, rams and ewes. After sorting the wool was baled using a steam press.[38]

The operation Drake described represented a substantial capital investment that only big wool producers could have afforded. However, in the early 1900s, the practice of contract shearing developed in Australia as large operations took to renting out their facilities. Small-scale Australian wool farmers could therefore also benefit from the new shearing and baling technologies.[39]

[37] 'The Wool Industry', p. 145.
[38] *AJCCGH*, 5, 8 (1892), pp. 15-16.
[39] R. Waterhouse, *The Vision Splendid* (2005), p. 83.

The elaborate grading process followed in Australia reduced the need for London wool buyers to sort Australian wool. In London wool was bought not by manufacturers but washers who supplied 'top' to manufacturers. Because the washers needed to spend more time and labour on cleaning and classing Cape wool they paid less for it at London auctions. However, they sold Cape and Australian 'top' for similar prices.[40] Some commentators even argued that because the Cape specialised in fine Merino wool which was used to manufacture more expensive cloth, Cape wool should by right be more valuable than the Australian article. Few Cape farmers, however, derived any benefit from this due to their poor standard of wool presentation.[41]

The average Cape clip was normally not skirted or classed and the majority of farmers apparently made little effort to clean dust or dung from the wool before baling.[42] 'Baling' usually consisted of the fleece being rolled and tied with a cheap hemp rope and then trampled into the bale by a hefty worker – often wearing dirty shoes. In the process the fleece broke up and hemp fibers were mixed in with the wool staple. Because the hemp was not always visible, it could not be removed before the wool was woven and dyed. The hemp, however, did not take dye like wool staple, causing discolourations in the finished cloth. Even worse, some farmers added dirt and extraneous matter to their bales in a fraudulent attempt to increase the weight of their clip.[43]

It was seldom practical for Cape wool producers to class their product. As discussed above, this required the services of a specialist wool classer. Few farmers had the necessary expertise to class their own wool and the service of an expert was expensive and, in isolated country districts, unobtainable. Also, farming units in Australia were much bigger on average than farms in the Cape. Cape farmers simply did not shear enough sheep to make a steam wool press, steam

[40] CPP [G. 30 – 1907], *Report of the Wool Expert for the Year 1906*, p. 123.
[41] 'The Wool Industry', *Men of the Times*, p. 148.
[42] Ibid., p. 146.
[43] *AJCCGH*, 11, 2 (1897), p. 70.

shearing machines, the services of a wool classer and an elaborate grading system cost effective. London wool buyers wanted to buy wool of uniform quality in as large quantities as possible. A Cape farmer with, for instance, 5000 sheep could deliver far fewer bales of a particular class of wool than an Australian farmer with 30 000 sheep. London wool buyers therefore accused Cape farmers of producing "samples".[44] Small lots of wool on the London market were removed from the main auction and sold at night when there were fewer buyers – the wool hence earned lower prices.[45]

The remedy for the quality problem was a less elaborate grading system and the breeding of more uniform sheep. In a large flock an elaborate wool classing system could accommodate differences in fleece density and length. Sheep breeding standards in Australia could therefore afford to be more relaxed but farmers with small flocks did not have this luxury.[46] Unfortunately, Cape farmers were not always particular about the standard of their breeding stock. Classing sheep for stud potential, just like wool classing, required a degree of expert knowledge that many farmers simply did not possess. Farmers interested in improving their flocks needed capital (a resource often in short supply) and advice from reputable experts. However, there was no governing body to set breed standards, certify sheep classers or offer authoritative advice on how best to employ stud breeds to improve a flock. The *South African Stud Book* was only inaugurated in 1907 to fill this void.[47]

Merchant capital and the average pricing system

The wool price was determined by global wool supply and demand. Wool prices therefore tended to fluxuate and wool farmers generally had little incentive to produce standard quality wool from

[44] CPP [G. 23 – 1908], *Report of the Wool Expert for the Year 1907*, p. 83.
[45] *AJCCGH*, 7, 1 (1894), p. 16.
[46] Ibid.
[47] K. Brown, 'Progressivism, Agriculture and Conservation in the Cape Colony, circa 1902-1908' (2002), pp. 111-113.

one season to the next. The Cape, however, had to struggle with more than just the consequences of commodification. The wool marketing system was blamed for many of the wool farmers' other tribulations. Cape wool merchants apparently bought wool at average prices without regard to quality and then sold it as mixed lots in London. Indeed, this was the main economic objection to anti-scab legislation during the final parliamentary debate on the Scab Act of 1886: as long as merchants continued to buy wool at average prices, farmers did not have an incentive to increase the quality of their wool and hence would not benefit from scab eradication.[48]

Saul Dubow (1982) described this system in detail: coastal merchant firms extended credit to storekeepers who purchased wool from farmers at average prices. The average wool price was set according to forecasts of merchant profits at the London auctions, of which there were five a year. Any sudden dip in the wool price meant that merchants suffered losses they recouped by offering low prices the following season. Dubow argued that the price of low quality wool declined more during slumps than that of good quality wool. The system of averages therefore resulted in farmers producing good wool subsidising the farmers producing low quality wool. In the prevailing wool marketing system, progressive farmers producing quality wool would only reap the full benefit of their industry if all other wool farmers improved the quality of their clip.[49]

Dubow argued that this state of affairs was characteristic of the level of development towards capitalist economic relations achieved by the Cape Colony. According to Dubow's analysis, the Cape, like other colonies, was reorganized in the nineteenth century to produce raw material for British industry. However, British industrial capital did not own the means of production at the Cape (i.e. the wool farms). Industrial capital could therefore not intervene directly in wool farmers' production methods. The geographical distance between the Cape and the British market

[48] *Debates in the House of Assembly* (23 may 1884), pp. 49-50.
[49] S. Dubow, 'Land, Labour and Merchant Capital: the Experience of the Graaff Reinet District in the Pre-industrial Rural Economy of the Cape 1852-1872' (1982), pp. 15-16, 22-27.

created the space for merchant capital to act as intermediaries between producers at the Cape and industrial capital, importing industrial goods and exporting wool. [50]

Dubow argued that there was an oversupply of merchant capital (i.e. there were too many merchants operating at the Cape relative to the size of the colonial wool sector). This oversupply meant that merchants competed with each other for farmers' custom. This competition pushed up the purchase price of wool, leading to merchants even buying six months clip from farmers at good prices.[51] At only six months growth, wool fibres were too short to spin into high quality thread. In addition, countryside merchants, being general dealers and produce buyers, often did not have expert knowledge of the wool market and wool production. Farmers therefore had no feedback on the quality or real price of their wool. These storekeepers also lacked knowledge of the wool market so they could not advise farmers on improved techniques of wool presentation. As farmers all received a standard price for their wool, they had little incentive to increase its quality.[52]

As discussed, due to the general decline of the wool price at the turn of the century farmers either had to produce more wool to maintain their income level or had to disinvest from wool production and find other sources of income. As will be discussed below, farmers in several districts disinvested in wool production between the 1891 and 1911 agricultural censuses to focus on meat production while farmers in other districts increased their wool production. The average pricing system meant that farmers who took pains to improve their wool yield were not remunerated in accordance to the improved quality of their produce. Debates in the *Agricultural Journal* showed that progressive wool producers were aware of this and actively sought to challenge the average pricing system by marketing their wool directly. Farmers were encouraged

[50] Ibid., pp. 21-22.
[51] Ibid.
[52] 'The Wool Industry', *Men of the Times*, p. 145.

to sell their wool directly to produce export firms headquartered on the coast rather than to countryside merchants or other middlemen, but these produce exporters claimed that their profit margin could not extend to sorting and classing wool at the Cape. They therefore did not challenge the average pricing system.[53] There was therefore a move among wealthier wool farmers to develop their own wool brand and sell it independently on the London markets.[54] Few Cape wool farmers, however, had the necessary knowledge or capital to market their own wool.

The low prices offered for Cape wool were therefore due to the low quality of Cape wool but this in turn was caused by the way the wool market in the Cape Colony was structured. Farmers imbued with the progressive ethos placed considerable importance on improving wool quality, but were frustrated in the lack of returns realized by their labour in this regard. The progressive ethos imbued greater wool quality with intrinsic value, but this intrinsic value was difficult to translate into cash value. The system of average pricing did not encourage investment in improved wool quality. These structural conditions were not altered with the advent of industrialisation. The influx of mining capital into South Africa would not have altered the existing terms of trade between the Cape countryside and the London wool markets. The Cape still supplied raw wool to the London market and manufactured goods were still imported from industrial centers in Europe and America to be sold at inflated prices by country storekeepers. In short, the wool market was still controlled by merchant capital even after the mining revolution.

The averaging of wool prices therefore persisted into the 20th century. The Report of the Chief Inspector of Sheep of the Union of South Africa for 1913/14 provided the following comparative price data: South African wool in the grease priced from 5d to 11.5d per pound when exported and received prices in London ranging from 6d to 13d. In contrast, Australian wool in the grease

[53] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of James Holt, Port Elizabeth based merchant and produce buyer, p. 258.
[54] *AJCCGH*, 12, 6 (1898), pp. 337-338.

received between 7.5d and 17.5d per pound in London. South African wool was therefore still discounted, in spite of the reduced incidence of scab, increased concern with improving the quality of wool sheep and increased efforts to class and prepare wool according to international standards. The solution suggested was the by now familiar advice that farmers should invest in increasing the quality of their wool and that they should not sell their wool to local country storekeepers but rather market it directly or through farming co-operatives.[55]

Countryside merchants and tanners complained that a similar offhand purchase system for skins harmed their trade. Unfortunately, the Cape Government did not record the prices skins fetched so testimonies from traders and tanners before the 1892-1894 Scab Commission must suffice. Skins from scabby sheep and goats had thick calluses and weak places that made the skins tan unevenly. Such skin would either crack or the finished leather had lumps in it that rendered it unsuitable for anything except blacksmiths' aprons, glue or low quality shoes. [56] Such skins could also not be processed with the latest machinery that split leather into layers to make suede.[57]

Countryside merchants, however, were contracted to buy skins offhand from large butcheries at set prices.[58] Since there was no export market for damaged skins (shipping cost exceeded profit), large merchant houses based in Port Elizabeth refused to buy skins offhand. They paid for skins according to quality, causing losses to countryside merchants.[59] In Port Elizabeth in 1892, scabby sheep, goat and Angora skins sold at 3.5d, 3d and 2d each while clean skins earned 4.75d, 7,75d and 4.75d respectively. Boer goat and Angora skins therefore lost more than fifty per cent of their

[55] SAR [U.G. 2 – 1915] *Afdeling Schapen Jaarrapport, 1913/14,* p. 88.
[56] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of Thomas Douglass, Port Elizabeth based tanner and currier, pp. 250-251.
[57] Ibid., evidence of James Holt, Port Elizabeth based merchant and produce buyer, p. 258.
[58] Ibid., evidence of William Diebel, Kimberley based butcher, p. 612.
[59] Ibid., evidence of John Bowen, Port Elizabeth based merchant, pp. 245-247.

value due to scab while sheep skins lost approximately twenty-six per cent.[60] In order to recoup their losses, countryside produce buyers preferred to sell skins offhand to local tanners, causing them to suffer losses in turn.[61] Since these merchants were in competition with each other, they were in a weak bargaining position with the butcheries. They therefore saw anti-scab legislation as the only means for increasing their profits.

Sheep farming and the environment

While the average price system forced farmers producing good quality wool to subsidise farmers producing low quality wool, Cape wool farmers would not have been able to recoup the capital investment needed to improve wool quality. The reason for this was that so many wool sheep were pastured on land that was environmentally marginal for small stock. Notwithstanding the challenges involved in marketing wool, wool production remained the most profitable sheep farming industry at the Cape. A mutton sheep provided income only once (i.e. when it was sold for slaughter) while a Merino could provide wool for several seasons before being sold for slaughter. But Merinos, although very hardy, needed more pasture than Cape fat-tailed sheep. Farmers tempted by the Merino's greater profitability therefore stocked them on unsuitable pasture.

There were a number of environmental challenges that limited wool production and discouraged investment. Farmers kraaled their sheep at night due to the threat posed by predators, especially jackal, and farms often had few permanent water sources. Sheep were therefore driven great distances each day between pasture, kraal and water. This exhausted the sheep and trampled the pasture. Due to the practice of kraaling, Cape wool was reputedly dirty. As the Karoo provide

[60] Ibid., evidence of Sydney Bryan, Port Elizabeth based produce buyer, pp. 244-246.
[61] Ibid., evidence of John Love Stewart, Port Elizabeth based tanner, fellmonger and currier, p. 251.

very few opportunities for arable farming, sheep dung was left to accumulate in the kraals and was another source of dirt on Merino fleeces. [62]

During times of strain due to disease or malnutrition, wool grows out slightly weaker. The weaknesses or striations in individual wool fibers (a measure of the wool's strength), together with the texture of the wool and the thickness and length of the fleece determine its quality. Assessors used to test for strength by pulling at a fleece by hand to gain a 'feel' for when individual fibers started to break. Microscopy, however, introduced a new 'objective' method for assessing strength. Wool was now graded for strength according to how many striations were found in a fleece per square inch, leading to stricter guidelines for judging wool quality. By the mid-1890s, this new wool grading system was adopted at international agricultural fairs and Cape wool generally showed unfavourably at such events.[63]

As kraaling was not conducive to producing high quality wool, progressives advocated the paddocking system. Paddocking entailed dividing a farm into separate camps, each with its own water source. Pasture could be managed through rotation and as sheep were no longer kraaled, trampling would no longer occur. Enclosure, however, required a substantial capital investment. Fencing material had to be imported and the size of farming units in dryer districts meant that the cost of fencing was prohibitive, even sometimes exceeding the value of the land to be fenced.[64] Farmers without perennial water on their farms were required to invest in periodic well digging or had to bore for water (an expensive undertaking) and then had to install imported windmill pumps in each camp or paddock. Beinart argued that the persistence of predators, particularly jackal, initially inhibited paddocking as ordinary fences did not keep the jackal out. Even if farmers

[62] W. Beinart, *The Rise of Conservation in South Africa* (2003), pp. 138-139, 220-221, 254.
[63] *Debates in the House of Assembly* (22 June 1894), p. 156.
[64] CPP [G. 11 - 1909] *Report of the Scab Acts and their Administration in the North-western District of the Cape Colony*, p. 2.

could afford paddocking, few could afford to absorb the losses they expected to suffer due to predation if they fenced their land instead of kraaling their sheep. Wire mesh was introduced as jackal-proof fencing material in the 1890s, lowering the final environmental barrier.[65]

Although new technologies to overcome the environmental constraints of lack of a perennial water supply and predators became available, certain areas of the country were simply too dry for quality wool production. Even if farmers could ensure sufficient drinking water for their sheep, lack of sufficient pasture during the dry season meant that sheep would suffer a degree of malnutrition each year that would reduce wool quality. Robert Wallace therefore advised that farmers in the western Karoo should focus instead on producing mutton. The lack of pasture could be ameliorated in some districts in the Cape Midlands by planting crops like lucerne and turnips or ensilaging natural grasslands, but the North West was too dry to grow such crops and the minimal plant cover in these districts made ensilaging the natural pasture impractical.[66]

As the mutton price was generally low before the rinderpest (1896-97), many farmers turned to wool production in unsuitable areas. Poorer wool producers and those in environmentally marginal districts would not have been able to improve the quality of their wool. The average wool price system would therefore have benefited them. They would not have profited if this system was challenged by the eradication of scab since their wool would still be of low quality and would then be priced accordingly.

