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THE GREAT AFRICAN CATTLE PLAGUE EPIDEMIC OF THE 1890's

ROY MACK*

Commonwealth Bureau of Animal Health, Weybridge, Surrey.

SUMMARY

Historical details of this rinderpest epidemic are given, with reference to some little-known and unpublished documents.

INTRODUCTION

The rinderpest epidemic of the 1890's was apparently the first in Africa; it swept through a whole continent of susceptible animals at a time when the only country to have a veterinary service was Cape Colony, and when the ox was the principal means of transport. 80–90 per cent of cattle, buffalo, eland, giraffe, wildebeest, kudu and antelopes died, and in South Africa alone the losses amounted to 2½ million cattle. The disease had important social and economic consequences, which do not seem to be appreciated in history books. In Kenya the Masai tribe were reduced to starvation and this, together with a smallpox epidemic that followed, severely reduced their numbers so that when the colonizers moved into Kenya they found great tracts of empty land, probably formerly populated by the Masai. The Masai never regained their supremacy over the Kikuyu tribe.

Edmund Burrows in his book "*A history of medicine in South Africa*" (1958) acknowledges that organized medical research owed its inception to the ravages of stock diseases. Organized research dated from 1891, when Alexander Edington, a medical graduate of Edinburgh, founded the Colonial Bacteriological Institute at Grahamstown. This laboratory was established to investigate stock diseases. Edington is now remembered, as far as rinderpest is concerned, for his modification of Koch's bile method of immunization, which consisted of adding glycerin to the bile.

SOURCE OF INFECTION AND COURSE

The origin was undoubtedly cattle brought from Asia, but the early course of the disease is uncertain, since what information we have comes from traveller's tales, and it was not diagnosed until it reached Bulawayo. The disease was prevalent in Egypt in 1841 and propably spread slowly southwards from there, although Duncan Hutcheon in his special report on rinderpest (1897) believed it started in Abyssinia in 1889. Against this we have the observation of Joseph Thomson, who in "*Through Masai land*" (1885) recorded the occurrence of what was undoubtedly rinderpest in October 1883. He was 'greatly astonished to observe the dried carcasses of numerous cattle which dotted the entire district' in Masai land. On 12th March 1884 'the Masai of the surrounding district were in despair through the almost

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utter loss of their cattle'. Thomson and his party were held to blame for the disaster, and he was obliged to indulge in a show of magic designed to keep the disease at bay. Captain Lugard, another explorer who wrote "*Rise of our East African Empire*," said that never before in memory of man, or by the voice of tradition, have the cattle died in such vast numbers; never before has the wild game suffered.

The disease crosses the Zambesi.—The Zambesi river, which is 2–3 miles wide in its lower reaches, apparently halted the southerly spread of the disease for some three years; here it became known as 'Zambesi cattle fever'. Then in February 1896 a herd of cattle was brought from the Zambesi region to Bulawayo, sold and dispersed in all directions. Trouble soon became apparent and on 6th March 1896 the Rhodesian Administrator of the British South Africa Company telegraphed the High Commissioner of South Africa in Capetown for advice. The enquiry was dealt with by Duncan Hutcheon, Chief Veterinary Surgeon of Cape Colony, who informed the Company that they already had a veterinary surgeon working for them as a telegraph operator, who should be sent to investigate the disease. This was Charles Gray who qualified at Edinburgh in 1890 and arrived in Capetown at the end of 1895. As there was no work for him as a veterinarian, he took the post of telegraph operator because he had done this for 7 years before entering the veterinary college. Gray, who later became the Principal Veterinary Surgeon of the Transvaal, was thus the first qualified man to see the disease south of the Zambesi.

The message received at Capetown was also passed to the Transvaal Government in Pretoria, who called in a Swiss veterinary surgeon, Arnold Theiler, to advise them. Theiler had arrived in Transvaal five years previously, soon after qualifying, hoping to set up a practice. He had found it difficult to convince the Boers of the need for veterinary attention and for two years had little to do. Then in 1893 a smallpox outbreak created the need for vaccine, and Theiler was entrusted with its preparation. Theiler later became the first government veterinary surgeon in the Transvaal and founded the Onderstepoort Veterinary Research Laboratory, which he directed until 1927. Theiler was sent to investigate the disease that had broken out at Bulawayo. He went by coach, travelling for 18 hours a day for six days. There he met Gray and together they confirmed that the disease was rinderpest.

