TABLE 2 (*a*).—*Protophyta* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Borrelia theileri	Arachnida Acarida Ixodidae	*Boophilus decoloratus* (Koch)	Blue tick.....	Enzootic	+	+	+	+	+	+	Theiler, 1905, 1906*b*; 1906*c*; Bedford, 1932
		Rhipicephalus evertsi Neum.	Red-legged tick..	Enzootic	+	+	+	+	+	°	Theiler, 1909*b*; Bedford, 1932
Leptospira icterohaemorrhagiae (Inada and Ido, 1916) Noguchi, 1917 Weil's disease	Hominidae...	*Homo sapiens* Linn.	Man.....	Sporadic	°	+	°	+	°	°	Cooper, 1953; Gear & Wolstenholme, 1960, 1961
	Canidae.....	*Canis familiaris* Linn.	Dog.....	Sporadic	°	°	°	+	°	°	Brownlie, 1953
Leptospira canicola Schüffner, 1934.	Hominidae...	*Homo sapiens* Linn.	Man.....	Sporadic	°	+	°	°	°	°	Gear & Wolstenholme, 1957, 1958, 1959, 1960, 1961; Gear, Wolstenholme, Jackson, Chesler & Brueckner, 1958
	Canidae.....	*Canis familiaris* Linn.	Dog.....	Sporadic	°	+	°	°	°	°	Malherbe & Kaschula, 1953; Brownlie, 1953
	Caviidae.....	*Cavia porcellus* Linn.	Guinea-pig.....	Lab. Tests	°	+	°	°	°	°	Malherbe & Kaschula, 1953
	Muridae.....	*Mus musculus* Linn.	Mouse.....	Lab. Tests	°	+	°	°	°	°	Malherbe & Kaschula, 1953
Leptospira pomona Derrick, 1942	Hominidae...	*Homo sapiens* Linn.	Man.....	Sporadic	°	+	°	°	°	°	Gear & Wolstenholme, 1960, 1961
Mycoplasmatales Mycoplasmataceae *Mycoplasma gallinarum* Freundt, 1955.	Aves Galliformes Phasianidae	*Gallus domsticus* Linn.	Fowl.....	Enzootic	+	+	+	+	+	?	Coles & Cumming, 1959; Abrams, 1961
	Meleagridae..	*Meleagris gallopavo* Linn.	Turkey.....	Enzootic	+	+	+	+	+	°	Coles & Cumming, 1959; Abrams, 1961
Chronic respiratory disease of poultry	Anseriformes Anatidae	*Anas platyryncha* Linn.	Duck.....	Enzootic	+	+	+	+	+	°	Coles & Cumming, 1959; Abrams, 1961

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

Class: Microtatobiotes

Order: Rickettsiales

Family: Rickettsiaceae

Rickettsia prowazeki is louse-borne and occurs exclusively in man who develops a premunity after recovery. It is not listed as a zoonosis but is included in this discussion to record the susceptibility of certain gerbilles which can be easily raised in captivity. These wild rodents are not only of great value for laboratory studies but have also been used for the production of vaccine for the immunization of man against epidemic typhus. This prophylactic measure has been supplemented by the control of human lice with insecticides.

R. typhi is flea-borne and is maintained by rats in nature. Man and rodents develop a premunity after recovery from murine typhus. It will be noticed from the listed information that the same *Tatera* spp. used for epidemic typhus investigations also proved to be of great value for studies on murine typhus. These gerbilles have also been employed for vaccine production for the immunization of man. Rat control with dicumarol compounds and the application of insecticides for the destruction of fleas have proved to be satisfactory for reducing the incidence of murine typhus.

R. conorii is responsible for tick-bite fever in man. At least seven ixodid ticks have been found to harbour this infectious agent which is transmitted transovarially. Laboratory tests have shown that the dog, laboratory animals and several wild rodents are susceptible. As in the case of the two previously mentioned *Rickettsia* spp. the *Tatera* spp. have been used for vaccine production for the immunization of man. Although the sheep is susceptible to *R. conorii*, it cannot be maintained in this species by serial passage.

Natural infections have been established in the black rat, vlei rat and striped mouse. Consideration of the extensive distribution of tick-bite fever in South Africa, and of the wide host range of the vecting ticks, suggests that there may be many more mammalian reservoirs of *R. conorii* than identified so far.