[65] Beinart, *The Rise of Conservation in South Africa*, pp. 220, 254.
[66] R. Wallace, *Farming Industries of Cape Colony* (1896), p. 355.

MUTTON FARMING

Progress and Investment

Gilfoyle[67] and Tamarkin[68] both suggest that many farmers opposing scab legislation did so because they were primarily meat producers and thus did not see the benefit of scab eradication. This assertion is not fully investigated by either of the authors and to do so is difficult. Much less is known about the Cape Colony meat sector than its wool industry. As wool was the primary export article of the colony for many decades, the wool industry received copious government attention and a wide range of authors commented on it. During these years, meat was primarily produced for the domestic market and demand was limited. Due to low demand, mutton production provided little scope for investment. Thom argues that Cape farmers took up wool production in order to have a product to sell in the international market so that they could escape the limitations of the domestic meat market.[69] Domestic demand for mutton grew after the rinderpest in 1896 devastated cattle numbers while the influx of people to the mining centers increased the market for Cape mutton. Archer suggests that this rise in demand spurred farmers to adopt the paddocking system in order to raise the carrying capacity of their farms.[70]

Farmers in a number of districts switched over to mutton production when the Scab Act was promulgated. The districts of Sutherland, Prince Albert, Fraserburg, Carnarvon, Beaufort West and Prieska mainly stocked wool sheep in 1895 but were mutton farming regions by the end of the South African War in 1902. Wool production in the North West (the region were the Scab Act could be suspended) declined between the 1891 and 1911 censuses from almost eleven percent to just over four percent of the total clip of the colony. Wool production for the Colony declined by almost eight percent during these years, but declined by more than 63 percent in the North

[67] D. Gilfoyle, 'Veterinary Science and Public Policy at the Cape Colony, 1877-1910' (2002), p. 106.
[68] M. Tamarkin, *Volk and Flock* (2009), p. 69.
[69] H. B. Thom, *Die Geskiedenis van die Skaapboerdery in Suid-Afrika* (1936), p. 382.
[70] S. Archer, 'Technology and Ecology in the Karoo: A Century of Windmills, Wire and Changing Farming Practice' (2000), p. 675.

West.[71] North West farmers argued that they switched to mutton because the Scab Act, by requiring them to keep their wool sheep clean, made wool farming unprofitable.[72] The switch was facilitated by a sharp rinderpest-induced rise in mutton prices after 1896. The average price for a mutton sheep in 1887 was 9s 9d.[73] By 1895 it was still only 10s 11d. This improved in 1896 to 14s 4d[74] and prices reached a high of 26s 2d for an average slaughter sheep by 1903.[75] Higher mutton prices, in combination with low wool prices, also prompted farmers in a number of wool producing districts to increase their holdings of mutton sheep and Boer goats. Holdings of cross-bred mutton sheep increased in a number of Midland regions after the South African War but as the mutton price declined, the proportion of wool sheep in these districts rose again.[76]

Mutton production therefore gradually became more profitable but there was a tendency amongst proponents of wool farming to see mutton production as 'unprogressive' sheep farming. Producing wool for the international market had symbolic importance for progressives, perhaps because wool farmers were involved in the 'progressive' and 'modern' arena of international trade and industry. In contrast, Cape fat-tailed sheep were maligned as an unprofitable breed. The change to mutton farming was applauded by some commentators in the wool sector who hoped that poorer sheep farmers would concentrate on mutton as their inferior wool damaged the reputation of the Cape clip,[77] but Davison believed that farmers should stick to wool production irrespective of low wool prices and increased demand for mutton. He bemoaned the importation of Persian studs and other investments in mutton production because, he believed, the pursuit of

[71] CPP [G. 6 – 1892] *Results of a Census of the Cape of Good Hope, as on the Night of Sunday, the 5th April, 1891*; SAR [U.G. 32h-1912] *Census, 1911: Annexures to General Report Part IX*. Figures calculated by author. The massive 1902-3 drought makes the 1904 census data unrepresentative. There was an increase in wool production between 1904 and 1911, but the proportion of wool produced by the North West did not substantially increased during this period.
[72] CPP [G. 11 - 1909] *Report of the Scab Acts and their Administration in the North-western District of the Cape Colony*, p. 5.
[73] *Statistical Register* (1887), p. 204.
[74] *Statistical Register* (1897), p. 278.
[75] *Statistical Register* (1903), p. 248.
[76] See Appendixes B and C.
[77] 'Editorial Notes', *AJCCGH*, 22, 3 (1903), p. 270.

short term profit fuelled by a temporary upward trend in the mutton price would damage investment in wool quality.[78] Barney Enslin, first CIS for the Union of South Africa, agreed. For these officials, progress in sheep farming was measured in the decline in number of Cape fat-tailed sheep and its cross-breeds and the spread of enclosure.[79]

Progressives' low opinion of mutton production meant that little was done to 'improve' the productivity of mutton sheep. The Cape fat-tailed sheep was not a particularly prized mutton breed. Their shoulder meat was bony while their haunches had too much fat. Since Merino carcasses were generally smaller than those of Cape sheep, they were little better. Merino ewes also had a lower lambing rate than Cape ewes. As both breeds were used for extensive farming and farmers generally could not afford to provide their sheep with extra feed, neither was bred to produce rapidly maturing lambs as is the case with contemporary mutton breeds.[80]

Cape fat-tailed sheep did not mature quickly and sheep farmers still needed to transport their stock to market on the hoof. Young lambs could not make this journey and wethers were only sold for slaughter at three years of age when they were judged to have the necessary stamina for the long trek to market.[81] Non-breeding stock was meat on the hoof for mutton farmers – they were so much unrealised profit. These animals, by also competing with breeding stock for pasture, limited how many of the latter could be kept on a farm. This practice meant that mutton farmers were especially vulnerable to drought. Because they needed to maintain a large non-breeding sheep population, they tended to overgraze their pasture or were unable to save pasture for dry seasons. Droughts thus caused great losses amongst sheep flocks in general but wool sheep at least generated an income before succumbing to drought. In addition, mutton farming

[78] A.G. Davison, 'The Working of the Scab Act'(1903), p. 570.
[79] SAR [U.G. 47- 1913] *Afdeling Schapen Jaarrapport, 1912/13*, p. 12.
[80] E. Terblanche, *Ken ons Kleinveerasse* (1979), pp. 24, 86, 93.
[81] S. Newton-King, *Masters and Servants on the Cape Eastern Frontier, 1760-1803* (1999), p. 169.

was concentrated in the more drought prone north western divisions that were unsuitable for wool farming.

There were few immediate options available to improve the Cape mutton sheep. European mutton breeds demanded more pasture than was generally available in the Karoo. They were also long wool breeds with open fleeces and it was suggested that farmers interested in combining wool and mutton production should choose one such breed for stud. However, importing flocks of European mutton sheep was impractical as they required stall feeding except in the wetter Western Cape and East Coast regions. Farmers practising mixed farming in coastal Australia and in New Zealand imported them and could produce wool of a respectable quality while supplying good quality mutton to the international frozen meat market.[82] Cape sheep farmers had to find another way to increase mutton production. Persian sheep were the best alternative but, apart from greater resistance to heartwater,[83] they did not enjoy any advantages over Cape sheep. Persians also stored fat in their hindquarters and their lambs also matured slowly.[84]

More productive mutton breeds with more evenly distributed body fat would push the Cape fat-tailed sheep out of the mutton market and into virtual extinction in the twentieth century, but in the period in question, poorer farmers could still compete with their wealthier counterparts in terms of mutton quality, whereas they could not compete in terms of wool quality. Systematic efforts to develop a mutton breed suitable for the arid regions of South Africa were only embarked on in the 1930s, resulting in the Dorper. The humble Boer goat, an indigenous species like the Cape fat-tailed sheep, had a happier fate. Being indiscriminate grazers they gained a reputation for environmental destructiveness in progressive discourse, but farmers started to breed

[82] *AJCCGH*, 7, 24 (1894), pp. 573-574.
[83] *AJCCGH*, 22, 3 (1903), p. 269.
[84] Terblanche, *Ken ons Kleinveerasse*, p. 117.

them to standard in the 1930s. Currently their ability to subsist on any type of pasture is seen as an advantage over other small ruminants and they have therefore survived commercially.[85]

As discussed in Chapter 2, short fleeced mutton breeds are generally less susceptible to scab. While farmers selling Merino sheep as mutton were concerned about scab due to the substantial weight loss it caused, farmers keeping Cape fat-tailed or Persian sheep (the latter became popular in the 1890s) gained no economic advantage from scab eradication. Thus Jacobus Nicolaas Moolman, a Carnarvon mutton farmer with approximately 6000 Cape sheep, could blatantly state that the Scab Act was of no importance to him because he "…does not concern himself about the interest of the Merino farmers in his district."[86]

As shown in figure 4.2, districts specialising in wool production but with greater holdings of cross-bred mutton sheep maintained a low scab incidence. This was due to a particular farming strategy: Merino and Cape fat-tailed sheep cross-breeds were well proportioned, attractive animals with a greater carcass weight than Merinos. Wool farmers wanting to take advantage of higher mutton prices mated older Merino ewes and younger Merino ewes that were not successfully covered by the Merino rams with Cape fat-tailed rams. These cross-bred sheep were not used for breeding stock. [87]

This explains why Cape Midland districts could increase their proportion of wool sheep quickly once the mutton price started to decline. Because these farmers still ran large flocks of wool sheep and the cross-breeds did not have the same resistance against scab that the Cape sheep did,

[85] Ibid., pp. 13, 129-130.
[86] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of Jacobus Nicolaas Moolman, p. 596. Moolman's Merino farming neighbours were not indifferent to the effects of scab but they too opposed the Act due to the difficulties they faced in keeping their sheep clean during drought. A neighbour like Moolman would also not have helped. As discussed above, Carnarvon Merino farmers switched to mutton production.
[87] Terblanche, *Ken ons Kleinveerasse*, p. 93.

they benefited from keeping their flocks clean. Farmers in North West districts who abandoned wool farming entirely for mutton sheep (a decision they came to regret when mutton prices declined[88]) had little financial interest in keeping their flocks free from scab. The result was that the mutton flocks kept by North West trek farmers continued to act as a re-infection reservoir for the wool flock.

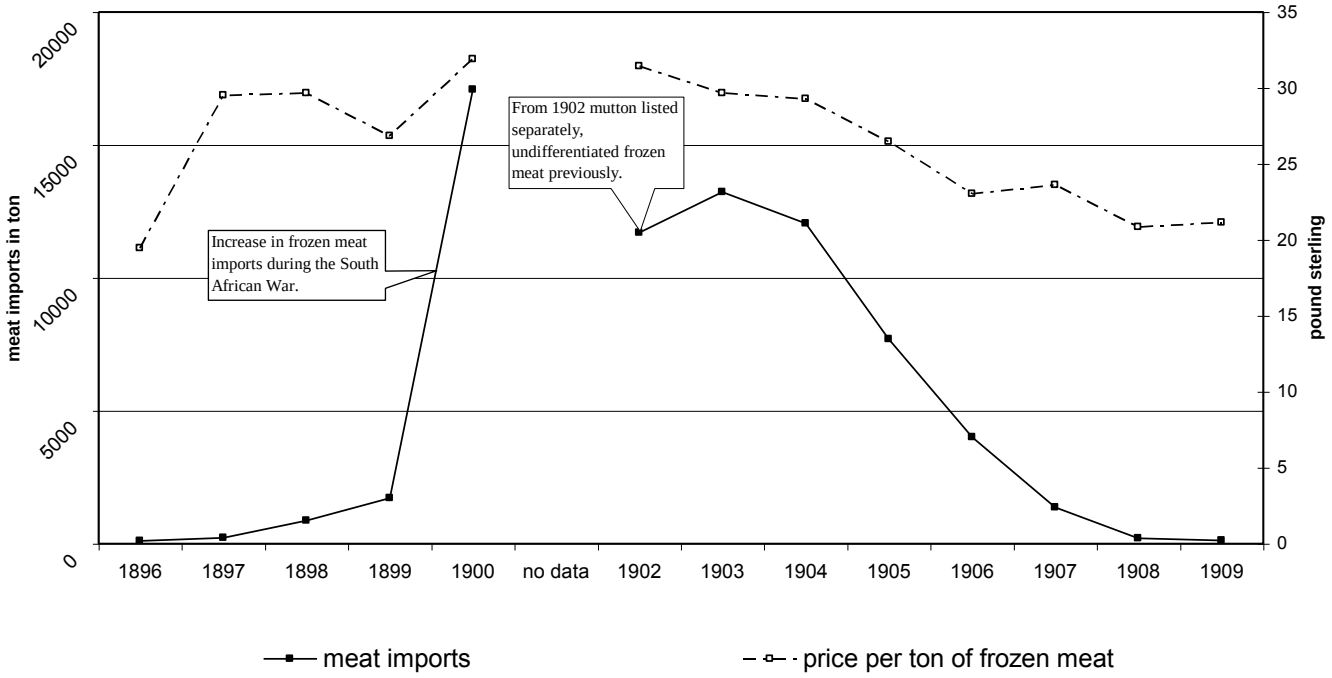
Marketing conditions for mutton

Unfortunately the Cape Government did not track domestic meat consumption and the export data for the period indicates that the Cape Colony meat exports were negligible before 1906. The findings of the 1905 Select Committee on Cold Storage, however, provides valuable insight into the meat market and suggests that the mutton market had structural difficulties similar to those of the wool market. Mutton farmers could therefore not escape the consequences of the penetration of merchant capital into the Cape countryside.

The relative lack of investment in mutton production meant that Cape farmers could not profit from the developing international market for frozen meat. There were no cold storage facilities or railway lines in mutton producing areas and the business model of the cold storage companies headquartered in Cape Town and Port Elizabeth precluded them from exporting colonial mutton. The Cape imported frozen meat from Argentina and Australia from the early 1890s onwards, but this trade increased after the rinderpest epizootic in 1896/7. As seen in figure 4.4, the increased demand for meat during the South African War, combined with the war's disruptive effect on the internal supply routes of the colony, caused frozen meat imports to increase exponentially. The frozen mutton trade was further spurred by the droughts of 1897/8 and 1903/4.

[88] CPP [G. 11 - 1909] *Report of the Scab Acts and their Administration in the North-western District of the Cape Colony*, p. 5.

Figure 4.4: Meat import figures for the Cape Colony, 1896-1909



Source: compiled from the *Statistical Register*, 1896 to 1909.