In Rhodesia the Matabele were becoming increasingly discontent with white men, for they had suffered bad drought and locusts; when their cattle began to die off, this was the last straw. A few days after Theiler arrived in Bulawayo the Matabele rebelled and murdered 244 white people; only those in Bulawayo and in the mining centre of Gwelo survived. Theiler had to return home quickly to warn his government of the disease, but the Matabele had blocked the way he had come, so he took a coach through the Motopo hills, via Tati, Palapye and Mafeking. On 3rd April he arrived at Palapye and there met Otto Henning, a Cape Colony veterinary surgeon sent by Hutcheon to investigate the disease. Henning had attempted to halt the disease at Palapye by slaughtering all sick animals. He had framed regulations to control movement of cattle along this important route, one of which was that all transport oxen from the north should be killed immediately upon arrival. The British Government, through the Resident Commissioner of Bechuanaland, refused to adopt this plan and refused funds for compensation for slaughter. Thus a good chance of halting the disease was lost.

Early control measures.—On March 25th Duncan Hutcheon himself was sent to Mafeking to urge upon the Resident Commissioner the necessity of slaughtering southbound oxen with payment of compensation. Rinderpest was now being spread

along the main route from Rhodesia to Cape Province at the rate of 80 to 100 miles a week. Hutcheon succeeded in obtaining his requirements, and set off northwards to link up with Henning, and to institute control of movement.

The importance of the ox cart is hard to realise now. By 1896 the railway from the Cape had reached Gaberones in Bechuanaland. From there to Bulawayo was 400 miles, and all goods for the developing colony of Rhodesia had to be carried by ox cart—a month's journey. An ox cart with its team of 16 oxen travelled 14–20 miles a day and could draw a load of two tons in fair country (Fig. 1). Oxen were plentiful and cheap, but horses had to be imported, and they were decimated by African horse sickness; 70,000 horses died from this viral infection in 1854–55.

Long distance ox transport was disrupted by rinderpest, and probably never resumed its former scale, for the railway reached Bulawayo in 1897 and Salisbury about 1900. Since oxen were also used for local transport and farm work, the life of the farmer was seriously disrupted by rinderpest. As late as 1904, the use of camels was suggested in order to overcome the shortage of oxen. In 1904 the Director of the newly-founded Transvaal Department of Agriculture (Stewart Stockman) stated in his annual report that horses had been used hitherto mainly for riding and for running in Cape carts, and their employment for agriculture or transport purposes was almost unknown. For working upon the land and for slow heavy transport, the ox was a cheap and efficient animal, well adapted to the country. He asserted that for a long time oxen would maintain their pre-eminence in this respect.

Theiler's account of his return to Pretoria indicates the havoc the disease wrought. 'From Palapye the coach was drawn by oxen until the first "Ausspanplatz", where they all developed rinderpest. From there to Palla there were dead oxen everywhere (Fig. 2), and abandoned transport wagons. I met drivers who had coupled together two or three wagons and still had half a team of oxen, although these were of course already infected. They were hurrying in order to get as far south as possible, to reach populated districts. I saw others who had lost their draught animals, and with women and children were in the wilds, exposed to hunger and thirst, several days away from human habitation. They all had to return on foot. Later the Transvaal Government sent mule carts to the Crocodile River, to bring home these people. In Palla I found 40 abandoned transport wagons, whose oxen were all dead.'

Theiler met President Krüger on 9th April, and recommended that wherever the disease broke out in the Transvaal it should be controlled by slaughter with compensation.

On 17 April 1896 an inter-state conference, the first of three, was held at Mafeking to discuss what to do about rinderpest. It was attended by Duncan Hutcheon and Dr Alexander Edington (Director of the Bacteriological Institute at Grahamstown) representing Cape Colony, Arnold Theiler for Transvaal, and representatives from Natal, Orange Free State and Bechuanaland. The conference resolved that the disease could be controlled only by stamping out, that compensation should be paid, and that a double fence should be erected along the western and northern borders of Cape Colony, and the Transvaal border.

After the conference, Hutcheon and Henning returned to their energetic campaign in Bechuanaland, and Theiler returned to Transvaal, where he investigated an outbreak in the Zeerust area; this first outbreak was contained by slaughtering 300 cattle. A cordon of police was placed along the northwest border, but control measures failed and eventually the disease overran the whole of the Transvaal.