Coxiella burnetii is responsible for Q fever, and has a world-wide distribution. Its presence in South Africa was established in 1950. Natural infections have been established in man, ox and wild-caught rodents. Although transmission may result from tick bites, the inhalation of infected vector faeces or the ingestion of contaminated milk are also known to produce this disease. In man it is usually an occupational disease, particularly in abattoirs.

The vecting ticks in South Africa still need to be determined. Their identification would make it possible to compare the sylvatic with the urban Q fever cycle.

Ehrlichia canis is known to be transmitted by the kennel tick. Its existence in dogs was first recorded in the Kruger National Park (Eastern Transvaal). It is believed to have been the cause of high mortality in the Cape hunting dog [*Lycaon pictus* (Temminck)] in this game reserve. This species is also susceptible to *Babesia canis*. In dogs malignant canine rickettsiosis is often encountered in association with biliary fever, and this makes it difficult to determine the virulence of the *E. canis* strain. The recorded case in the black-backed jackal suffered from a mixed infection which terminated fatally.

Cowdria ruminantium is still responsible for serious losses in domestic ruminants. Successful stock-farming is possible provided immunization and timely treatment of affected animals are practised. The vecting tick (*Amblyomma hebraeum*) is widely distributed in the Transvaal, Natal and Eastern Cape Province. In contradistinction to other rickettsial diseases transovarial transmission does not occur in the vector. Convincing evidence has been brought forward that heartwater can maintain itself in nature in the complete absence of domestic ruminants. Certain antelopes are known to be susceptible. A few fatal cases have been diagnosed in springbuck in its natural habitat, the Springbuck Flats in the Northern Transvaal.

Family: Chlamydiaceae

Miyagawanella psittaci has been encountered in a few parrots and several budgerigars but not in man.

M. ornithosis appears to be a fairly common infection in domestic pigeons but no cases have been recorded in human beings.

Family: Bartonellaceae

Eperythrozoon ovis is widely distributed in sheep. This parasite is suspected to be louse-borne. Experimental evidence is available that the blesbuck and eland are susceptible. The host specificity of blood-sucking lice indicates that transmission in nature would not, if at all, take place readily from one susceptible species to another.

Family: Anaplasmataceae

Anaplasma marginale is prevalent in cattle in the blue tick infested regions and is known to cause severe losses. Artificially infected sheep developed a submicroscopic infection while the three artificially infected antelopes showed a low grade parasitaemia. Although natural infections have not yet been observed in antelopes it is suspected that they can serve as reservoirs.

A. centrale causes benign anaplasmosis. Although this parasite is widely distributed following either the transmission by the blue tick or the artificial infection by the administration of anaplasmosis vaccine (citrated blood harbouring *A. centrale*) it is not often seen in the numerous blood smears from sick or dead cattle submitted at regional veterinary laboratories. The blesbuck develops an inapparent infection. The role played by antelopes as reservoirs in nature still needs to be determined.

A. ovis is widely distributed, and causes a relatively mild disease in sheep and goats. An artificially infected splenectomized blesbuck developed a fairly high grade blood parasitaemia. An entire eland showed a very low parasitaemia after receiving infective blood. Their role as natural reservoirs is unknown.