The consequence of this trade was that Cape mutton farmers struggled to find a local market for their slaughter stock, despite the increased demand for meat.[89] The premier wool producing areas of Australia experienced a great drought, intensified by overstocking, from 1895 to 1903. Australian sheep flocks were therefore culled during this period, greatly increasing the supply of frozen mutton and lowering prices.[90]

The Select Committee on Cold Storage was proposed and chaired by Frank William Powrie, Wodehouse MP and sheep farmer, to explore the feasibility of establishing a government funded network of abattoirs and cold storage facilities at railway hubs. Powrie was especially concerned that sheep farmers could not find adequate markets for their mutton due to competition from the

[89] CPP [A. 5 – 1905] *Report of the Select Committee on Cold Storage*, evidence of F. W. Powrie, p. 1.
[90] E. A. Boehm, *Prosperity and Depression in Australia, 1887-1897*(1971), pp. 93-94. By 1902 Australia had approximately 54 000 000 sheep remaining. This was almost half of its 1895 holdings and corresponded to early 1870s stocking levels.

cold storage companies.[91] The latter dominated the national urban meat market and also supplied meat to the mines. Imported frozen mutton priced Cape mutton out of these markets and fresh, chilled colonial mutton became a luxury article, preferred for its richer, juicier taste but unaffordable to the working class.[92]

Here the Cape was again out-competed by Australia. Since the late 1880s the government of New South Wales had erected cold storage facilities to warehouse farmers' fresh produce for a minimal fee and other Australian colonies quickly followed suite. Cold storage facilitated the development of a fresh produce market in Australia and made smaller farming units profitable. It was hoped that a similar system at the Cape would enable dairy farmers to reach urban markets and help fruit farmers to export their produce. It was also hoped that such a network would enable Cape mutton farmers to increase their share of the domestic meat market: local cold storage facilities would enable them to slaughter and freeze sheep when they were in prime condition, thereby shielding them against dry season losses and reducing the consumer price of local mutton. [93]

The cold storage companies complained that they could not get a regular supply of colonial meat as farmers normally only sold sheep when they were at their fattest. As the demand for mutton was year round, they were forced to source their mutton from freezing works in Australia and Argentina. As cold stores had credit arrangements and long term contracts with these bulk foreign suppliers, small scale colonial mutton producers were effectively excluded from the market.[94]

[91] CPP [A. 5 – 1905] *Report of the Select Committee on Cold Storage*, evidence of F. W. Powrie, p. 8.
[92] Ibid., evidence of Thomas Masterton, p. 23.
[93] Ibid., evidence of T. W. Powrie, p. 4.
[94] Ibid., evidence of R. J. Verster, pp. 33-34.

The cold storage companies, however, did not source all their meat internationally as they were not always certain of the market. Excess stock could be stored longer or be marketed in Europe but both options entailed reduced profits. The companies therefore did occasionally buy extra stock from passing freighters or local producers. The latter were apparently the least attractive option: Ryno Johannes Verster, manager of the Federal Cold Storage Company, testified that only a quarter of the mutton sold by his company per annum was local produce[95] and Thomas Masterton, a representative for the Cape Cold Storage Company, testified that they sold "very little" colonial mutton.[96]

The cold storage companies, however, maintained an absolute monopoly over the Cape meat trade. At stock fairs, the largest buyers were the representatives of these large butchering concerns and they colluded to fix prices. Farmers, unwilling to accept these low prices, sold only a small portion of their excess stock and returned home with the rest. These surplus sheep could not be adequately supported during the dry season and accommodating them forced farmers to reduce their breeding stock.[97]

In 1905 colonial meat was priced at 7.8d to 8.1d per pound (a carcass averaging forty pounds in weight was sold at 26s to 27s) while frozen mutton was landed at the Cape at 3.75d and sold by the cold storage companies to butchers at 5.5d per pound.[98] Rail freight was two shillings per sheep and sheep lost weight during rail transit – on journeys from the inland districts a sheep could loose between four and five pounds.[99] Cold storage companies were willing to buy colonial meat but preferred that farmers pay the transportation costs. So Verster offered to buy colonial sheep at 26s 3d per head after he had heard that the monopolistic practices of his company were

[95] Ibid., p. 31.
[96] Ibid., evidence of Thomas Masterton, p. 17.
[97] Ibid., evidence of W. J. Warren, pp. 150-151.
[98] Ibid., evidence of Thomas Masterton, p. 19.
[99] Ibid., evidence of Dr. T. W. Smartt, p. 167.

discussed in parliament, but he expected such sheep to produce carcasses weighing forty-five pounds on average and wanted them delivered to his abattoir at Tulbagh Road. No domestic mutton farmer therefore accepted his offer.[100]

The Cold Storage Commission recommended the establishment of government cold storage facilities. The failure of a similar system in Natal, however, weighed heavily against the adoption of this recommendation in the Cape.[101] It was found that such a system would be too expensive to be practical and the government eventually imposed a tax on imported mutton and raised anti-trust legislation to break the monopoly of the cold storage companies on the market.[102] Dr Smartt, then Minister for Public Works, proposed that the government railways should reserve a number of cold cars for colonial produce and that Cape farmers should be charged lower freight rates, measures that were apparently implemented.[103] Perhaps due to these measures, mutton imports started to decrease. This came too late to save mutton farmers, however, as the mutton price declined sharply from 1906 onwards. In 1907 it had fallen from its 1903 high of 26s 2d to an average of just 18s 2d per sheep.[104] South Africa only became a net mutton exporter in 1915.[105]

It should be noted that the Cold Storage Commission was proposed by an Eastern Cape MP and that most witnesses testifying before it were cold storage company employees, MPs or Eastern Cape and Midland farmers. The Cold Storage Commission therefore represented an effort by wool farmers who had diversified into mutton to improve the mutton market, much as the Scab Act was an effort by the same wool farmers to improve the wool market. Wool farmers who increased their mutton holdings could marginalise North West mutton farmers because they had

[100] Ibid., evidence of R. J. Verster, pp. 36-37.
[101] Ibid., Minority Report, pp. vi-vii.
[102] Brown, 'Progressivism, Agriculture and Conservation in the Cape Colony, circa 1902-1908', pp. 47-48.
[103] CPP [A. 5 – 1905] *Report of the Select Committee on Cold Storage*, evidence of Dr. T. W. Smartt, pp. 166-167.
[104] *Statistical Register* (1907), p. 110.
[105] *Official Yearbook of the Union of South Africa*, No. 1, 1910-1916 (1918), p. 392.

better access to markets and transportation. Witnesses before of the Cold Storage Committee acknowledged that the provision of shambles at large railway stations and inland cold storage facilities would not improve the lot of farmers living far from the railway line as they would still have to travel for long distances with their stock to reach such facilities.[106]

Due to the great size and low population density of the North West districts, an extensive railway network there was and remains unprofitable. As illustrated in map 1, the region was bypassed by the trans-Karoo line. The railway line from De Aar to Prieska, planned years earlier, was only constructed in 1903/4 because government used the public work as drought relief for ruined farmers and destitute poor whites.[107] The geographically isolated North West farmers therefore had to wait for the advent of cheap motorised transport before they could profit from better mutton marketing conditions. The lack of market access also contributed to trek farmers' overstocking and the losses they suffered during droughts and dry seasons, which reinforced the region's economic and environmental marginality.

THE ECONOMIC COSTS OF THE SCAB ACT

The Implementation of the Scab Act

In this economic environment, poorer farmers' goal more often was subsistence than profit. Their fears that the forced dipping and quarantine of their sheep would ruin them were real, not imagined. Trek farmers were able to win concessions to delay the cleaning of their sheep and to break quarantine for reasons of pasture change. Even these weak measures, however, were seen by North West farmers as an unsupportable burden.

[106] CPP [A. 5 – 1905] *Report of the Select Committee on Cold Storage*, evidence of Bernard Niland, p. 163.
[107] *Debates in the House of Assembly* (7 July 1903), pp. 243-244.

Farmers without the wherewithal to construct dipping tanks and dipping kraals (an enclosure with sliding gates to funnel sheep to the dipping tank) had to dip sheep by wrestling them to the ground and throwing them bodily into a washtub or clay-lined hole dug for dipping. As mutton sheep were not used to being handled, this rough treatment caused them to panic and trample each other. Lambs were therefore often killed during dipping.[108] The sheep were also often not immersed in the dipping fluid for a sufficient length of time and the dip stuff was not mixed to the right concentration. [109] Davison believed such half-hearted dipping was conducted for reasons of false economy. Farmers, believing that the manufacturers' indications contained a margin of error, experimented with lowering the concentration of manufactured dips to save money.[110] This did not cure scab but it enabled farmers with quarantined sheep to claim that they had made an effort to clean their sheep, allowing them to postpone further dipping until the dry season when the Act would likely be suspended.[111]

The Scab Act allowed for the removal of clean sheep under owners' passes without the permission of an inspector, provided they certified their sheep as clean. Farmers were, however, obligated to give the name of their destination on these passes. In addition, farmers with quarantined sheep needed to procure removal passes from a sheep inspector.[112] The Act therefore accommodated pre-arranged removals of sheep like that practised by farmers with farms (or rental agreements for the use of pasture) in both summer and winter pasture. Sneeuberg, Wodehouse and Barkley East farmers who trekked to pastures on lower elevation in the winter trekked at set times to predetermined destinations. They could therefore ensure their sheep were

[108] CPP [G. 11 – 1909] *Report of the Scab Acts and their Administration in the North-western District of the Cape Colony*, p. 8.
[109] *AJCCGH*, 6, 21 (1893), p. 405.
[110] Davison, 'The Working of the Scab Act', p. 558.
[111] Act 28 of 1899. The Scab Act Amendment Act instructed inspectors to allow farmers to hand dress quarantined sheep in winter instead of dipping them, provided that the sheep were in low condition. Lenient inspectors were easily persuaded that a flock could not withstand dipping, allowing farmers to delay dipping.
[112] Act 20 of 1894.

clean before trekking or arrange for the supervised dipping of their sheep. The Act therefore did not interfere with their transhumance practices.[113]

By contrast, trek farmers grazing their sheep on marginal pasture often arranged the hire of pasture while trekking so they did not always know their destination before they started out. Trekkers sometimes needed to trek at the spur of the moment. A particular pasture might be good but its only water source was a shallow pan of rainwater. A few days of unanticipated hot, windy weather would dry the pan and so force a farmer to move immediately or suffer mortality among his flock.[114]

Dipping when the only source of water on a farm was a few rapidly drying pools of rainwater was impossible. On farms with only a single well, a farmer might have found it necessary to spend hours daily drawing water for their sheep to drink. Dipping in such circumstances would be a major undertaking and farmers also had no assurance that the well might not dry up. Farmers were therefore not willing to use precious water resources to dip their sheep.[115] Indeed, a Prieska farmer testified that he had to ration water to such an extent during droughts that his wife could not do the laundry and even then his flock could only drink every other day. Hygiene could not be prioritised above survival.[116]

If sheep were under quarantine when their drinking water literally evaporated, farmers were required to contact a sheep inspector and engage him to inspect and treat their sheep before trekking. The great distances between farms and towns in the North West, however, made

[113] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of William Diederick Snyman, pp. 392-393.
[114] Ibid., pp. 5-8.
[115] Ibid., p. 5.
[116] Ibid, evidence of Gilliam van Niekerk, p. 565. Van Niekerk was an advocate of dipping, believed scab was an infectious disease and even wanted protection from careless farmers. He opposed the Act, however, since he believed that anti-scab measures was impossible to enforce in his district.

contacting a travelling sheep inspector difficult at the best of times. Certain pastures contained poisonous bushes causing a fatal condition called *dikkop*. A farmer had to remove his sheep from such contaminated pasture at the first sign that his sheep were being poisoned or risk losing the greater portion of his flock. Again, trek farmers could not wait for quarantine to be lifted or for access to new pasture to be negotiated.[117]

Similarly, if scab broke out in the flock of a trek farmer, he might simply not have been able to report the outbreak within the required time period. When Parliament discussed what constituted a reasonable interval between noticing a scab outbreak and reporting it, John X. Merriman, MP for Namaqualand, protested that some fieldcornetcies in his district were a hundred miles across. Farmers would therefore not have a chance of reporting a scab outbreak within 48 hours as the Scab Bill proposed. He suggested fourteen days as an alternative. Progressives demurred and eventually a seven day period was agreed to.[118] This was insufficient for the needs of the North West as many farmers may have been days away from the nearest sheep inspector or without any trusted labourers to send or leave in charge of their flock. [119]

These were difficulties that only affected trek farmers or poor farmers. Considerable animosity was therefore engendered by the administration of the Scab Act in the North West. Davison, however, was indifferent to such complaints. As discussed in Chapter 1, he was of the opinion that scab would be easy to eradicate in the North West. Davison and other progressives sincerely believed that North West farmers could clean their sheep during the rainy season and so avoid experiencing subsequent difficulties in obtaining passes or facing prosecution for trekking with scabby sheep. Davison testified before the 1898 Scab Commission that he "…would like it to be

[117] CPP [G. 11 – 1909] *Report of the Scab Acts and their Administration in the North-western District of the Cape Colony*, p. 6.
[118] *Debates in the House of Assembly* (13 July 1894), p. 286.
[119] CPP [G. 11 – 1909] *Report of the Scab Acts and their administration in the North-western District of the Cape Colony*, pp. 5-8.

understood that the want of water is not a reasonable excuse at all; and in [Davison's] own opinion where a farmer complains of not having enough water to dip, it is his own fault, carelessness and neglect."[120] He therefore continued to campaign for stricter anti-scab legislation that would no longer allow farmers any leeway to trek with scabby sheep.[121]

Explanations for the demise of transhumance

The spectre of white poverty and the urbanisation of the rural poor hovered over all discussions of the scab acts. Farming units were being consolidated and the poor expelled from the rural economy. Beinart argues that innovation in fencing and irrigation technologies opened the way for increased productivity in the pastoral sector.[122] There were therefore more investment opportunities. With sufficient capital investment for fencing and hydrological engineering works, formerly marginal land inhabited by squatters could be farmed profitably. The paddocking system enabled farmers to preserve pasture for the dry season through rotational grazing while reducing labour requirements. Marginal land that was formerly rented to *bywoners* could now be farmed productively. *Bywoners* and trek farmers who squatted on crown land were therefore squeezed out of the rural economy.

This analysis is supported by the Carnegie Commission report on poor-whiteism in the 1930s. The report highlights the increased capital investment in agriculture after 1880 as the driving force behind urbanisation. This investment was made possible, it argued, by the availability of jackal-proof fencing and the expansion of the railway network which made transportation cheaper

[120] CPP [A. 21 – 1898] *Report of the Select Committee on the Scab Act*, evidence of A.G. Davison, p. 9.
[121] CPP [G. 31 – 1909] *Report of the Chief Inspector of Sheep for the Year 1908*, p. 44.
[122] Beinart, *The Rise of Conservation in South Africa*, p. 220.

and faster. As a consequence "…suitable lands became scarcer or more expensive, causing trekking to weaker areas but also migration to non-rural work circles."[123]

Dubow argues that because there were few investment opportunities for merchant capital to increase the production or quality of wool, merchant capital invested in land. Merchants also increasingly acted as money lenders. They extended long-term credit to farmers on easy terms to secure their custom. Dips in the wool price caused merchants to tighten credit, driving indebted farmers into bankruptcy. The penetration of merchant capital into the rural economy resulted in land speculation accompanied by a boom-and-bust cycle in land prices. The resultant land shortage and fluctuating land prices pushed poorer farmers from the rural economy. He also argued that the mineral revolution caused a demand for labour and this spurred the government to adopt stronger measures against squatting. Ownership of the means of production (i.e. agricultural land) was therefore increasingly concentrated in the hands of wealthier land owners and Africans and poor whites were denied economic independence as rural producers.[124]

The impact of the influx of merchant capital and the introduction of new agricultural technologies, however, should not be overstated. As discussed in Chapter 1, trek farmers were not self-sufficient and were therefore never cushioned from market forces. Trek farmers were exposed to poverty and the effects of commercialism before the Cape was incorporated in the global economy. [125] Economic developments in the second half of the nineteenth century therefore did not introduce commercialisation but rather caused its impact on trek farmer society to intensify.[126]

[123] 'Gesamentlike Bevindinge en Aanbevelinge van die Kommissie' in *Die Armblanke-vraagstuk in Suid-Afrika: Verslag van die Carnegie-kommissie* (1932), p. xxi. The original Afrikaans reads, "…geskikte gronde het skaarser of duurder geword, sodat trek na swakker streke begin het, maar ook 'n verskuiwing na nie-landelike werkkringe."
[124] Dubow, 'Land, Labour and Merchant Capital', pp. 30, 39-42.
[125] Newton-King, *Masters and Servants on the Cape Eastern Frontier, 1760-1803*, pp. 170-171.
[126] R. Ross, 'Capitalist farming in the Cape Colony' (1986), p. 66.