One of the chief control measures was the building of fences to stop movement of animals (Fig. 3). There was a shortage of barbed wire, for it had to be ordered from

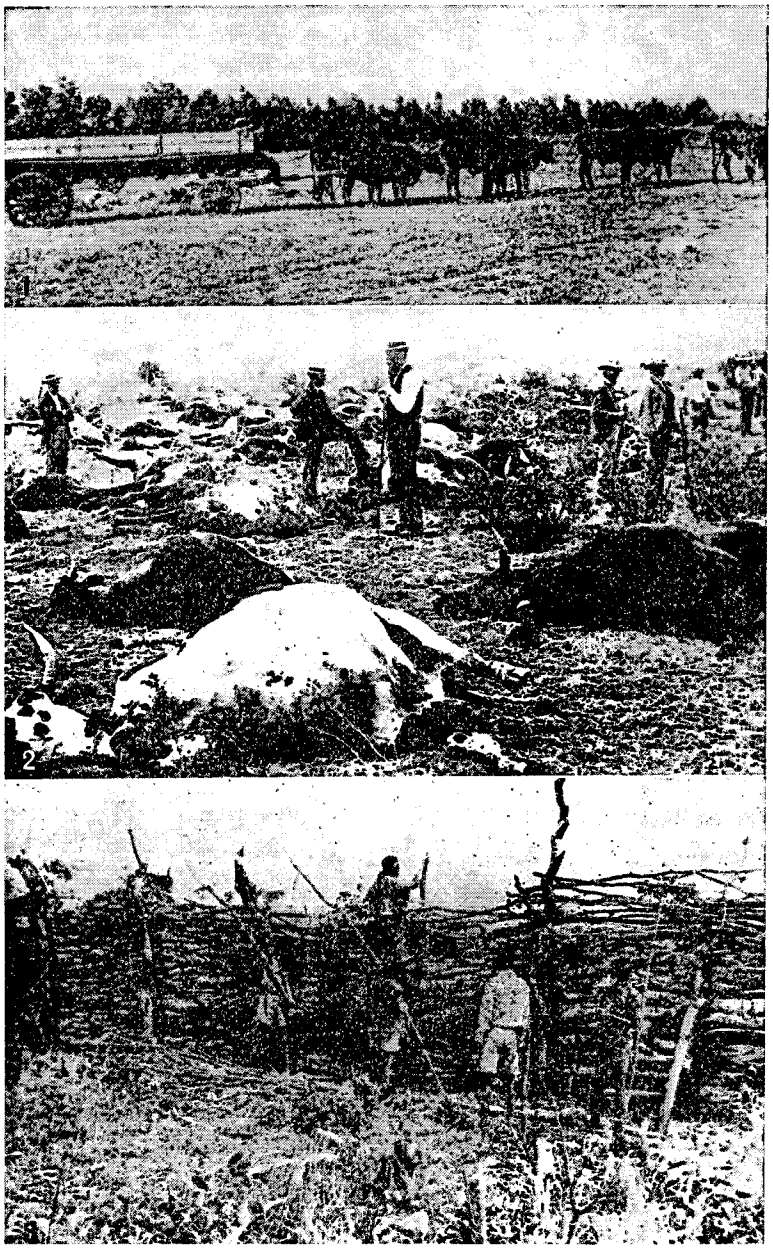

FIG. 1 Ox-cart drawn by team of oxen—South Africa
FIG. 2 Cattle dead from Rinderpest—South Africa
FIG. 3 Shrub-fence erected to control movement of cattle
Photographs by courtesy of
Librarian, Onderstepoort Veterinary Research Institute

Europe and would not arrive until October 1896. So the first fences were built from trees and shrubs. Often, particularly in Bechuanaland, the disease jumped the fence before it was completed, and there must have been many miles of fencing abandoned for this reason. The climax was a double barbed-wire fence extending along the line of the Orange River, 980 miles long, completed in December 1896. This halted the epidemic for four months, long enough for Koch to develop a method of protecting cattle.