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TABLE 2 (*b*).—*Protophyta*

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Microtatobiotes Rickettsiales Rickettsiaceae *Rickettsia prowazeki* Da Rocha Lima, 1916.	Mammalia Primates Hominidae	*Homo sapiens* Linn.	Man.....	Endemic	+	+	+	+	+	°	Girdwood & Girdwood, 1909–1910; Mitchel, 1917; Pijper & Dau, 1931, 1933, 1934, 1935; Rhodes, 1934; Gear, De Meillon & Davis, 1944; Gear, 1938; Gear & Murray, 1947
					°	°	°	°	°	+	Helman, 1935
Epidemic typhus Louse typhus	Rodentia Caviidae	*Cavia porcellus* Linn.	Guinea-pig.....	Lab. Tests	°	+	°	°	°	°	Pijper & Dau, 1931, 1934; Gear, 1938
					°	°	°	+	°	°	Finlayson & Grobler, 1940
	Muridae.....	*Mus musculus* Linn.	Albino mouse....	Lab. Tests	°	°	°	+	°	°	Finlayson & Grobler, 1940
		Rattus norvegicus (Berkenhout)	Albino rat.....	Lab. Tests	°	°	°	+	°	°	Finlayson & Grobler, 1940
	Gerbillidae...	*Desmodillus* sp.	Gerbille.....	Lab. Tests	°	+	°	°	°	°	Gear & Davis, 1942*a*
		Tatera afra (Gray)	Gerbille.....	Lab. Tests	°	+	°	°	°	°	Gear & Davis, 1942*a*, 1942*b*; Gear, Harris & Saner, 1942
		Tatera brantsii (A. Smith)	Gerbille.....	Lab. Tests	°	+	°	°	°	°	Gear & Davis, 1942*a*, 1942*b*; Gear, Harris & Saner, 1942
	Aves Galliformes Phasianidae	*Gallus domesticus* Linn.	Chick embryo....	Lab. Tests	°	+	°	°	°	°	Ordman, 1941; Gear, 1941, 1944; Bevan, 1944; Berkowitz, 1946
	Insecta Siphunculata Pediculidae	*Pediculus humanus* var. *humanus* Linn.	Body louse.....	Endemic	+	+	+	+	+	+	Gear, De Meillon & Davis, 1944
		Pediculus humanus var. *capitis* De Geer	Head louse								

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

TABLE 2 (*b*).—*Protophyta* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Rickettsia typhi (Wolbach and Todd, 1920) (= *Rickettsia prowazeki* var. *mooseri* Pinkerton, 1936).	Hominidae...	*Homo sapiens* Linn.	Man.....	Endemic	+	+	+	+	+	°	Scroggie, 1931; Cawston, 1932; Maister & Miller, 1931; Rhodes, 1934; Pijper & Dau, 1933, 1934; Gear & De Meillon, 1939; Ann. Rep. S.A.I.M.R., 1951–1957
Murine typhus Rat typhus	Artiodactyla Bovidae	*Ovis aries* Linn.	Sheep.....	Lab. Tests	°	+	°	°	°	°	Mason & Alexander, 1939
	Carnivora Canidae	*Canis familiaris* Linn.	Dog.....	Lab. Tests	°	+	°	°	°	°	Mason & Alexander, 1939
	Rodentia Caviidae	*Cavia porcellus* Linn.	Guinea-pig.....	Lab. Tests	°	+	°	°	°	°	Pijper & Dau, 1933; Gear & De Meillon, 1939; Mason & Alexander, 1939; Finlayson & Grobler, 1940
	Muridae.....	*Rattus norvegicus* (Berkenhout).	Brown rat.....	Endemic	°	+	°	+	°	°	Pijper & Dau, 1933; Gear & De Meillon, 1939; Gear, De Meillon & Davis, 1944; Finlayson & Grobler, 1940
			Albino rat.....	Lab. Tests	°	+	°	+	°	°	Mason & Alexander, 1939; Finlayson & Grobler, 1940; Gear & Davis, 1942; Osburn, 1946
		Rattus rattus Linn.	Black rat.....	Endemic	+	+	+	+	+	°	Harrington & Young, 1944; Ann. Rep. S.A.I.M.R., 1951–1957