P.J. van der Merwe (1945) described the demise of trek farming as the inevitable consequence of population increase. Extensive farming, as practised on the ever-shifting South African colonial frontier, was only profitable as long as land prices and the population remained low. Poorer farmers could not acquire land in more settled areas and were expelled to the frontier, driving expansion. As soon as a particular area drew more settlers (or as the population increased), land prices rose, farmers became more assertive of their property rights and it became necessary to invest in improved production methods. Those who lacked capital to buy land or to invest in agricultural technologies were then expelled to the new frontier. However, when the frontier closed, such farmers were expelled from the rural economy entirely and became poor whites in South Africa's towns and cities.[127] Merchant capital and new agricultural technologies were merely incidental to this process.

Competition for pasture therefore predates the advent of British rule at the Cape. VOC officials allowed farmers who wanted to protect their trek pasture from encroachment by newcomers to include their customary Karoo encampments, then situated beyond the boundaries of the colony, in the deeds for their loan farms. Such competition for pasture drove frontier expansion. [128] The British government honoured such documented claims, but did not grant farmers title solely on the basis of customary usage. Hantam, Bokkeveld and Roggeveld farmers successfully appealed to the government to stop trek pasture around Zak River in Calvinia from being surveyed and auctioned in 1848 and attempted to repeat this success after the promulgation of the 1860 Crown Land Act.[129] The 1864 committee on Crown land, however, saw "…no sufficient reason for

[127] P.J. van der Merwe, *Trek* (1945), pp. 44-61, 63-71.
[128] CPP [A. 80 – 1859] *Report, Proceedings, &c., of the Select Committee on the Disposal of certain Vacant Crown Lands in the Division of Worcester*, pp. 1-2.
[129] CPP [A. 133 – 1861] *Correspondence on the subject of the Trekvelden near the Zak River*; CPP [A 49 – 1863] *Memorial of Certain Inhabiants of the Hantam, Bokkeveld, and Roggeveld*.

treating those lands otherwise than as ordinary Crown property."[130] Land utilized as trek pasture by generations of North West farmers was therefore auctioned off to the highest bidder under various acts governing the disposal of Crown land. At such events the competition for land often drove farmers to offer overly high amounts for marginal land that could only be improved with difficulty. Burdened subsequently with high mortgages, farmers were unable to invest in agricultural improvement.[131] According to testimony before the 1892-4 Scab Commission, a group of Calvinia farmers managed to protect their trek pasture by forming a land syndicate for the lease and subletting of back country Crown land. It is not known how widely their example was emulated, but no other witnesses mentioned a similar arrangement.[132]

In this economic climate, landowners could no longer afford charity towards trek farmers and *bywoners*. Some landowners were opposed to the Act not because they wanted their own dry-season trekking accommodated or because they were concerned about poorer farmers who could not afford to dip. Rather, they were concerned about the provisions in the Scab Act for the quarantine of livestock. As mentioned in the introduction, landowners with public roads crossing their farms could not prohibit trek farmers from crossing their land. These farmers were afraid that scabby sheep belonging to trek farmers or *bywoners* would be quarantined on their property, leaving them to bear the cost for supporting and dipping the animals. A Prince Albert sheep farmer therefore wanted the Scab Act to give him the right to refuse trek farmers access to his land. He also warned that he would need to use more pasture for his own flock if he was to keep them scab free, which would necessitate him to expel the *bywoners* on his farm.[133] Reverent Gustav Adolf Mader, a German missionary working in Victoria West, accused farmer

[130] CPP [C. 2 – 64] *Report of the Select Committee on Crown Land*, p. vii.
[131] CPP [G. 68 – 1899] *Reports by the Special Commisioner appointed to inguire into the Agricultural Distress and Land Matters in the Divisions of Clanwilliam, Van Rhyn's Dorp, Calvinia, Fraserburg, Carnarvon, Kenhardt, Gordonia, Prieska and Hope Town*, pp. 4-8.
[132] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of Jeremias Nieuwoudt, p. 577.
[133] Ibid., evidence of Louis Daniel van Zyl, p. 367.

representatives who claimed they were opposing the Scab Act for the sake of the poor of hypocrisy. If they were really concerned with the poor, he argued, they would assist them in cleaning their sheep. Instead they sought to escape their obligations towards their *bywoners* and increasingly set them off of their land.[134]

The testimony before the Scab Commission of Daniel Gabriel de Villiers provides proof of this hypocrisy. De Villiers, a member of the Beaufort West Divisional Council and owner of 30 000 sheep spread over several farms (he had the largest livestock holdings of all the farmers who testified), initially stated that he was opposed to the Scab Act because of the need to accommodate trek farmers. But he was confronted with the fact that he had recently ordered his attorney to enquire if one of his farms, which were bisected by a major trek route, could be placed under the 1886 Scab Act. His concern for the plight of drought stricken trekkers was therefore the public position his Divisional Council constituents expected him to hold and was exposed as such. Further questioning revealed that De Villiers was a local dipping advocate who helped his neighbours to dip. He also believed that only a scab act will help to root out poor dipping practices and enable him to keep his flocks clean.[135]

Little direct statistical evidence exists to substantiate the argument that trek farmers were increasingly impoverished. Unfortunately government censuses did not record the average sizes or prices of agricultural holdings. It also did not track household income. In addition, there is no district level breakdown for the number of people who identified themselves as pastoralists. Per capita livestock holdings can therefore not be used to determine the economic wellbeing of the average North West sheep farmer. Comparative data on wire fencing and boreholes shows, however, that the North West was under represented in these visible signs of agricultural

[134] Ibid., evidence of Gustav Adolf Mader, p. 545.
[135] Ibid., evidence of Daniel Gabriel de Villiers, pp. 522-526.

progress: The North West consisted of almost 39 percent of the surface area of the colony but possessed only 455 (or 6.25%) of the 7285 boreholes recorded in the 1911 census (the first census to record boreholes). Similarly, while 29.59% of the surface area of the colony was fenced by 1911, only 2.88% of the North West was fenced.[136] There was also a decline of 3430 *bywoners* (2030 of which were listed as European men) from the1904 census to that of 1911.This figure may indicate a change in definition since the number of farm overseers, agriculturalists and pastoralists shows increases during the period. More revealing is the district-based statistics for direct farm employment. In the period between 1891 and 1911, direct employment on farms declined as a proportion of total European male employment. The number of European males in the Cape Colony increased by 53.12% while those occupied on farms only increased by 15.93%. During the same period the number of European males employed on farms in the North West increased by 43.82%. The number of European males who indicated they were directly occupied on farms declined slightly from 1904 to 1911, while census returns for the North West showed that European male farm employment increased by 12.52% for the same time period. The farms in the region therefore drew European males while farms in the rest of the colony were shedding them.[137]

In the nineteenth and early twentieth century evidence for pasture degradation was primarily derived from the massive losses suffered by farmers during drought. Progressive commentators

[136] SAP [U.G. 32h-1912] *Census, 1911: Annexures to General Report Part IX*.
[137] CPP [G. 6 – 1892] *Results of a Census of the Cape of Good Hope, as on the Night of Sunday, the 5th April, 1891*; CPP [G. 19 – 1905] *Statistical Register of the Colony of the Cape of Good Hope for the half-year, January to June, 1904, including Census Population results for 1904, with Certain Supplementary Returns to 31st December, 1904***;** SAP [U.G. 32h-1912] *Census, 1911: Annexures to General Report Part V*; SAP [U.G. 32h-1912] *Census, 1911: Annexures to General Report Part IX*. Percentages calculated by author. Direct employment on farms was used instead of agricultural employment in general because agricultural employment included the trade in and marketing of agricultural goods, those engaged in forestry and people who traded or owned agricultural land but who did not farm. Since the Western Cape was developing a strong fruit export industry during this period, employment in the agricultural sector did not decline significantly despite the problems that plagued the livestock sector. Women were largely removed from the agricultural workforce in the 1911 census and their labour was now classed as domestic labour. I therefore used comparative data for male Europeans instead of Europeans in general.

therefore developed Malthusian fears for the future of Cape livestock farming.[138] The practice of transhumance allowed farmers to own more livestock than their home farms could sustain, but was only an effective pasture management system as long as farmers could reserve sufficient pasture in different rainfall zones. By the end of the nineteenth century increased land shortages meant that transhumance was no longer an effective strategy to mitigate the effects of drought. Farmers therefore lost great numbers of stock to malnutrition annually. Loosing half of one's livestock during a drought became an accepted risk of sheep farming.[139] Above and beyond progressive fears about long-term pasture damage, these massive losses were seen as wasteful and preventable. According to T.D. Hall (1934) trekkers left "…the animals for provender to Providence and their own devices – which in many cases were starvation and death."[140] Hutcheon, commenting in 1895 on this wastage, advocated that farmers decrease their livestock numbers in favour of breeding more productive animals.[141]

When the North West was thinly populated and land was more easily acquired, farmers could eventually recover from devastating drought losses but by the late nineteenth century increased land prices and higher interest rates on mortgages meant that drought-ruined farmers had no opportunity to recover. Such impoverished farmers lost their land and started living yearlong in tents on pasture formerly reserved for summer grazing.[142] The resultant overgrazing increased their vulnerability to drought and also increased the progressives' distaste for transhumance.

The sale of Crown lands was not only linked to increased dry season livestock losses, but also to increased scab incidence. In Aberdeen, a Midlands region containing large tracks of marginal

[138] T.D. Hall, 'South African Pastures: Retrospective and Perspective' (1934), pp. 61-67.
[139] CPP [G. 11 – 1909] *Report of the Scab Acts and their Administration in the North-western District of the Cape Colony*, p. 1.
[140] Hall, 'South African Pastures: Retrospective and Prospective', p. 77.
[141] Ibid., 70.
[142] CPP [G. 11 – 1909] *Report of the Scab Acts and their Administration in the North-western District of the Cape Colony*, p. 1.

pasture rented out by absentee landlords to poorer sheep farmers, the office of the CIS recorded drought related livestock losses proportionally comparable to that of the North West. In the words of H.J. Weideman, an Aberdeen farmer, "…when there was plenty of Government ground, there was great scope for trekking; there was no dipping, but with a little scope [i.e. fresh pasture] the scab cured itself." As his neighbours no longer tolerated trespass, Weideman, unable to afford rented pasture, was now limited to his farm and his livestock suffered for it.[143]

In the light of the above, Davison and other progressives' lack of sympathy with trek farmers' economic grievances against the Scab Act can be re-evaluated. Their contempt for trek farmers was underpinned by their belief that trek farmer poverty was caused by their own negligent farming practices. A prize-winning essay submitted to the Wynberg Agricultural Society by one Harold Hignell expressed progressive sentiment succinctly:

> Social evolution and political economy alike, demand that the efficiency of the progressive moiety of the community should not be crippled or restrained by the necessity of bearing the burdens shirked by the inefficient and inert portion of the population at present in the Cape Colony. The clean man has to pay part of the dirty man's washing bill in the case of scab, and as largely, by reason of his dirt, the unclean citizen is often incapable of contributing equally with the clean to the public funds, it follows that the lion's share of the former's laundry account is settled by the latter.[144]

Progressive farmers were also urged to see forbearance towards the 'unclean', based on their supposed ignorance, as the extension of charity towards the undeserving poor. It was believed that these farmers' ignorance, like the perceived economic backwardness of the Cape, was caused by trek farmers' supine inertia. Hignell proposed that the 'unclean' should be publicly shamed and fined in order to "flay the farmer as his sheep [were] flayed by the scab insect." [145]

[143] CPP [G.1 – 1894] *Report of the Scab Commission*, evidence of H.J Weideman, p. 188.
[144] H. Hignell, 'The Erradication of Scab' in *AJCCGH*, 34, 3 (1909), pp. 264-268.
[145] Ibid., p. 268.

THE ECOMOMIC REALITIES OF SHEEP FARMING SUMMARISED

Progressives billed anti-scab legislation as the panacea for the struggling wool sector of the Cape Colony, but, as discussed above, their claims were dubious as they overstated the economic impact of scab. Due to the smaller sizes of farming units in the Cape, wool farmers were unable to adopt the wool presentation techniques of their Australian counterparts. Cape wool, apart from the presence of scab, was therefore generally inferior to the Australian article. The average pricing system by which merchants bought wool also discouraged investment in improving wool quality. Progressive wool farmers therefore effectively subsidized farmers who produced low quality wool. The latter would not substantially benefit from scab eradication while the cost of dipping sheep would consume their profits.

Mutton farmers were not merely disinterested in scab eradication; the legislation presented a substantial threat to them. Scab did not affect the profitability of mutton farming because the Cape fat-tailed sheep was resistant to the disease. As the cost of dipping their sheep would not be offset by increased profits, anti-scab regulations requiring them to clean their sheep were a considerable economic burden. A combination of environmental and economic factors also meant that the economic position of mutton farmers was strained: mutton farming was predominantly practised in drought-prone areas and mutton farmers therefore suffered greater losses due to environmental scarcity. In addition, the lack of transportation infrastructure in the North West and the monopoly of the cold storage companies over the Cape meat market meant that North West mutton farmers were disadvantaged in the colonial mutton market.

The progressives who advocated anti-scab legislation, however, stigmatized mutton farming as unprogressive and refused to accept that the economic objections to the Scab Act were valid. Progressive wool farming was seen as normative, ignoring the needs of trek farmers on marginal

pasture. It is therefore not surprising that the opponents of the Scab Act saw it as a piece of class legislation aimed at ruining poor farmers and reducing them to servitude.[146]

[146] *Debates in the House of Assembly* (15 June 1894), p. 122.

CONCLUSION

This dissertation has depicted the Scab Act of 1894 as class legislation serving the needs of progressive wool farmers and merchants. The achievements of the Australian colonies in the area of wool production and in eradicating scab were seen as the gold standard of sheep farming. The presence of scab in the Cape Colony did not only devalue colonial wool and sheep skins in the international market, but stigmatised Cape farmers as backwards. The object of anti-scab legislation was not merely to protect farmers who wanted to clean their sheep from re-infection, but to eradicate scab in the Cape Colony. A colony-wide scab act was therefore seen by progressives as an important signifier that the Cape Colony was modern and progressive.

It was not self-evident, however, that the material benefits of eradicating scab would outweigh the cost. Progressive arguments that eradicating scab would benefit the sheep farming sector as a whole rang hollow since it was premised on a normative understanding of sheep farming. Non-wool farmers and arid region wool farmers had nothing to gain from dipping their sheep, but anti-scab measures affected them disproportionately. They therefore strenuously protested against the legislation and managed to delay implementation of a colony-wide scab act to 1894. They also managed to weaken its measures.