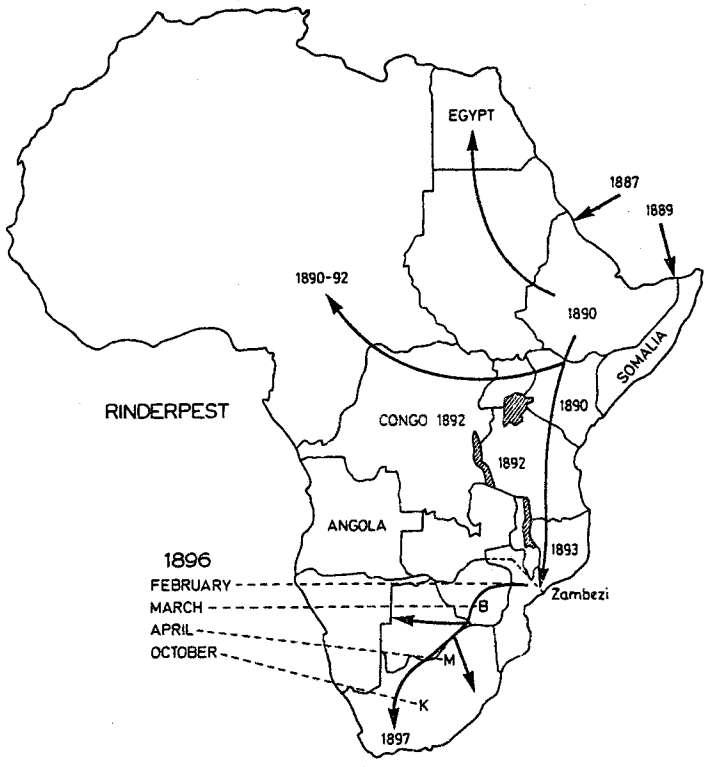

FIG. 4 Course of Rinderpest epidemic from North to South Africa 1887–1897

A report by a Dr J. Maberly, in *The Lancet* in 1898, stated that South Africa was teeming with cattle in January 1896. Hundreds of ox transport wagons could be seen toiling along the road from Mafeking and Bulawayo. The cost of transport along this route of 500 miles was 14s./cwt. By July the country did not contain sufficient cattle for ploughing, and the transport cost had risen to £6 a cwt., and was almost entirely dependent upon mules, donkeys and horses. The price of transport oxen had risen from about £6 to as high as £60 for 'salted' (recovered) cattle.

Although the control measures were executed with great energy, they were never as effective as they had been in Britain, because of wild animals, natives, and shortage of personnel.The reports of Theiler and Hutcheon contain some fascinating examples of how the disease jumped the cordons. The breakthrough of the Orange River line on 24 March 1897 was caused by the leader of an ox transport wagon, travelling south across the Orange Free State towards Cape Colony. On the way he had picked up a sack containing some dried meat and a pair of trousers stained with blood, probably from the meat. He put on the trousers without washing them, and his two leading oxen developed rinderpest a few days after crossing the Orange River (Fig. 4).

The quest for a cure.—By the middle of 1896 it was evident that police measures and fences would not stop the spread of the disease. In October 1896, two months before Koch arrived in South Africa, Arnold Theiler and Watkins-Pitchford (Chief Veterinary Surgeon of Natal) started experiments in Transvaal with immune serum, the serum-virus method of immunization, the preparation of hyper-immune serum in goats, and the infectivity of various tissues. This important research seems to have been entirely ignored at the time, or perhaps the scene was overshadowed by the work of Koch, who arrived just before the experiments were completed. Theiler and Watkins-Pitchford had obtained a grant of £550 and their equipment consisted of a corrugated iron shed, some tents and a mule wagon. It was research done under hard conditions. While the Cape government appealed to Germany, the Transvaal government had evidently appealed to France for help, for at the end of January 1897 Drs Jean Danysz and Jules Bordet arrived from the Pasteur Institute. Theiler stated in his account of his experiments (published in the Schweizer Archiv für Tierheilkunde) 'I was ordered to place myself at the disposal of Drs Bordet and Danysz'. One obtains the impression that Theiler and Watkins-Pitchford resented the intrusion of the Frenchmen. This is confirmed in letters sent by Watkins-Pitchford to the veterinary historian, General Smith, in 1925 and 1928*, in which he claimed priority for the discovery of serum prophylaxis and therapy. Unfortunately his notes and charts were destroyed in a fire at the Pietermaritzburg town hall. He writes 'the findings were some months prior to Koch's first reports. You would be much more interested in learning the great difficulty I had in getting this Natal claim to priority successfully established years after, and this was done finally by bringing pressure to bear upon the Natal Government to appoint a commission of enquiry. The investigation (i.e. experiments) cost under £1,000 and the ultimate saving of animal life must be computed at many millions, but beyond placing the findings of the Commission on the Table of the Natal House no notice, official or otherwise, was taken of this work'. The second letter is a bitter attack on Arnold Theiler which contains several accusations, among them a charge that Theiler suppressed Watkins-Pitchford's work. Watkins-Pitchford also claimed that he had put in a claim for a million rouble prize which the Russian government had offered to the first person to invent a cure and preventative for rinderpest, but the Royal College of Veterinary Surgeons would not support his claim. A mystery remains: who, if anyone, got the million roubles?