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

TABLE 2 (*b*).—*Protophyta* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Rickettsia typhi	Gerbillidae...	*Desmodillus* sp.	Gerbille.....	Lab. Tests	°	+	°	°	°	°	Gear & Davis, 1942*a*
		Tatera afra (Gray)	Gerbille.....	Lab. Tests	°	+	°	°	°	°	Gear & Davis, 1942*a*, 1942*b*
		Tatera brantsii (A. Smith)	Gerbille.....	Lab. Tests	°	+	°	°	°	°	Gear & Davis, 1942*a*, 1942*b*
	Aves Phasianidae	*Gallus domesticus* Linn.	Chick embryo....	Lab. Tests	°	+	°	°	°	°	Alexander & Mason, 1939; Bevan, 1944; Berkowitz, 1946
	Insecta Siphonaptera Pulicidae	*Xenopsylla cheopis* (Rotsch.)	Rat flea.....	Endemic	+	+	+	+	+	°	Gear & De Meillon, 1939
Rickettsia conorii Brumpt, 1932 (=*Dermacentroxenus rickettsi* var. *pijperi* Mason and Alexander, 1939)	Hominidae...	*Homo sapiens* Linn.	Man.....	Endemic	+	+	+	+	+	°	Pijper & Dau, 1930*a*, 1930*b*, 1931*a*, 1931*b*, 1934; Troup, McDonald, Camband & Pijper, 1931; Gear & Bevan, 1936; Gear, 1939
Tick-bite fever...	Bovidae.....	*Ovis aries* Linn.	Sheep.....	Lab. Tests	°	+	°	°	°	°	Mason & Alexander, 1939
	Canidae.....	*Canis familiaris* Linn.	Dog.....	Lab. Tests	°	+	°	°	°	°	Alexander, Mason & Neitz, 1939; Alexander & Mason, 1939; Mason & Alexander, 1939
	Caviidae.....	*Cavia porcellus* Linn.	Guinea-pig.....	Lab. Tests	°	+	°	°	°	°	Pijper & Dau, 1930*a*, 1931*a*; Alexander & Mason, 1939; Mason & Alexander, 1939; Gear & Bevan, 1936
					°	°	°	+	°	°	Finlayson, Grobler & Smithers, 1940

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

TABLE 2 (*b*).—*Protophyta* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Rickettsia conorii	Muridae.....	*Mus musculus* Linn.	Albino mouse....	Lab. Tests	°	°	°	+			Finlayson, Grobler & Smithers, 1940
		Rattus norvegicus (Berkenhout)	Albino rat.....	Lab. Tests	° °	+ °	° °	° °	° +	° °	Mason & Alexander, 1939 Finlayson, Grobler & Smithers, 1940
		Rattus rattus Linn.	Black rat.....	Endemic	°	+	°	°	°	°	Gear *et al.*, 1951–1957
		Rhabdomys pumilio (Sparrman)	Cape striped field mouse	Endemic	°	+	°	°	°	°	Wolstenholme & Harwin, 1951, 1952
	Gerbillidae...	*Desmodillus* sp.	Gerbille.....	Lab. Tests	°	+	°	°	°	°	Gear & Davis, 1942*a*
		Tatera afra (Gray)	Gerbille.....	Lab. Tests	°	+	°	°	°	°	Gear & Davis, 1942*a*, 1942*b*; Bevan, 1944
		Tatera brantsii (A. Smith)	Gerbille.....	Lab. Tests	°	+	°	°	°	°	Gear & Davis, 1942*a*, 1942*b*; Bevan, 1944
	Otomyidae...	*Otomys irroratus* (Brants)	Vlei rat.....	Endemic	°	+	°	°	°	°	Wolstenholme & Harwin, 1951, 1952
	Aves Phasianidae	*Gallus domesticus* Linn.	Chick embryo....	Lab. Tests	°	+	°	°	°	°	Alexander & Mason, 1939; Mason & Alexander, 1939; Bevan, 1944; Berkowitz, 1946
	Archnida Acarida Argasidae	*Ornithodoros moubata* (Murray).	Eyeless tampan (not a vector)	Lab. Tests	°	+	°	°	°	°	Gear, 1942