The fate of the 1894 Scab Act highlights the difficulty of policing unpopular legislation. Since its success depended on farmers voluntarily reporting scab and refraining from trekking with infected animals, it was unsuccessful in districts where the population opposed it. Despite increasing prosecutions and a high conviction rate, scab was not eradicated, but merely suppressed. Farmers were able to take advantage of loopholes in the Act to remove scabby sheep and to avoid dipping them.

As discussed in Chapter 1, historians who have focussed on depicting trek farmer objections to progressive initiatives have focused on trek farmer character instead of on their economic position. They ascribe various 'traditional' traits to trek farmers that, upon closer analysis, are revealed as euphemisms for ignorance and superstition. As discussed, this attempt bogs down in the theoretical problems associated with defining traditional knowledge and differentiating it from science. At the heart of the problem is a problematic definition of irrationality: The 'irrationality' displayed by 'traditional people' are not the irrationality of holding 'false beliefs' in the face of contrary empirical evidence, rather it is the irrationality of practicing 'false economy'.

In the world economy created in the nineteenth century through European colonial expansion, the refusal or inability to accumulate capital marked people as 'irrational'. Cape Colony Progressives was slow to credit trek farmers with farming knowledge where this conflicted with their economic interests. The report of the 1892-1894 Scab Commission is one of the few archival sources in which trek farmer voices were recorded.

I have argued in this dissertation that the opponents of the Scab Act shared economic interests. The anti-scab act movement tried casting the conflict surrounding the Scab Act in ethnic terms in order to gain broader support in the Cape Dutch community. This attempt largely failed since there was no simple dichotomy between English Eastern Province progressives and Dutch-speaking traditionalists that could be exploited to drum up wider support for the aims of the movement. The pastoral community was divided by the differing interests of wool and mutton farmers and class divisions between landlords, *bywoners* and transhumant pastoralists. The anti-scab act movement could therefore not manage to gain the support of the wider Dutch-speaking pastoralist community, let alone the support of Dutch-speaking agriculturalist and urban professionals.

This attempt at ethnic mobilization would eventually backfire. While the main political division of the Colony was interpreted as the ethnic divide between English and Dutch speakers, sophisticated economic arguments against progressive policies were not developed. As the value of scientific progress was adopted more generally in the Colony, government scientific intervention could be depicted as politically neutral. The Union government had ambitious plans for agricultural improvement and North West sheep farmer representatives were placed in the difficult position of having to argue that their constituents could not afford progress. Since condoning this would result in the spread of scab, non-North West MPs' charity did not extend to accommodating trek farmers.

The failure of the anti-scab act movement to mobilize support along ethnic lines should raise caution about the possibility of identifying an Afrikaner trek farmer sub-ethnicity. The category of 'traditional knowledge' cannot be used to demarcate this proposed ethnic identity: Not only is this category theoretically incoherent, but opposition to the Act did not correlate with opposition to the scientific explanation for the disease. As shown, some farmers constructed alternative theories for scab that were sophisticated and drew on mid-nineteenth century medical theories like the environmental explanation for epidemic diseases and ideas of spontaneous generation to explain the reproduction of insects and arachnids. But these ideas were heterogeneous and cannot be used to exemplify aspects of a distinct 'traditional' epistemology. There is also not sufficient evidence for the so-called trek farmer moral economy based on shared ideals about social justice for this idea to withstand historical scrutiny.

The failure of the Scab Act hardened progressives' opinion against the opponents of the Act. This negative opinion was underpinned by a contemporary discourse that blamed the poor for their poverty. Progressives therefore persistently discounted the valid economic grievances of farmers who would not materially benefit from scab eradication. It was illustrated in this thesis that anti-

scab legislation was recognized as class legislation by its proponents and opponents alike. This recognition was the space that gave the anti-scab act movement room to manoeuvre and it was the progressives' main avenue for attack. While progressives acknowledged that a general colony-wide scab act would cause hardship, they were diligent in depicting their opponents as irrational and unable to recognize their own economic interests. The economic interests of Midlands and Eastern Cape wool farmers were judged to be the common good while the economic interests of mutton farmers and trek farmers were largely ignored. It was implied that these farmers had a civic duty to make sacrifices for the benefit of wool farmers. Scientific theories that connected drought with overgrazing helped progressives undermine trek farmers' arguments that the Act was not suitable for the North West. Since they believed that the environmental challenges faced by trek farmers were caused by the trek farmers' wasteful system of pasture management, progressives did not give credence to claims of North West exceptionalism. The progressives' depiction of their opponents eroded their platform for protesting against anti-scab legislation. The difficulties they experienced in curing their sheep were seen as a symptom of their negligence while their alternative views on scab were seen as symptomatic of their backwardness.

As shown above, Hutcheon and progressives' scab science served the class interests of wool farmers. The long incubation period of the disease was not emphasized while the infectability of the disease was exaggerated through the official focus on the dangers of kraaling, shared drinking holes and sleeping places. The scientific explanation for scab was therefore clearly influenced by the progressive prejudice against transhumance. The assertion of mutton farmers that Cape fat-tailed sheep was largely immune to scab was also not scientifically investigated. Because progressives attempted to use veterinary science to downplay the economic concerns of the anti-scab act movement, veterinary science became a point of contention between proponents and opponents of the Act. It is not merely that the interests of wool farmers determined the topic (i.e. scab) that was investigated by the CVS, the contents of his scientific position was shaped by their

interests. This example shows that it is necessary for historians not merely to report on a particular scientist's career, but to evaluate the content of her science.

Because the efficacy of veterinary science had not yet gained widespread recognition and its methods (so far as the investigation of scab was concerned) was not technologically sophisticated, the scientific explanation for scab could be challenged. Attempts by the government and progressives to convert the anti-scab act movement to their cause through an appeal to the authority of science were therefore not successful. This blunt appeal to the authority of science contrasts with the approach of the CVS to livestock diseases like heartwater that affected a narrower Eastern Cape progressive constituency. This constituency's ideas regarding livestock diseases was investigated by government experts at the Cape, but Hutcheon's scientific curiosity was not stirred by the claims of the anti-scab act movement. Since he considered the aetiology of the disease to be scientifically complete, his experiments with *acari*, like that of Davison, were conducted only to confirm the established account of the disease. As discussed in Chapter 2, this neglect helped delay the development of a richer scientific account of the disease in South Africa.

Hutcheon was in contact with the broader scientific community of the USA and Europe. He was also more open to challenges from farmers like the Eastern Province progressives who shared his cultural background. But Hutcheon and the colonial veterinary establishment seemingly ignored the field experience of a large proportion of the settler community. This concern becomes even more urgent to historians investigating scientific intervention in the Transkeian Territories and other native reserves in South Africa. In the case of anti-scab legislation, the settler community were divided about the need for a scab act; they argued about its scientific description and argued about what particular form this legislation should take. This served to ameliorate the impact of the Scab Act in the Colony Proper. As discussed, the Agriculture Department was not concerned about debates amongst African communities in the Transkeian Territories about either the

scientific account of the disease or the particular anti-scab measures that would be enforced in the area. The scientific account of scab was similarly closed to challenges from Africans' practical sheep farming experience.

The Cape was a settler colony and its economy was organized to privilege its ability to supply primary products (wool and minerals) to the industrialised world. Considering that the Scab Act was intended to improve the quality of Cape wool exports at the expense of economically marginal pastoralists and of mutton farmers who supplied the domestic market, the scientific account of scab cannot be detached from its colonial context. In the light of this example, can historians of veterinary science afford to detach Cape veterinary science from its colonial context in general? The Africanists critique of colonial science cannot be dismissed for the Cape Colony – scientific bias existed at the Cape despite the fact that colonial scientists had to serve an established settler economy. Science was used to defend the interests of capitalist settler farming within the broader settler community. Settler capitalism also had to be defended against the interests of the indigenous inhabitants of the colony and science was also employed to this end. There should therefore be a middle way between dismissing colonial science as an instrument of colonial power and writing a history of science that, in its attempt to depict this science first and foremost as science, largely portray colonial scientists as politically neutral.

BIBLIOGRAPHY

ARCHIVAL SOURCES, CAPE ARCHIVES, CAPE TOWN DEPOT

CA ARG (Department of Agriculture)

Volume 126/520 – Correspondence of Allan Gardiner Davison, 1892-1895.

CA C (Council of Policy)

Volume 22/10-13 – Resolutions of the Council of Policy, 8 July 1791.

CA CIS (Archive of the office of the Chief Inspector of Sheep) volumes:

1/S/2/697 – Administration of the Scab Acts in Aberdeen – Correspondences from Allan G. Davison, CIS, to the Acting Under Secretary of Agriculture, 21 February 1911.

2/S8 – Administration of the Scab Act in Albert, 1905-1909. S8/864, undated correspondence from J.A. Kruger to F.P. Fincham, attached to letter dated 3 March 1909 from A.G. Davison to Under Secretary of Agricluture, re matter of Rex vs. Hatting, 23 February 1909.

5/S24 – Administration of the Scab Act in Calvinia, 1909-1910.

35/S196 – The Administration of the Scab Act in Victoria West, 1909-1911. P.J. du Toit, Acting Secretary for Agriculture, to the Resident Magistrate of Victoria West, 22 March 1911.

37/ S216 – Returns for the year ended, 1911.

47/40 – Administration of the Scab Act in Tarka, 1906. J.R. Herselman to A.G. Davison, Tarkastad, 23 August 06.

47/33 – Administration of the Scab Act in Paarl and Stellenbosch, 1907.

48/46 – Scab Reports and Draft Acts, 1902-1913.

49/ 51 – Procedure in cases of prosecution for contravention of the Scab Acts, 1906.

CA CO (Colonial Office)

Volume 4275/D34 – Memorial received from A.G. Davison, increase of salary.

PUBLISHED GOVERNMENT SOURCES, CAPE OF GOOD HOPE

Agricultural Journal of the Cape of Good Hope, 1889-1911 (*AJCGH*).

Statistical Register, 1881-1909.

Debates in the House of Assembly, 1893-1907.

Cape of Good Hope Civil Service List, 1895-1910.

Cape Parliamentary Papers (in chronological order)

[A. 80 – 1859] *Report, Proceedings, &c., of the Select Committee on the Disposal of certain Vacant Crown Lands in the Division of Worcester.*

[A. 133 – 1861] *Correspondence on the subject of the Trekvelden near the Zak River*.

[A. 49 – 1863] *Memorial of Certain Inhabiants of the Hantam, Bokkeveld, and Roggeveld*.

[C. 2 – 64] *Report of the Select Committee on Crown Land*.

[A. 3 – 1874] *Report of the Select Committee on the Proposed Scab Bill.*

[A. 5 – 1884] *Report of the Select Committee on the Scab Bill.*

[G. 26 – 1886] *Report of the Colonial Veterinary Surgeon for 1885.*

[G. 14 – 1887] *Report by the Colonial Veterinary Surgeon for the Year 1886.*

[G. 6 – 1892] *Results of a Census of the Cape of Good Hope, as on the Night of Sunday, the 5th April, 1891*.

[G. 1 – 1894] *Report of the Scab Commission.*

[A. 21 – 1898] *Report of the Select Committee on the Scab Act.*

[G. 68 – 1899] *Reports by the Special Commissioner appointed to inquire into the Agricultural Distress and Land Matters in the Divisions of Clanwilliam, Van Rhyn's Dorp, Calvinia, Fraserburg, Carnarvon, Kenhardt, Gordonia, Prieska and Hope Town.*

[G. 19 – 1905] *Statistical Register of the Colony of the Cape of Good Hope for the half-year, January to June, 1904, including Census Population results for 1904, with Certain Supplementary Returns to 31st December, 1904.*

[A. 5 – 1905] *Report of the Select Committee on Cold Storage.*

[A. 12 – 1905] *Report of the Select Committee on the Scab Acts.*

[G. 29 – 1905] *Estimates of the Expenditure to be Defrayed during the Year ending 30th June, 1906.*

[A. 3 – 1906] *Schedule of Reductions and Omissions Recommended by the Select Committee on the Estimates of Expenditure, 1906-7 [G. 58 - '06].*

[A. 10 – 1906] *Report of the Select Committee on the Poor White Question.*

[G. 58 – 1906] *Estimates of the Expenditure to be Defrayed during the Year ending 30th June, 1907.*

[G. 69 – 1906] *Supplementary Estimates of Expenditure to be Defrayed during the Year ending the 30th June, 1907.*

[A. 5 – 1907] *Schedule of Reductions and Omissions Recommended by the Select Committee on the Estimates of Expenditure, 1907-8 [G. 11 - '07].*

[G. 11 – 1907] *Schedule of Reductions and Omissions Recommended by the Select Committee on the Estimates of Expenditure, 1907-8 [G. 11 - '07].*

[G. 30 – 1907] *Report of the Wool Expert for the Year 1906.*

[G. 64 – 1907] *Supplementary Estimates of Expenditure to be Defrayed during the Year ending the 30th June, 1908.*

[A. 4D – 1908] *Schedule of Reductions and Omissions [Secretary of Agriculture's Division] Recommended by the Select Committee on the Estimates of Expenditure [G. 21 - '08].*

[G. 23 – 1908] *Report of the Wool Expert for the Year 1907.*

[G. 51 – 1908] *Estimates of the Expenditure to be Defrayed during the Year ending 30th June, 1909*.

[G. 51 – 1908] *Supplementary Estimates of Expenditure to be Defrayed during the Year ending the 30th June, 1909*.

[A. 5. – 1909] *Schedule of Reductions and Omissions Recommended by the Select Committee on the Estimates of Expenditure [G. 26 - '09]*.

[G. 11 - 1909] *Report of the Scab Acts and their administration in the North-western District of the Cape Colony*.

Cape Parliamentary Papers (chronological list of the annual reports of the CIS)

[G. 39 – 1894] *Reports of the Superintendents of Scab Inspectors in the Colony and in the Transkeian Territories for the Year 1893.*

[G. 28 – 1895] *Reports of the Superintendents of Scab Inspectors in the Colony and in the Transkeian Territories for the Year 1894.*

[G. 33 – 1896] *Reports of the Superintendents of Scab Inspectors in the Colony and in the Transkeian Territories for the Year 1895.*

[G.61 – 1896] *Further Report of the Chief Inspector of Sheep of the Year 1895, relating to carrying out Simultaneous Dipping During the period November, 1895, to March, 1896.*

[G. 61 – 1897] *Reports of the Superintendents of Scab Inspectors in the Colony and in the Transkeian Territories for the Year 1896.*

[G. 35 – 1898] *Reports of the Chief Inspector of Sheep and of the Superintendent Sheep Inspector, Transkeian Territories, for the Year 1897.*

[G. 20 – 1899] *Reports of the Chief Inspector of Sheep and of the Superintendent Sheep Inspector, Transkeian Territories, for the Year 1898*.

[G. 48 – 1900] *Report of the Chief Inspector of Sheep, with Annexures, for the year 1899.*

[G. 26 – 1901] *Report of the Chief Inspector of Sheep, with Annexures, for the year 1900.*

[G. 17 – 1902] *Report of the Chief Inspector of Sheep, with Annexures, for the year 1901*.