A witness of the Transvaal experiments was Watkins-Pitchford's assistant, Mr F. Verney, FRCVS, who states that their experimental camp was broken up in March 1897 'owing to the behaviour of the Transvaal government'. 'We worked for about three months and it was under difficult and trying conditions that Theiler so impressed one with his untiring energy, his intense keenness, optimism, and above all his great knowledge of the problem we were trying to solve. There was no literature on rinderpest that he had not perused, and he was entirely *au fait* with the work the Russian worker (Semner) had done, and which formed the basis of the numerous experiments we carried out.' Ironically the method finally evolved in the Transvaal came to be known as 'The method of the French doctors', referring to Bordet and Danysz.

Theiler's report to the Transvaal government on the experiments was dated 30 June 1897, and again it appears that no notice was taken of it, perhaps because a report signed by Danysz, Bordet and Theiler appeared on 21 July; it was the latter report that was widely publicized and put into practice.

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* I am indebted to Mr J. W. Barber-Lomax, MRCVS for bringing these letters to my notice.

Robert Koch's Contribution.—Koch arrived at Capetown, with Paul Kohlstock as assistant, on 1st December 1896. A laboratory had been erected for him near Kimberley, and he was assisted by Dr George Turner, Medical Officer of Health for Cape Colony, and Dr Alexander Edington, Director of the Bacteriological Institute at Grahamstown. At that moment the disease was being held at the Orange River, but because it might break through at any time, the need for a prophylactic was urgent. Koch wasted no time, and after 30 days he produced his first report, which described the infectivity of various tissues, among them bile, which proved to be non-infective. On 10th February 1897 he reported that cattle could be protected by the injection of 10 ml of bile obtained from an ox killed 10–12 days after infection, and recommended that this method should be brought into use as soon as possible. This was three months before the report of the Transvaal workers on hyperimmune serum was published. Bile stations were set up throughout the country, and men were sent to the Kimberley laboratory for training in the bile method. Koch was unable to complete his experiments, because the German Emperor ordered him to India to advise on bubonic plague. He left in March 1897 and concluded his series of Kimberley reports with the bombastic sentence 'The decision of the Cape government to call in the aid of science for the campaign against rinderpest has had the most fruitful results for South Africa'.

Koch nominated Wilhelm Kolle, then 28, to be his successor at Kimberley, and Kolle spent two years there. Letters between the two men were published in 1959, and they throw interesting light on the rinderpest campaign. Thus Koch, writing from Bombay in June 1897, complained that people expected losses to cease the moment bile was injected. He had read in the newspaper that 6,000 animals had been inoculated and 1,500 had died. Koch considered this to be a good result for an infected herd, for without inoculation 90 per cent would have died. Then in September he told Kolle: 'The administration is sitting between two stools, as it was in my time, because they listen to the hot air of Edington and his colleagues and are hoping to come across a magic substance that will banish rinderpest without too much expenditure of money or effort.' The bile method was far from perfect, particularly in the hands of inexperienced persons but it could be produced without much delay, compared with the two or three months required to produce hyperimmune serum. Koch did not recommend the addition of glycerin to the bile; this was the suggestion of Edington, who without much evidence, regarded untreated bile as too dangerous.

Hyperimmune Serum.—Turner and Kolle worked together at Kimberley and perfected a method of obtaining hyperimmune serum, and confirmed the value of simultaneous inoculation of serum and virulent blood, established in preliminary experiments by Turner. Their report was published in English by the Cape of Good Hope Department of Agriculture, but curiously the version that is usually cited is in German in the *Zeitschrift für Hygiene*, with Kolle's name appearing first.