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ABLE 2 (*b*).—***Protophyta*** (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Rickettsia conorii	Ixodidae.....	*Amblyomma hebraeum* Koch.	Bont tick.....	Lab. Tests	°	+	°	°	°	°	Brumpt, 1927
		Boophilus decoloratus (Koch)	Blue tick.....	Lab. Tests	°	+	°	°	°	°	Brumpt, 1927
		Haemaphysalis leachi (Audouin).	Yellow dog tick..	Lab. Tests	°	+	°	°	°	°	Gear & Douthwaite, 1938; Gear & De Meillon, 1939
		Hyalomma rufipes Koch	Stripe-legged tick	Lab. Tests	°	+	°	°	°	°	Neitz & Du Toit, 1938
		Hyalomma sp.	Stripe-legged tick	Lab. Tests	°	°	°	+	°	°	Finlayson, Grobler & Smithers, 1940
		Rhipicephalus appendiculatus Neum.	Brown ear tick..	Lab. Tests	°	+	°	°	°	°	Pijper & Dau, 1934
		Rhipicephalus sanguineus (Latreille).	Dog tick.....	Lab. Tests	°	+	°	°	°	°	Neitz, Alexander & Mason, 1941
Coxiella burnetii (Derrick, 1939) (=*Rickettsia burneti* Derrick, 1939.	Hominidae...	*Homo sapiens* Linn.	Man.....	Endemic	+	+	+	+	+	°	Gear, 1949; Gear, Wolstenholme & Carr, 1950; Saner, & Fehler, 1950; Gear *et al.*, 1950–1961
" Q fever ".....	Bovidae.....	*Bos taurus* Linn.	Cow (Milk tested)	Endemic	+	+	+	°	°	°	Wolstenholme, 1950
	Caviidae.....	*Cavia porcellus* Linn.	Guinea-pig.....	Lab. Tests	°	+	°	°	°	°	Wolstenholme, 1950, 1952
	Muridae.....	*Rattus rattus* Linn.	Black rat.....	Endemic	°	+	°	°	°	°	Wolstenholme, 1960
		Otomys irroratus (Brants).	Vlei rat.....	Endemic	°	+	°	°	°	°	Wolstenholme, 1952
		Rhabdomys pumilio (Sparrman)	Cape striped field mouse	Endemic	°	+	°	°	°	°	Wolstenholme, 1952

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TABLE 2 (*b*).—*Protophyta* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Ehrlichia canis (Donatien and Lestoquard, 1935) (=*Rickettsia canis* Donatien and Lestoquard, 1935). Malignant canine rickettsiosis	Canidae.....	*Canis familiaris* Linn.	Dog.....	Enzootic	°	+	°	°	°	°	Neitz & Thomas, 1938; Neitz, 1939; Malherbe, 1947, 1948
		Thos mesomelas (Schreber).	Black-backed jackal	Lab. Tests	°	+	°	°	°	°	Neitz & Thomas, 1938; Neitz & Steyn, 1947
	Ixodidae.....	*Rhipicephalus sanguineus* (Latreille).	Dog tick.....	Lab. Tests	°	+	°	°	°	°	Neitz, 1943
Cowdria ruminantium (Cowdry, 1925) (=*Rickettsia ruminantium* Cowdry, 1925) Heartwater.....	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	°	+	+	+	+	°	Cowdry, 1925; Alexander, 1931
		Capra hircus Linn.	Goat.....	Enzootic	°	+	+	+	+	°	Cowdry, 1925; Alexander, 1931
		Ovis aries Linn.	Sheep.....	Enzootic	°	+	+	+	+	°	Cowdry, 1925; Alexander, 1931
		Antidorcas marsupialis (Zimmermann).	Springbuck.....	Enzootic	°	+	°	°	°	°	Neitz, 1944
		Connochaetes gnou (Zimmermann)	Black wildbeest, gnu	Lab. Tests	°	+	°	°	°	°	Neitz, 1935
		Damaliscus albifrons (Burchell).	Blesbok.....	Lab. Tests	°	+	°	°	°	°	Neitz, 1933, 1935, 1937
		Taurotragus oryx (Pallas).	Eland.....	Lab. Tests	°	+	°	°	°	°	Grosskopf, 1958
	Carnivora....	*Mustela eversmanni furo* Linn.	Ferret.....	Lab. Tests	°	+	°	°	°	°	Mason & Alexander, 1940
	Ixodidae.....	*Amblyomma hebraeum* Koch.	Bont tick.....	Enzootic	°	+	+	+	+	°	Lounsbury, 1900; Cowdry, 1925*b*; Alexander, 1931; Theiler, 1948

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S .= South West Africa.