[G. 37 – 1903] *Report of the Chief Inspector of Sheep for the Year 1902.*

[G. 28 – 1904] *Report of the Chief Inspector of Sheep for the Year 1903.*

[G. 28 – 1904] *Report of the Chief Inspector of Sheep for the Half Year Ending 30th June, 1904.*

[G. 47 – 1906] *Report of the Chief Inspector of Sheep for the Year 1905.*

[G. 30 – 1907] *Report of the Chief Inspector of Sheep for the Year 1906.*

[G. 23 – 1908] *Report of the Chief Inspector of Sheep for the Year 1907*.

[G. 31 – 1909] *Report of the Chief Inspector of Sheep for the Year 1908.*

[G. 10 – 1910] *Report of the Chief Inspector of Sheep for the Year 1909*.

Statutes and Bills (in chronological order)

Act 31 of 1874 (The Scab Act of 1874)

Act 28 of 1886 (The Scab Act of 1886)

Act 33 of 1888 (Scab Act Amendment Act)

Bill to Amend the Laws Relating to Scab in Sheep (Government Notice No. 530, 1894, *The Cape of Good Hope Government Gazette*, 11 May 1894, pp. 918-921.)

Act 20 of 1894 (The Scab Act of 1894)

Act 28 of 1899 (The Scab Act Amendment Act, 1899)

Act 10 of 1908 (The Scab Act Amendment Act, 1908 – The abolition of dip depots)

Act 3 of 1909 (To Continue, for a certain period, the Special Retrenchment Act No. 7, 1908)

PUBLISHED GOVERNMENT SOURCES, UNION OF SOUTH AFRICA

Debates of the House of Assembly, 1911.

South African Reports

[U.G. 16 – 1912] *Annual Report of the Chief Inspector of Sheep for the Year 1910.*

[U.G. 32h – 1912] *Census, 1911: Annexures to General Report Part V*

[U.G. 32h – 1912] *Census, 1911: Annexures to General Report Part IX*.

[U.G. 54 – 1912] *Annual Report, 1911: Sheep Division.*

[U.G. 47 – 1913] *Afdeling Schapen Jaarrapport, 1912/13.*

[U. G. 2 – 1915] *Afdeling Schapen Jaarrapport, 1913/14.*

Acts

Act 14 of 1911 (Stock Diseases Act)

CONTEMPORARY PUBLISHED SOURCES

Newpapers

Cape Argus

De Volksbode

Midlands News

Ons Land

Patriot

Zuid Afrikaan

Contemporary Books

Cooper, W. and nephews, *The World's Sheep Farming for Fifty Years* (Berkhamsted: Cooper and Nephews, 1893).

Flemming, G., *A Manual of Veterinary Sanitary Science and Police, Vol. 2* (London: Chapman and Hall, 1875).

Men of the Times: Old Colonists of the Cape Colony and the Orange River Colony (Johannesburg: Transvaal Publishing Co., 1906).

McKee, W. M., *South African Sheep and Wool* (Cape Town: Maskew Miller, 1913).

Official Yearbook of the Union of South Africa, No. 1, 1910-16 (Pretoria: Government Printer, 1918).

Wallace, R., *Farming Industries of Cape Colony* (South Africa: J. C. Juta and Co., 1896).

Contemporary Articles

Bedford, G.A.H., 'Experiments and Observations carried out with *Psoroptes communis* at Onderstepoort', *3rd and 4th Reports of the Director of Veterinary Research, Union of South Africa* (Pretoria: Department of Agriculture, 1915), pp. 101-108.

Davison, A.G., 'Scab Legislation under Union', *AJCCGH*, 36, 3 (1910), pp. 295-306.

Davison, A.G., 'The Working of the Scab Act', *AJCCGH*, 23, 5 (1903), pp. 558-570.

Hignell, H., 'The Eradication of Scab', *AJCCGH*, 34, 3 (1909), pp. 264-268.

Hutcheon, D., 'Scab: its Nature, Cause, Symptoms and Treatment', *AJCGH*, 32, 4 (1908), pp. 432-448.

Hutcheon, D., 'Scab: What is it?', *AJCGH*, 7, 21 (1894), pp. 507-508.

MacOwan, P., '*Steekgras* in Wool', *AJCGH*, 3, 11 (1890), pp. 83-84.

Shilston, A.W., ' Sheep Scab: Observations on the Life-history of *Psoroptes communis*, var. *ovis* and some points connected with the Epizootiology of the Disease in South Africa', *3rd and 4th*

Reports of the Director of Veterinary Research, Union of South Africa (Pretoria: Department of Agriculture, 1915), pp. 71-98.

SECONDARY PUBLICATIONS

Books

Beinart, W., *The Political Economy of Pondoland 1860-1930* (Johannesburg: Ravan Press, 1982).

Beinart, W., *The Rise of Conservation in South Africa: Settlers, Livestock, and the Environment 1770-1950* (New York: Oxford University Press, 2003).

Boehm, E.A., *Prosperity and Depression in Australia, 1887-1897* (London: Oxford University Press, 1971).

Bundy, C., *The Rise and Fall of the South African Peasantry* (London: Heinemann, 1979).

Chatterjee, P., *Nationalist Thought and the Colonial World: A Derivative Discourse* (London: Zed Books, 1986).

Dawkins, R., *The Greatest Show on Earth: the Evidence for Evolution* (London: Bantam Press, 2009).

De Kiewiet, C.W., *A History of South Africa: Social and Economical* (Oxford: Oxford University Press, 1941).

Dooling, W., *Slavery, Emancipation, and Colonial Rule in South Africa* (Scottsville, South Africa: University of KwaZulu-Natal Press, 2007).

Dubow, S., *A Commonwealth of Knowledge* (New York: Oxford University, 2006).

Elkins, J., *The Object Stares Back – on the Nature of Seeing* (New York: Simon and Schuster, 1996).

Giliomee, H., *The Afrikaners* (Cape Town: Tafelberg, 2003).

Gutting, G., *Michel Foucault's Archaeology of Scientific Reason* (Cambridge and New York and Melbourne: Cambridge University Press, 1989).

Habermas, J., *Between Naturalism and Religion* (Cambridge: Polity Press, 2008).

Horton, R., *Patterns of Thought in Africa and the West: Essays on Magic, Religion and Science* (Cambridge: Cambridge University Press, 1993).

Molony, J., *The Penguin Bicentennial History of Australia: The Story of 200 Years* (Ringwood, Victoria, Australia: Viking, 1987).

Midgely, M., *Evolution as a Religion: Strange Hopes and Stranger Fears* (London and New York: Routledge, 2002).

Newmark, D.S., *Economic Influences on the South African Frontier, 1652-1836* (Stanford: Stanford University Press, 1957).

Newton-King, S., *Masters and Servants on the Cape Eastern Frontier, 1760-1803* (Cambridge: Cambridge University Press, 1999).

Penn, N.G., *The Forgotten Frontier* (Cape Town: Double Story, 2005).

Porter, R., *The Greatest Benefit to Mankind: a Medical History from Antiquity to the Present* (London: Harper Collins, 1997).

Scott, J. C., *Seeing Like a State: How Certain Schemes to Improve the Human Condition have Failed* (New Haven and London: Yale University Press, 1998).

Smith, F. B., *The People's Health, 1830-1910* (London: Croom Helm,1979).

Strom, C., "*Making Catfish Bait out of Government Boys": The Fight against Cattle Ticks and the Transformation of the Yeoman South* (Athens and London: The University of Georgia Press, 2009).

Talbot, A.M. and Talbot, W.J., *Atlas of the Union of South Africa* (Pretoria: Government Printers, 1960).

Tamarkin, M., *Volk and Flock: Ecology, Identity and Politics among Cape Afrikaners in the Late Nineteenth Century* (Pretoria: University of South Africa Press, 2009).

Tambiah, S.J., *Magic, Science, Religion, and the Scope of Rationality* (Cambridge: Cambridge University Press, 1990).

Terblanche, E., *Ken ons Kleinveerasse* (Cape Town and Pretoria: Human & Rousseau, 1979).

Thom, H. B., *Die Geskiedenis van die Skaapboerdery in Suid-Afrika* (Amsterdam: N.V. Swets and Zeitlinger, 1936).

Tropp, J.A., *Natures of Colonial Change: Environmental Relations in the Making of the Transkei* (Athens: Ohio University Press, 2006).

Turnbull, D., *Masons, Tricksters and Cartographers: Comparative Studies in the Sociology of Scientific and Indigenous Knowledge* (Amsterdam: Harwood Academic Publishers, 2000).

Van der Merwe, P.J., *Die Noordwaartse Beweging van die Boere voor die Groot Trek, 1770-1842* (Den Haag: W.P. van Stockum, 1937).

Van der Merwe, P.J., *Die Trekboer in die Geskiedenis van die Kaapkolonie, 1657-1842* (Cape Town: Nasionale Pers, 1938).

Van der Merwe, P.J., *Trek: Studies Oor die Mobiliteit van die Pioniersbevolking aan die Kaap* (Cape Town: Nasionale Pers, 1945).

Waterhouse, R., *The Vision Splendid: a Social and Cultural History of Rural Australia* (Fremantle, West Australia: Curtin University Books, 2005).

Articles and Chapters in Books

Abolins, S. et al, 'Control of the Sheep Scab Mite *Psoroptes ovis in vivo* and *in virto* using Fungal Pathogens', *Veterinary Parasitology*, 148 (2007), pp. 310-317.

Agrawal, A., 'Dismantling the Divide between Indigenous and Scientific Knowledge', *Development and Change*, 26 (1995), pp. 413-439.

Archer, S., 'Technology and Ecology in the Karoo: A Century of Windmills, Wire and Changing Farming Practice', *Journal of South African Studies*, 26, 4 (2000), pp. 675-696.

Bechtel, W., 'Scientific Evidence: Creating and Evaluating Experimental Instruments and Research Techniques', *Proceedings of the biennial meeting of the philosophy of science association*, Vol. 1 (1990), pp. 559-572.

Beinart, W., 'Environmental Destruction in Southern Africa', in M. Leach and R. Mearns (eds.) *The Lie of the Land: Challenging Received Wisdom on the African Environment* (London: International African Institute in Association with James Currey, Oxford and Heinemann, 1996), pp. 54-72.

Beinart, W., 'Sheep, Pastures, and Demography in Australia', in W. Beinart and L. Hughes (eds.) *Environment and Empire* (New York: Oxford University Press, 2007), pp. 93-110.

Beinart, W., 'Conflict in Qumbu: Rural Consciousness, Ethnicity and Violence in Rural Transkei, 1880-1913', *Journal of Southern African Studies*, 8, 1 (1981), pp. 94-122.

Beinart, W., Brown, K. and Gilfoyle, D., 'Experts and Expertise in Colonial Africa Reconsidered: Science and the Interpretation of Knowledge', *African Affairs*, 108, 432 (2009), pp. 413-433.

Beinart, W. and Bundy, C., 'State Intervention and Rural Resistance: The Transkei, 1900-1965' in M.A. Klein (ed.) *Peasants in Africa: Historical and Contemporary Perspectives* (Beverly Hills and London: Sage Publications, 1980), pp. 271-315.

Bisdorff, B. et al, 'Control and Management of Sheep Mange and Pediculosis in Great Britain', *Veterinary Parasitology*, 155 (2007), pp. 120-126.

Boyce, W. et al., 'Morphometric Analysis of Psorptes spp. Mites from Bighorn Sheep, Mule Deer, Cattle, and Rabbits', *The Journal of Parasitology*, 76, 6 (1990), pp. 823-828.

Breidbach, O., 'Representation of the Microcosm: The Claims for Objectivity in 19th Century Scientific Microphotography', *Journal of the History of Biology*, 35, 2 (2002), pp. 221-250.

Brown, K., 'Political Entomology: The Insectile Challenge to Agricultural Development in the Cape Colony, 1895-1910', *Journal of Southern African Studies*, 29, 2 (June 2003), pp. 529-549.

Bundy, C., '"We Don't Want your Rain, We Won't Dip": Popular Opposition, Collaboration and Social Control in the Anti-Dipping Movement 1908-1916', in W. Beinart and C. Bundy, *Hidden*

Struggles in Rural South Africa: Politics and Popular Movements in the Transkei and Eastern Cape 1890-1930 (Johannesburg: Ravan Press, 1987), pp. 191-221.

Carnegie-kommissie, 'Gesamentlike Bevindinge en Aanbevelinge van die Kommissie', in *Die Armblanke-vraagstuk in Suid-Afrika: Verslag van die Carnegie-kommissie* (Stellenbosch: Pro Ecclesia, 1932), pp. v-xxxiii.

Colebrook, E. and Wall, R., 'Ectoparasites of Livestock in Europe and the Mediterranean region', *Veterinary Parasitology*, 120 (2004), pp. 251-274.

Cross, P. et al., 'Use of Randomized Response Technique to obtain Sensitive Information on Animal Disease Prevalence', *Preventative Veterinary Medicine*, 96 (2010), pp. 252-262.

De Wet, J., 'Skaapbrandsiekte', in J. De Wet and G. Bath (eds.) *Kleinveesiektes* (Cape Town: Tafelberg, 1994), pp. 94-99.

Dimri, U. et al., 'Psoroptic Mange Infestation increases Oxidative Stress and decreases Antioxidant Status in Sheep', *Veterinary Parasitology*, 168 (2010), pp. 318-322.

Dubow, S., 'Land, Labour and Merchant Capital: the Experience of the Graaff Reinet District in the Pre-industrial Rural Economy of the Cape 1852-1872', *Communications*, 6 (1982).

Elgin, C.Z., 'Creation as Reconfiguration: Art in the Advancement of Science', *International Studies in the Philosophy of Science*, Vol. 16, No. 1 (2002), pp. 13-25.

Elgin, C.Z., 'True Enough', in E. Sosa and E. Villanueva (eds.) *Philosophical Issues, Vol. 14: Epistemology* (2004), pp. 113- 131.

Gilfoyle, D., 'The Heartwater Mystery: Veterinary and Popular Ideas about Tick-borne Animal Diseases at the Cape, c. 1877-1910', *Kronos*, 29, Environmental History (November 2003), pp. 139-160.

Greene, A. 'The Now-Opprobrious Title of "Horse Doctor": Veterinarians and Professional Identity in Late Nineteenth-Century America' in K. Brown and D. Gilfoyle (eds.) *Healing the Herds: Disease, Livestock Economies, and the Globalization of Veterinary Medicine* (Athens, Ohio: Ohio University Press, 2010), pp. 42-58.

Fisher, J., 'Nineteenth-Century Australian Pastoralists and the Origins of State Veterinary Services', in K. Brown and D. Gilfoyle (eds.) *Healing the Herds: Disease, Livestock Economies, and the Globalization of Veterinary Medicine* (Athens, Ohio: Ohio University Press, 2010), pp. 180-194.

Fourie, L. J. and Horak, I.G., 'Status of Dorper sheep as host of ectoparasites', *Small Ruminant Research* 36 (2000), pp. 159-164.

Gooday, G., '"Nature" in the Laboratory: Domestication and Discipline with the Microscope in Victorian Life Science', *The British Journal for the History of Science*, 24, 3 (1991), pp. 307-341.

'Interview with Simon Blackwell', in Gordon, N. and Wilkinson, C. (eds.) *Conversations on Truth* (New York: Continuum, 2009), pp. 1-13.