Closing stages.—When the epidemic was largely mastered in 1898, some areas had escaped infection, so that fresh, localized outbreaks occurred from time to time. In 1900 the disease reappeared in South-West Africa and in 1901 in Basutoland. Bile was still used in the Basutoland outbreak, together with serum which had been prepared at Kimberley four years previously, and was found to be still potent. In 1903 the first Pan-African Veterinary Conference recommended that the best way of stamping out rinderpest was the liberal use of serum. If this was unobtainable, pure bile (not glycerinated) inoculation, carried out under professional supervision, was preferable to any other method.

Rinderpest was finally eradicated from South Africa in 1905. In that year George

Turner read a paper before the British Association at Johannesburg. He showed that of the 1·6 million cattle in Cape Province, only 576,000 (38·6 per cent) died from rinderpest. According to Theiler, the total losses in the whole of South Africa were about 2½ million.

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PRINCIPAL PERSONS INVOLVED IN THE EPIDEMIC

GREY, Charles Elias, MRCVS (Edin.) 1864–1937
Veterinary Surgeon to the British South Africa Company
THEILER, Arnold (Sir) Dr.med.vet. (Zürich) 1867–1935
Veterinary advisor to the Transvaal Government
HUTCHEON, Duncan, MRCVS 1842–1901
Chief Veterinary Surgeon, Cape Colony
TURNER, George (Sir), MB (Camb.), DPH, PRCP (Lond.), MRCS 1848–1915
Medical Officer of Health, Cape Colony
WATKINS-PITCHFORD, Herbert (Lt.-Col.), FRCVS 1866–1951
Principal Veterinary Surgeon of Natal
EDINGTON, Alexander, MD, CM (Edin.), DPH, DTM, FRS (Edin.) 1860–1928
Director of the Bacteriological Institute, Grahamstown
KOCH, Robert 1843–1910
In South Africa from December 1896 to March 1897
KOHLSTOCK, Paul Dr.med. 1861–1900
Koch's assistant in South Africa, 1896–1900
KOLLE, Wilhelm, Dr.med. 1868–1935
Koch's successor at Kimberley, 1897–1899
DANYSZ, Jean 1860–1928
Pasteur Institute, Paris
BORDET, Jules 1870–1961
Pasteur Institute, Paris

REFERENCES

BURROWS, E. H. (1958). **A History of Medicine in South Africa.** A. A. Balkema, Cape Town (& Amsterdam).

CURSON, H. H. (1936). 'Theiler and rinderpest epizootic of 1896–1903'. *Journal of the South African Veterinary Medical Association*, **7**, 187–203.

CURSON, H. H. (1937). Obituary: Charles Elias Gray. *Journal of the South African Medical Veterinary Association*, **8**, 177–179.

DANYSZ, J., BORDET, J. & THEILER, A. (1897). Report of the French experts and the Government Veterinarian. Reprinted from *The Weekly Press*, 31 July 1897.

DU TOIT, P. J. & JACKSON, C. (1936). 'The life and work of Sir Arnold Theiler'. *Journal of the South African Veterinary Medical Association*, **7**, 135–186.

EDINGTON, A. (1899). 'A retrospect of the rinderpest campaign in South Africa'. *Lancet*, **i**, 357–359.

HANNA, A. J. (1960). **The Story of Nyasaland and Rhodesia.** Faber, London.

HENNING, M. W. (1956). **'Animal diseases in South Africa'.** *Central News Agency*, Johannesburg, 3rd edition.

HUTCHEON, D. (1897.) 'Special report on rinderpest in South Africa'. Government Printers Cape Town (Bound in *Cape of Good Hope Rinderpest Reports*, Central Vet. Lab., Weybridge).

HUTCHEON,D. (1898). 'Inoculation for rinderpest'. *Veterinarian*, **71**, 656–674.

HUTCHEON, D. (1899*a*). 'Serum treatment for rinderpest'. *Veterinarian*, **72**, 260–269.

HUTCHEON, D. (1899*b*). 'Rinderpest'. Reprinted from *Landbouw Journal*, 8 June 1899. (Bound in *Cape of Good Hope Rinderpest Reports*, Central Vet. Lab., Weybridge).

HUTCHEON, D. (1902). 'Rinderpest in South Africa. A short description of its history, general characters and methods of treatment'. Government Printers, Cape Town.

KIRK, J. (1896). 'African rinderpest'. *Nature*, **55**, 53.

KOCH, R. (1898). 'Reise-Bericht über Rinderpest, Bubonpest in Indian und Afrika, Tsetse- oder Surrakrankheit, Texasfieber, tropische Malaria, Schwarzwasserfieber'. Julius Springer, Berlin. (Royal Society of Medicine Library.)