TABLE 2 (*b*).—*Protophyta* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Chlamydiaceae *Miyagawanella psittaci* (Lillie, 1930) Moshkovsky, 1945 (= *Rickettsia psittaci* Lillie, 1930). Psittacosis.....	Hominidae...	*Homo sapiens* Linn.	Man.....	—	°	°	°	°	°	°	No cases recorded
	Aves Psittacidae	*Melopsittacus undulatus* Shaw.	Budgerigar.....	Sporadic	°	+	°	°	°	°	Coles, 1944*a*
		Psittacus erithacus Linn.	Parrot.....	Sporadic	°	+	°	°	°	°	Coles, 1944*b*; Abrams, 1964
	Muridae.....	*Mus musculus* Linn.	Albino mouse....	Lab. Tests Intraperit	°	+	°	°	°	°	Coles, 1944*a*, 1944*b*
Miyagawanella ornithosis Rake, 1948. Ornithosis	Hominidae...	*Homo sapiens* Linn.	Man.....	—	°	°	°	°	°	°	No cases recorded
	Aves Columbidae	*Columba livia* (Gmel.).	Domestic pigeon	Enzootic	+	+	°	+	°	°	Coles, 1940, 1943, 1944*b*, 1951, 1956; Abrams, 1964
	Muridae.....	*Mus musculus* Linn.	Albino mouse....	Lab. Tests Intracereb.		+					Coles, 1940, 1943, 1944*b*, 1951, 1956
Bartonellaceae *Eperythrozoon ovis* Neitz, Alexander and Du Toit, 1934.	Bovidae.....	*Ovis aries* Linn.	Sheep.....	Enzootic	+	+	+	+	+	°	Neitz, Alexander & Du Toit, 1934; Neitz, 1937
		Damaliscus albifrons (Burchell).	Blesbuck.....	Lab. Tests	°	+	°	°	°	°	Neitz, 1939
Ovine eperythrozoonosis		*Taurotragus oryx* (Pallas).	Eland.....	Lab. Tests	°	+	°	°	°	°	Enigk, 1942
Anaplasmataceae *Anaplasma marginale* Theiler, 1910.	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	+ °	+ °	+ °	+ °	+ °	° +	Theiler, 1911; Spreull, 1909 Leipziger, 1910; Schmid, 1920
Malignant bovine anaplasmosis Gallsickness		*Ovis aries* Linn.	Sheep.....	Lab. Tests	°	+	°	°	°	°	Neitz & Du Toit, 1932
		Connochaetes gnou (Zimmermann).	Black wildebeest..	Lab. Tests	°	+					Neitz, 1935

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

TABLE 2 (*b*).—*Protophyta* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Anaplasma marginale	Bovidae.....	*Damaliscus albifrons* (Burchell).	Blesbuck.....	Lab. Tests	°	+	°	°	°	°	Neitz & Du Toit, 1932
		Sylvicapra grimmia (Linn.).	Duiker.....	Lab. Tests	°	+					Neitz & Du Toit, 1932
	Ixodidae.....	*Boophilus decoloratus* Koch.	Blue tick.....	Enzootic	+	+	+	+	+	+	Theiler, 1912; Theiler, G., 1949, 1962
		Rhipicephalus simus Koch.	Black-pitted tick	Enzootic	+	+	+	+	+	+	Theiler, 1912; Theiler, 1962
Anaplasma centrale Theiler, 1911.	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	+ °	+ °	+ °	+ °	+ °	° +	Theiler, 1911; Robinson, 1919 Div. Agric. S.W.A., 1930–1964
Benign bovine anaplasmosis		*Damaliscus albifrons* (Burchell)	Blesbuck.....	Lab. Tests	°	+	°	°	°	°	Neitz & Du Toit, 1932
	Ixodidae.....	*Boophilus decoloratus* Koch	Blue tick.....	Enzootic	+	+	+	+	+	+	Theiler, 1912; Theiler, G., 1962
Anaplasma ovis Lestoquard, 1924.	Bovidae.....	*Ovis aries* Linn.	Sheep.....	Enzootic	+	+	+	+	+	°	De Kock & Quinlan, 1926; Neitz, 1964
Ovine and caprine anaplasmosis		*Capra hircus* Linn.	Goat.....	Lab. Tests	°	+	°	°	°	°	De Kock & Quinlan, 1926; Neitz, 1964
		Damaliscus albifrons (Burchell).	Blesbuck.....	Lab. Tests	°	+	°	°	°	°	Neitz, 1939
		Taurotragus oryx (Pallas).	Eland.....	Lab. Tests	°	+	°	°	°	°	Enigk, 1942

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

(C) THALLOPHYTA

Members of the phylum Thallophyta, responsible for zoonoses in South Africa, are included in the classes Ascomycetes and Fungi Imperfecti. The former class is represented by a single and the latter by eleven species. The *Nocardia* sp. and *Actinomyces* spp., which are included by Tunder (1961) in the phylum Thallophyta, have been listed with the Protophyta in the order Actinomycetales in Table 2 (*a*).