Grosskopf, J.F.W., 'Plattelandsverarming en Plaasverlating', in *Die Armblanke-vraagstuk in Suid-Afrika: Verslag van die Carnegie-kommissie* (Stellenbosch: Pro Ecclesia, 1932), pp. 1-136.

Guelke, L., 'Frontier Settlement in Early Dutch South Africa', *Annals of the Association of American Geographers*, 66, 2 (1976), pp. 25-37.

Hall, T.D., 'South African Pastures: Retrospective and Prospective', *SA Journal of Science*, 31 (November, 1934), pp. 59-97.

Kirkwood, A.C., 'History, Biology and Control of Sheep Scab', *Parasitology Today*, 2, 11 (1986), pp. 302-307.

Legassick, M., 'The Frontier Tradition in South African Historiography' in S. Marks and A. Atmore (eds.) *Economy and society in pre-industrial South Africa* (London: Longman, 1980), pp. 44-79.

Lynch, M., 'Discipline and the Material Form of Images: an Analysis of Scientific Visibility', *Social Studies of Science*, 15, 1 (1985), pp. 37-66.

Mason, J. E., 'Hendrik Albertus and his Ex-Slave Mey: A Drama in Three Acts', *The Journal of African History*, 31, 3 (1990), pp. 423-445.

O'Brien, D.J., 'Treatment of Psoroptic Mange with Reference to Epidemiology and History', *Veterinary Parasitology*, 83 (1999), pp. 177-185.

Rodrígues-Cadenas, F. et al., 'Development and Evaluation of an Antibody ELISA for Sarcoptic Mange in Sheep and a Comparison with the Skin-scraping Method', *Preventative Veterinary Medicine*, 96 (2010), pp. 82-92.

Ross, R., 'Capitalist Farming in the Cape Colony', in S. Trapido, W. Beinart and P. Delius (eds.), *Putting a Plough to the Ground: Accumulation and Dispossession in Rural South Africa* (Johannesburg: Ravan Press, 1986), pp. 56-100.

Rafferty, D. E. and Gray, J.S., 'The Feeding Behaviour of *Psoroptes* spp. Mites on Rabbits and Sheep', *The Journal of Parasitology*, 73, 5 (1987), pp. 901-906.

Seddon, H. R., 'Eradication of Sheep Scab from New South Wales', *Australian Veterinary Journal*, 40 (1964), pp. 418-421.

Stephenson, M.J., 'Wool Yields in the Medieval Economy', *The Economic History Review*, New Series, 41, 3 (1988), pp. 368-391.

Taylor, B. et al, 'Effects of Sheep Fleece Washings on the Germination and Growth of *Beauveria bassiana*', *Journal of Invertebrate Pathology*, 100 (2009), pp. 79-84.

Van der Broek, A.H. and Huntley, J.F., 'Sheep scab: the Disease, Pathogenesis and Control', *Journal of Comparative Pathology*, 128 (2003), pp. 79-91.

Van der Merwe, G.F., 'Ear Scab in Sheep and Goats', *Journal of the South African Veterinary Medical Association*, 20 (1949), pp. 93-98.

Van Heyningen, E., '"Regularly Licenced and Properly educted Practitioners": Professionalisation 1860-1910', in Harriet Deacon et al (eds.) *The Cape Doctor in the Nineteenth Century: A social History* (Amsterdam and New York: Rodopi, 2004), pp. 195-222.

Van Sittert, L., 'Class and Canicide in Little Bess: the 1893 Port Elizabeth Rabies Epidemic', *South African Historical Journal*, 48 (May 2003), pp. 207-234.

Visser, N., ' "Ontological Gap" or Political Calculation? A Critique of the Tradition-Modernity Dichotomy in Mordechai Tamarkin's *Volk and Flock*', *Kronos*, 36 (November 2010) pp. 289-298.

Warner, J. H., 'The History of Science and the Sciences of Medicine', *Osiris*, 2nd Series, 10, Constructing Knowledge in the History of Science (1995), pp. 164-193.

Wilson, G. I. et al, 'The Infectivity of Scabies (mange) Mites, *Psoroptes ovis* (Acarina: Psoroptidae), to Sheep in Naturally Contaminated Enclosures', *Research in Veterinary Science*, 22 (1977), pp. 292-297.

Woods, A. 'Breeding Cows, Maximizing Milk: British Veterinarians and the Livestock Economy, 1930-50', in K. Brown and D. Gilfoyle (eds.) *Healing the Herds: Disease, Livestock Economies, and the Globalization of Veterinary Medicine* (Athens, Ohio: Ohio University Press, 2010), pp. 59-75.

Wright, F. C., 'Cross-mating Studies with *Psoroptes ovis* (Hering) and *Psoroptes cuniculi* Delafond (*Acarina: Psoroptidae*)', *The Journal of Parasitology*, 69, 4 (1983), pp. 696-700.

Zahler, M. et al, 'Genetic Evidence Suggests that *Psoroptes* Isolates of Different Phenotypes, Host and Geographic Origins are Conspecific', *International Journal for Parasitology*, 28 (1998), pp. 1713-1719.

UNPUBLISHED THESES AND PAPERS

Brown, K, 'Progressivism, Agriculture and Conservation in the Cape Colony, circa 1902-1908' (University of Oxford, D. Phil. thesis, 2002).

D'Arcy Nell, D., '"You Cannot Make the People Scientific by Act of Parliament": Farmers, the State, and Livestock Enumeration in the North-western Cape, c. 1850-1900' (University of Cape Town, MA thesis, 1998).

Davenport, T.H. R., 'The Afrikaner Bond' (University of Cape Town, D. Phil. thesis, 1960).

Du Plessis, J., 'Colonial Progress and Countryside Conservatism: an Essay on the Legacy of Van der Lingen of Paarl, 1831-1875' (University of Stellenbosch, MA thesis, 1988).

Gilfoyle, D. and Brown, K. 'Veterinary Science, Environment and the State in South Africa c1900-1950', unpublished proof, 2009.

Gilfoyle, D., 'Veterinary Science and Public Policy at the Cape Colony, 1877-1910' (University of Oxford, D. Phil. thesis, 2002).

Giliomee, H., 'The Development of Afrikaner Ethnicity, c. 1850-1915', paper presented at the conference on 'Economic Development and Racial Domination', Bellville, 1984.

Meintjies, T., 'The Bio-ecology of the Sheep Scab Mite *Psoroptes ovis* (acari: psoroptidae) Hering (1835)' (University of the Free State, MA thesis, 1999).

Scully, P., 'The 1914 Dipping Disturbances: An Analysis of the Effects of the East Coast Fever Regulations on East Griqualand Society' (University of Cape Town, Honours thesis, 1984).

Tamarkin, M., 'Flock and Volk: Ecology, Culture, Identity and Politics Amongst Cape Afrikaner Stock Farmers in the late 19th Century', paper presented at the Conference on 'African Environments, Past and Present', Oxford, July 1999.

Van Sittert, L., 'Nation-Building Knowledge: Dutch Indigenous Knowledge and the Invention of White South Africanism, 1890-1909', unpublished paper, 2009.

Gou Yang, G. et al., 'Polymorphism of the Ovine FOXP3 Gene (FOXP3)', *Veterinary Immunology and Immunopathology* (2010), unedited manuscript accepted for future publication.

APPENDIXES

APPENDIX A: THE 1894 SCAB BILL, THE SCAB ACT OF 1894 AND THE SCAB ACT OF 1899

APPENDIX B: SCAB PERCENTAGES FOR THE CAPE COLONY, 1895-1911

APPENDIX A: A SUMMARY OF THE 1894 SCAB BILL, THE SCAB ACT OF 1894 AND THE SCAB ACT OF 1899

	Bill to Amend the Laws Relating to Scab in Sheep, May 1894 (proposed by Sir John Frost, Minister of Agriculture)	**Act 20 of 1894** (or the Scab Act of 1894)	**Act 28 of 1899** (or the Scab Act Amendment Act of 1899)
Kraals	Inspector had right to disinfected or destroy all kraals • during period of simultaneous dipping • if a flock was under quarantine	Inspector could disinfect kraals only • during period of simultaneous dipping. • with owner's permission if a flock was under quarantine **Note:** Since infected kraals were blamed for spreading scab, this was a disaster for the advocates of strong anti-scab legislation.	
simultaneous dipping	Simultaneous dipping for two consecutive years over a three month period from December to February, 1895 and 1896. • During the three months, individual districts were to be placed under a six week quarantine fitted to their climatic conditions and shearing schedule. • No sheep to be removed during simultaneous dipping from an area were dipping has not yet taken place. • Government reserved right to call for simultaneous dipping of selected areas in future.	Simultaneous dipping for two consecutive years over a four month period from November to February, 1895 and 1896. • Dipping arrangements repeated the Bill. • Government did not gain right to schedule additional simultaneous dipping. **Note:** Simultaneous dipping was seen as key to eradicating scab. Staffing problems and government inability to ensure that farmers could obtain sufficient sheep dip in the North West caused both the 1895 and 1896 dipping to fail, demolishing progressive hopes for speedy scab eradication.	Simultaneous dipping for two consecutive years over a four month period from February to May, 1900 and 1901. • Government to supply the dip. • Government reserved right to call for simultaneous dipping of selected areas in future. **Note:** The outbreak of the South African War made the proposed simultaneous dipping impossible. Simultaneous dipping occurred thereafter only in Barkley East before the annual stock removals to the Transkei.

dipping tanks	All sheep farmers to built and maintain their own dipping tank on their property, whether said property were rented or owned outright.	Sheep farmers could arrange to use a neighbour's dipping tank. **Note:** Scab-infested sheep were moved for dipping, spreading the disease. This provided a loophole for trekking with scabby sheep.	
owner's passes	Sheep owners could issue passes to shepherds for the removal of their clean flocks. • have to provide herder with sheep dip • herd has to report scab outbreak and dip immediately	Sheep owners could issue passes to shepherds for the removal of their clean flocks. • did not have to provide herder with sheep dip • scab outbreak had to be reported but hand dressing sufficed until dipping tank was reached.	
reporting time	48 hours	Seven days **Note:** The long reporting time and system of owners passes facilitated farmers in removing scabby sheep. They merely had to claim that 1) they did not notice scab amongst their flock before they started trekking and 2) that the scab infection broke out within the last seven days. The CIS's annual reports tracked the removal of scabby flock under owner's passes. So, for instance, a total of 827 infected flocks were removed under owners' passes in 1908.[544]	

[544] CPP [G. 31 – 1909] *Report of the Chief Inspector of Sheep for the Year 1908*, p. 45.

quarantine periods (cleansing orders)	Six weeks quarantine period. • Had to dip within 14 days and them from 10 to 14 days thereafter, otherwise in contravention of the act. • After six weeks quarantine expired and sheep still not clean, inspector had right to dip the sheep at owner's expense.	Six weeks quarantine period • No instructions how soon farmers should dip after being placed under cleansing order. • Dipping interval: 10 to 14 days • If inspector judged farmer did not attempt to clean his flock and the sheep were still infected, the inspector could dip the sheep at the owners' expense.	Different quarantine periods for winter and summer: 1st November to 30th April • sheep to be dipped within seven days of being placed under cleansing order (except if impractical or sheep inspector judged it dangerous). • Dipping interval: 10 to 14 days 1st May to 31 October • order could be renewed for four weeks after expiration, • If cleansing order expired and sheep inspector judged dipping to be impossible or dangerous, visibly infected sheep could hand be dressed or hand dipped only. **Note:** This provision accommodated farmers' fears of and difficulties experienced with dipping in winter,[545] but with the collusion of a lenient inspector, a sheep farmer could entirely avoid cleaning his sheep during winter, the dry season in the Karoo.

[545] CPP [A. 21 – 1898] *Report of the Select Committee on the Scab Act*, pp. 216-225. A number of farmers complained to the commission that their sheep died due to being dipped in winter. Malnutrition (which was common in dry winter months), the presence of other parasites like wire worm, and sudden cold spells (causing hypothermia in wet sheep) could cause sheep to die after being dipped. Many farmers dipped in winter without mishap but others were less fortunate. It is not clear from the farmers' testimonies whether those whose animals died due to winter dipping were careless or if they were simply overtaken by unexpected bad weather. Some farmers testified that their sheep died some time after dipping so it is not clear whether a causal connection really existed. Their testimonies convinced the commission that the Scab Act should be amended in consideration of the dangers of winter dipping.

removing sheep for slaughter	• Sheep had to be dipped once under supervision of a sheep inspector • Sheep inspector to issue special license (or pass), giving the date sheep were dipped, the date of the removal and the destination. • Sheep to be given special brand, to be noted on the pass. • Sheep to be dipped again after 10 days of arrival at destination, except if they were to be slaughtered within 14 days of arrival.	Repeat of the Scab Bill. **Note:** This seems like a harsh measure against mutton farmers but it was easy to circumvent in practice. Mutton farmers could simply remove their livestock under owners' passes. In addition, it gave stock speculators (perhaps needing to remove sheep to market or to move sheep after the rental period on a particular pasture expired) the opportunity to break quarantine after dipping their sheep only once by fraudulently claiming the sheep were meant for slaughter.[546]	
drought	• Colony-wide simultaneous dipping (to be done for first two years of the working of the Act from December to March) to be suspended in Carnarvon, Calvinia, Clanwilliam, Namaqualand, Ceres, Sutherland, Kenhardt, Van Rhynsdorp and Fraserburg. • Quarantines to be suspended (and sheep removed) on a case-by-case basis at the owner's request and on the judgment of the sheep inspector. Sheep to be dipped once under inspector's supervision. Sheep to be issued special pass, to be dipped by owner at new location within 10-14 days of first dip.	• All sections of the Scab Act (except those governing removal from areas in which Act is suspended) to be suspended during drought in Carnarvon, Calvinia, Clanwilliam, Namaqualand, Ceres, Sutherland, Kenhardt, Van Rhynsdorp and Fraserburg. • No removal from the suspended area unless the sheep was dipped twice (if infected or not) within 14 days of removal under supervision of a sheep inspector. • If sheep was judged to be in a bad condition, the sheep inspector could hand dress the visibly infected sheep before the removal and forego dipping.	The North West was seen as one district or division for the purposes of the Act. This meant: no special permission/ pass required to break quarantine for trek between and in North West districts during period the Act was suspended. Farmers still needed to acquire special passes to remove sheep from the area in which the Act was suspended. **Note:** During drought, scab spread uncontrollably in the North West, obliterating any progress made in proceeding years.

[546] A.J. Davison, 'The Working of the Scab Act', (1903), p. 559.