KOHLSTOCK, P. & EDINGTON, A. (1897). Reports by Dr Kohlstock and Dr Edington giving results of experiments made by them of preventive inoculation against rinderpest. Cape Times Printing Works, Cape Town. (Bound in *Cape of Good Hope Rinderpest Reports*, Central Vet. Lab., Weybridge.)

KOLLE, K. (1959). Robert Koch: Briefe an Wilhelm Kolle. Georg Thieme, Stuttgart. (Wellcome Historical Medical Library).

KOLLE, W. (1898). 'Weitere Studien über Immunität bei Rinderpest'. *Deutsche Medizinische Wochenschrift*, no. **25**, p. 396.

KOLLE, W. (1899). Beitrag zur Klärung der Frage über die Wirkungsweise der Rinderpestgalle. *Zeitschrift fur Hygiene*, **30**, 32–46.

KOLLE, W. & TURNER, G. (1897). Über den Fortgang der Rinderpestforschungen in Koch's Versuchsstation in Kimberley (dated 23. ix. 97). *Deutsche Medizinische Wochenschrift*, **23**, 793–795 & 818–821.

KOLLE, W. & TURNER, G. (1898). Ueber Schutzimpfung and Heilserum bei Rinderpest. *Zeitschrift fur Hygiene*, **29**, 309–376.

MABERLY, J. (1898). 'The rinderpest in S. Africa', *Lancet* **ii**, 1189–1192.

THEILER, A. (1897). 'Rapport in zake onderzoekingen volgens oprdacht der HEd. Regeering omtrent Runderpest. 30 Juni 1897. Gouvernements-Veearts, Pretoria (CBAH reprint collection).

THEILER, A. (1897). 'I. Rinderpest in Süd-Afrika. II. Experimentelle Studien über Rinderpest. *Schweizer Archiv fur Tierheilkunde*, **39**, 49–62 & 193–213.

THEILER, A. (1898). 'Blutserum immuner Thiere im Kampfe gegen die Rinderpest.' *Deutsche Tierärztliche Wochenscrifte*, **6**, 205–208.

THEILER, A. (1902).'Das Wiedererscheinen der Rinderpest und die Erfolge der Schutzimpfung in Südafrika'. *Monatshefte fur praktische Tierheilkunde*, **13**, 145–161.

TURNER, G. & KOLLE, W. (1898). Report on the cure and prevention of Rinderpest. Cape of Good Hope Dept. of Agriculture, Capetown.

TURNER, G. (1905). 'Rinderpest.' Paper read before the British Association Meeting in Johannesburg. (CBAH reprint collection).

VERNEY, F. A. (1898). 'The rinderpest in South Africa'. *Journal of Comparative Pathology and Therapeutics*, **11**, 95–103.

WATKINS-PITCHFORD, H. (1897). Report on rinderpest investigations in the Transvaal. *Veterinarian* **70**, 530–535.

ANON. (1896). Proclamaties betreffende de runderpest. Staatsdrukkerij van de Z. -A. Republiek.

ANON (1928). Alexander Edington. *Journal of the Medical Association of South Africa*, **2**, 392.

CAPE OF GOOD HOPE DEPT. OF AGRICULTURE (1897). Rinderpest conference held at Mafeking, April 1896; Rinderpest conference held at Vryburg, August 1896. (Bound in 'Cape of Good Hope Rinderpest Reports' Central Vet. Lab., Weybridge).

CAPE OF GOOD HOPE (1898). Fort Beaufort rinderpest inquiry. Evidence taken by the commission. (Bound in 'Cape of Good Hope Rinderpest Reports' Central Vet. Lab., Weybridge).

SOUTH AFRICAN REPUBLIC (1898). Report on the International Rinderpest Congress held at Pretoria from the 2nd to the 13th August 1897. Staatsdrukkerij, Pretoria.

The Great African Cattle Plague Epidemic of the 1890's.

La grande epidemie de peste bovine du betail Africain de 1890.

Résumé—On rapporte ici des détails historiques de cette épidémie de peste bovine, avec des références à des documents peu connus ou non publiés.

La gran epidemia Africana de la peste bovina del año 1890.

Sumario—Se dan detalles históricos de la epidemia de peste bovina haciendo referencia a algunos documentos muy poco conocidos y sin publicación previa.