		• Sheep to be dipped as soon as could bear after arrival at new location. • No removals of undipped sheep out of the suspended area. • Removal of undipped sheep between districts where the Act was suspended only with permission from sheep inspectors in the district the sheep were to be moved to. Needed to inform the inspectors of proposed route and destination. **Note:** Lenient inspectors also issued hand dressing passes to sheep that could have been dipped. Such flocks were dipped at their destination but spread scab en route.[547]	
inspectors	Four levels: 1) one CIS; 2) inspectors over regions; 3) one sub-inspector for each district; and 4) dipping inspectors for each ward. Dipping inspectors to be elected by majority of the farmers in the district, other officials to be appointed by the government. **Note:** Dipping inspectors were subordinate to sub-inspectors and could not work independently. This four-tier system was expensive, all the different inspectors' duties were not clearly deliminated and advocates of locally administered anti-scab	Three levels: 1) One CIS; 2) a number of assistant for the CIS; and 3) one sheep inspector per ward or location, voted in by sheep owners with 100 or more sheep for 3-year period. (Could combine two or more wards if a ward did not contain many sheep.) The CIS could inspect all sheep in the Colony but his assistants could only enter private property to inspect sheep if accompanied by the CIS or a ward inspector or if they were filling in as ward inspector in areas temporary without sheep inspectors. **Note:** Sheep farmers in areas opposed to the Act	A three member scab board, chaired by the Civil Commissioner, to nominate three candidate sheep inspectors for pre-determined administrative areas. Government to make final decision. The divisional council appointed one member of the board. The rest appointed through vote by Divisional Council voters. Board members needed to be residents of the district, own more than 250 sheep. They were appointed for 3 years. Insolvency and contravention of Scab Acts disqualified sheep farmers from the board. **Note:** In areas opposed to the Act, elected scab

[547] CIS 35/S196 – The Administration of the Scab Act in Victoria West, 1909-1911. P.J. du Toit, Acting Secretary for Agriculture, to the Resident Magistrate of Victoria West, 22 March 1911.

	legislation were not satisfied with the subordinate position granted to dipping inspectors.[548]	deliberately appointed incompetent inspectors or appointed men opposed to the Act. Inspectors were lenient in order to be re-elected.[549]	boards also opposed the Act and nominated men they knew would be lenient.[550]
fines and penalties	unspecified fine	Maximum penalty of £20 **Note:** In his annual reports, Davison records an average fine for contravention of the Scab Act ranging between £2 and £4 for the Colony and £1 and £2 for the Transkeian Territories (the maximum fine in Transkei was £10). As noted in the introduction, these 'low' fines were seen as an insufficient deterrent.	The progressives were not able to increase the fine in 1899 since the main difficulty rested in the unwillingness of magistrates to impose the maximum penalty. Under the 1911 Stock Diseases Act, penalties ranged from £50, £100, £250 and (depending on the severity of the contravention and the contravener's ability to pay) 6 months, 12 months and 2 years imprisonment for first, second and third contraventions of the Act respectively. In contrast, contravention of an anti-scab measure under the Act carried a £50 fine while not reporting a scab outbreak carried a £20 fine. Contraveners were only to be imprisoned if they were unable to pay the fine. This was the last legislative success of the anti-scab act movement.

[548] *Debates in the House of Assembly* (20 July 1894), pp. 323-324.
[549] CPP [A. 21 – 1898] *Report of the Select Committee on the Scab Act*, evidence of A.G. Davison, pp. 5-6.
[550] CPP [G. 17 – 1902] *Report of the Chief Inspector for the Year 1901*, p. 4

APPENDIX B: SCAB PERCENTAGES FOR THE CAPE COLONY, 1895-1911

	1895	1897	1898	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	district averages	Product
Aberdeen	37.86	4.23	12.53	n/a	21.52	25.81	9.90	1.07	5.79	7.02	4.35	2.36	4.91	11.45	MG
Albany	3.75	2.06	0.65	n/a	3.88	5.67	0.83	3.79	4.13	0.72	1.15	0.49	0.68	2.32	W & M
Albert	6.50	18.59	5.96	43.09	37.40	7.24	9.48	0.50	1.34	1.73	2.31	2.01	0.65	10.52	W
Alexandria	9.07	21.22	3.10	1.86	6.66	1.24	0.00	clean	clean	2.37	1.32	clean	clean	3.60	M
Aliwal North	12.07	19.71	6.62	10.80	28.50	2.04	1.77	5.63	1.24	1.65	1.42	1.57	0.79	7.22	W
Barkley East	25.29	11.63	11.07	n/a	39.89	7.13	0.89	0.90	1.37	0.93	1.15	3.10	2.75	8.84	W
Barkley West	15.34	2.17	clean	10.37	3.09	7.87	1.80	clean	0.98	11.72	1.91	1.07	0.44	4.37	BG
Bathurst	0.55	1.07	clean	clean	0.83	0.36	2.29	1.76	1.43	0.62	0.56	clean	clean	0.73	BG
Beaufort W.	19.79	3.58	17.95	23.70	29.96	5.72	4.88	8.36	6.45	10.28	1.69	8.82	2.75	11.07	W & M
Bedford	0.54	0.84	0.58	6.68	3.62	1.81	2.63	0.86	1.21	0.47	0.98	0.08	0.78	1.62	W & M
Bredasdorp	8.91	3.84	6.75	7.65	10.46	9.75	8.27	3.77	4.31	1.69	clean	0.55	clean	5.07	W
Britstown	30.89	39.66	6.20	20.67	42.62	1.53	9.37	2.68	7.17	2.75	1.19	8.73	7.05	13.89	W & M
Caledon	6.50	4.48	5.82	2.22	9.48	16.45	11.61	2.92	1.26	2.77	1.16	4.54	1.29	5.42	W
Calvinia	63.96	4.13	6.33	2.09	2.12	8.96	18.94	9.15	7.08	11.77	12.86	7.85	10.71	12.77	M
Cape	45.70	5.82	10.39	7.63	7.05	14.14	1.57	2.90	4.29	3.55	clean	2.86	2.76	8.36	W
Carnarvon	43.49	4.60	15.31	8.59	21.14	3.02	36.81	19.41	2.07	0.69	14.16	17.77	17.14	15.71	W to M
Cathcart	2.57	0.84	0.61	1.81	0.37	0.36	clean	0.04	0.49	clean	0.16	0.20	clean	0.57	W
Ceres	13.35	0.11	9.69	28.69	11.75	8.11	5.83	1.55	0.76	4.76	5.14	4.75	4.23	7.59	W
Clanwilliam	4.86	2.90	2.48	n/a	12.49	20.20	13.46	5.44	1.27	2.06	1.78	1.98	2.90	5.98	BG

	1895	1897	1898	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	district averages	Product
Cradock	2.89	8.05	3.49	5.87	8.18	2.46	2.05	1.89	2.30	2.46	2.84	1.47	1.24	3.48	MG
East London	0.40	0.40	clean	clean	clean	clean	clean	clean	clean	0.15	0.10	0.57	1.84	0.27	BG
Fort Beaufort	6.09	4.71	0.95	3.13	2.90	3.50	0.61	0.66	0.30	1.01	3.93	0.37	clean	2.17	W
Fraserburg	48.41	9.30	7.25	8.53	9.92	1.74	6.83	4.23	5.44	6.26	14.09	14.62	18.01	11.89	W to M
George	16.25	24.25	3.89	3.87	11.20	8.03	clean	1.46	clean	1.48	0.96	0.40	1.13	5.61	W
Glen Grey	0.70	5.60	1.62	4.14	2.33	3.35	0.25	1.03	2.18	0.87	1.39	2.16	3.28	2.22	W
Graaff Reinet	5.41	8.79	9.10	7.48	12.88	2.15	6.24	0.87	3.12	0.70	0.30	0.43	2.02	4.58	MG
Hanover	8.04	26.00	13.58	n/a	52.30	1.85	4.41	1.55	1.75	0.47	0.64	0.35	0.80	9.31	W & M
Hay	41.99	5.57	2.19	n/a	5.83	1.72	2.92	0.64	0.35	0.28	0.11	0.97	1.23	5.32	BG
Herbert	8.34	6.08	1.45	6.61	6.33	0.24	2.07	clean	clean	clean	1.10	8.67	1.99	3.30	W to M
Herschel	4.49	5.95	2.11	10.80	6.57	2.76	0.42	0.29	0.11	2.67	11.53	7.42	0.05	4.24	W
Hopetown	45.73	22.44	11.20	n/a	21.96	6.66	13.34	6.36	3.13	4.79	0.19	27.28	2.18	13.77	M
Humansdorp	3.98	1.02	1.08	0.74	0.99	0.77	0.27	clean	0.56	0.42	0.00	0.07	0.20	0.78	W & M
Jansenville	21.59	0.72	5.86	1.25	6.77	1.54	0.66	1.05	2.69	1.79	1.97	0.23	1.08	3.63	MG
Kenhardt	12.00	8.28	1.62	0.40	0.89	0.83	0.05	0.15	0.11	0.21	1.01	1.61	25.06	4.02	M
Kimberley	42.93	10.79	1.25	14.61	6.75	6.69	5.16	clean	1.77	0.48	0.55	1.58	1.26	7.22	W to M
King Wllmst.	5.91	2.28	0.14	2.43	2.63	1.12	0.14	0.23	0.02	0.56	0.34	0.32	0.44	1.27	W
Knysna	clean	clean	clean	10.17	6.81	2.23	clean	0.59	clean	1.17	1.93	clean	clean	1.76	W
Komgha	clean	clean	4.48	n/a	clean	clean	clean	clean	1.97	clean	clean	0.64	clean	0.59	W & M
Ladismith	19.76	0.09	3.74	n/a	8.09	1.24	0.05	0.50	0.14	0.71	2.68	2.25	1.31	3.38	BG
Laingsburg	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.25	4.11	2.26	2.19	8.93	3.75	M

	1895	1897	1898	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	district averages	Product
Middelburg	7.63	12.00	6.65	23.35	39.01	11.16	1.69	1.48	1.50	1.02	0.44	0.50	0.36	8.22	W & M
Molteno	n/a	n/a	n/a	n/a	35.29	7.94	97.06	8.09	2.20	4.01	1.51	0.49	0.47	17.45	W
Montagu	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.41	clean	clean	0.14	BG
Mossel Bay	17.79	0.83	8.82	n/a	13.47	5.91	4.59	n/a	5.06	clean	clean	0.54	clean	4.85	W
Murraysburg	6.41	21.36	25.85	n/a	23.36	16.27	8.23	0.26	2.83	2.62	1.96	0.11	0.09	9.11	W & M
Namaqualnd.	14.39	3.64	0.68	1.92	1.47	4.31	3.88	3.91	clean	clean	clean	0.65	6.91	3.22	M
Oudtshoorn	0.47	1.79	clean	10.74	2.15	1.05	0.93	0.98	0.96	0.48	clean	0.44	0.14	1.55	BG
Paarl	10.21	1.03	0.75	1.44	1.73	3.03	0.85	clean	clean	3.69	3.16	1.78	1.03	2.21	W
Peddie	1.41	2.24	1.57	1.35	3.12	1.54	0.20	2.32	3.05	2.99	8.69	5.11	7.69	3.18	BG
Philipstown	9.74	37.22	10.10	n/a	25.43	1.50	5.07	2.85	0.34	2.98	2.44	1.78	0.98	7.73	W & M
Piquetberg	4.40	2.25	1.13	n/a	9.45	2.63	5.67	4.87	1.18	0.92	2.13	2.30	1.64	2.97	W
Port Elzbth.	0.88	clean	clean	clean	clean	clean	clean	clean	6.57	clean	0.98	clean	clean	0.65	BG
Prieska	47.13	32.28	4.84	5.64	11.94	4.45	2.96	4.67	2.58	1.84	3.31	4.76	5.88	10.18	W to M
Prince Albert	37.47	7.20	11.90	17.94	34.89	17.00	3.64	1.59	1.17	5.72	7.57	12.35	3.54	12.46	W to M
Queenstown	1.43	6.67	7.78	0.34	20.27	4.44	0.12	0.19	0.60	0.71	1.75	0.18	0.86	3.49	W
Richmond	11.13	24.24	6.70	40.57	51.24	15.38	19.91	4.95	3.84	0.60	1.09	0.09	0.54	13.87	W & M
Riversdale	13.82	2.26	14.88	11.31	9.82	4.15	0.75	0.44	0.48	0.46	0.56	3.08	0.33	4.80	W
Robertson	3.44	3.41	2.02	5.35	11.83	5.39	16.28	4.02	6.64	0.00	3.41	clean	clean	4.75	BG
Somerset E.	6.21	4.06	6.40	12.10	8.99	9.01	5.53	2.71	3.21	0.81	3.13	1.39	1.93	5.04	MG
Stellenbosch	31.76	0.00	6.02	2.75	clean	clean	clean	clean	clean	0.62	clean	clean	0.55	3.42	W
Steynsburg	4.99	22.69	7.95	n/a	25.83	7.64	3.19	1.92	2.16	3.60	0.36	3.73	clean	7.00	W & M

	1895	1897	1898	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	district averages	Product
Stockenstrm.	14.45	2.81	1.06	n/a	5.05	3.07	clean	0.66	0.69	1.84	5.03	1.71	2.36	3.23	W
Stutterheim	1.50	clean	1.57	1.35	0.48	0.37	0.58	0.74	clean	0.25	clean	0.21	clean	0.54	W
Sutherland	17.14	0.72	8.62	12.31	10.41	6.59	6.44	1.10	11.96	6.50	3.72	10.91	16.69	8.70	W to M
Swellendam	6.45	3.07	3.44	7.99	5.19	3.80	3.57	7.69	5.22	3.68	1.91	2.77	1.18	4.31	W
Tarka	5.08	20.05	3.81	6.89	3.24	3.55	0.00	0.49	1.72	1.52	3.25	2.83	4.04	4.34	W
Tulbagh	11.59	12.41	1.39	20.41	10.65	7.97	4.04	4.25	n/a	2.97	1.82	5.63	0.00	6.93	W
Uitenhage	4.56	1.09	3.75	1.63	6.85	0.75	1.28	9.40	1.94	1.60	2.55	2.25	1.04	2.98	MG
Uniondale	19.31	1.53	8.66	6.75	6.29	7.90	0.42	2.39	1.84	0.98	0.45	1.01	0.28	4.45	W & M
Van Rhynsd.	1.00	clean	clean	0.93	0.13	4.12	6.50	1.29	0.19	0.70	clean	1.30	2.03	1.40	M
Victoria East	2.50	0.84	clean	0.42	1.54	0.69	0.40	clean	0.18	0.21	1.07	0.65	0.75	0.71	W & M
Victoria W.	26.10	41.47	16.68	n/a	11.31	8.13	14.73	8.97	8.41	4.87	2.00	8.64	3.04	12.86	W & M
Willowmore	35.28	1.38	9.87	11.72	25.30	4.69	1.57	1.89	2.40	15.06	6.84	3.07	0.58	9.20	MG
Wodehouse	0.00	9.76	3.72	1.55	5.70	2.74	3.35	1.30	1.63	2.06	1.74	3.34	1.76	2.97	W
Worcestor	15.54	1.31	4.45	3.68	2.33	10.47	1.28	0.76	0.21	2.23	1.35	1.32	7.03	4.00	W & M
Total livestock	14,830,532	15,893,566	15,251,544	13,664,880	14,639,216	14,413,976	16,655,540	18,516,788	22,537,160	20,842,708	22,252,695	22,444,764	23,367,709		
Total infected	2,250,812	1,452,800	1,033,602	1,283,174	1,869,357	757,274	930,047	533,075	552,712	544,525	601,750	810,455	841,372		
% infection	15.18	9.14	6.78	9.39	12.77	5.25	5.58	2.88	2.45	2.61	2.70	3.61	3.60		

Note: annual averages were derived from the total small ruminant population of the Cape Colony and from the total number of scab infected animals, not by averaging scab incidence.

Key for main products:

BG =	Boer Goats
MG =	Mohair
M =	mutton
W=	wool
W & M =	mainly wool but farmers increased their numbers of mutton sheep after the South African War
W to M =	mainly wool at Act's commencement but became mainly mutton farming district after the South African War