Fungi causing superficial mycoses are mainly anthropophilic or zoophilic parasites, while a few are geophilic organisms which can maintain themselves in nature in the complete absence of mammalian hosts. Fungi responsible for systemic mycoses are in most instances in soil or on vegetation, and share this habitat with non-pathogenic fungi. Infection in man and animals depends upon incidental contact with the pathogens in their natural environment. Superficial mycoses rarely terminate in death while systemic mycoses are often fatal.

Consideration of the information listed in the subjoined Table 3, makes it apparent that studies on human infections have received more attention than those of animals. This becomes evident when the animal host range of certain *Trichophyton* spp., *Sporotrichum* spp. and *Microsporum* spp. is taken into account. It is anticipated that further investigations will reveal additional mammalian hosts besides those already recorded in South Africa.

Class: Ascomycetes

Order: Endomycetales

Family: Coccidioidaceae

Rhinosporidium seeberi infections occur sporadically in human beings and horses. In man lesions appear in the form of granulomas on the conjunctiva and nasal mucosa but in horses they occur only on the nasal mucous membrane. Their surgical removal was followed by recovery.

Class: Fungi Imperfecti

Order: Moniliales

Family: Moniliaceae.

Aspergillus fumigatus outbreaks, resulting in serious losses, have been recorded so far only in birds. This organism has a wide distribution in nature. Young ostriches, chickens and turkey poults often contract pneumonia and air sac infections when exposed to contaminated bedding in brooders. Captive penguins, particularly the King variety, are prone to develop fatal aspergillosis in zoological gardens.

Histoplasma capsulatum has been encountered quite often in either the benign or malignant form in human beings after their exposure to the geophilic organism in caves. The affected dog, listed in Table 3, derived its infection before it was introduced into South Africa. The indigenous white-tailed rat has been shown to be highly susceptible and should, therefore, serve as a useful laboratory animal.

Trichophyton mentagrophytes is responsible for dermatomycosis (ringworm) in man, domestic solipeds and ruminants and a variety of rodents. In South Africa natural infections have been diagnosed only in man. Recent investigations have shown that exposure of a monkey, guinea-pig, mouse and rabbit in a cave in the Transvaal resulted in infection. This event has illustrated that at least some strains, if not all, possess geophilic affinities (Lurie & Way, 1957).

T. gypseum is known to cause sporadic ringworm in man, dogs and cats. In South Africa, it has been recorded only in a horse.

T. equinum is regarded primarily as a zoophilic parasite and is generally believed to be the chief cause of equine dermatomycosis. In South Africa it appeared as an occupational disease in a man handling horses.

Sporotrichum beurmanni dermatomycosis has frequently been observed in human beings, particularly among labourers in mines. Timber parasitized by this fungus is often the source of infection.

S. schenkii has its habitat on plants. It has been described several times in human beings and once in a horse as the cause of dermatomycosis.

The *Sporotrichum* sp. recorded in a horse by Thorold (1951) has not been identified. It is listed for differential diagnostic reasons.

Microsporum canis is primarily a zoophilic parasite, and has been recorded from dogs, cats, sheep and monkeys. In South Africa, it has been diagnosed only in human beings but is suspected to cause also dermatomycosis in dogs and cats.

M. audouinii is an anthropophilic organism, and has been encountered in man suffering from epidemic ringworm of the scalp in South Africa. It has not yet been diagnosed in dogs and other animals.

M. gypseum is a geophilic organism. It has been diagnosed fairly frequently in man, and once in a monkey that had been exposed in a cave in Transvaal (Lurie & Way, 1957).

TABLE 3.—*Thallophyta*

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Ascomycetes Endomycetales Coccidioidaceae *Rhinosporidium seeberi* (Wernicke) Seeber, 1912 Rhinosporidiosis	Mammalia Primates Hominidae	*Homo sapiens* Linn.	Man.....	Sporadic	+	+	+	°	°	°	Simson & Strachan, 1937, 1939; Anon., 1937, 1939; Dick, 1951
	Perissodactyla Equidae	*Equus caballus* Linn.	Horse.....	Sporadic	°	+	°	°	°	°	Theiler, 1906; Quinlan & De Kock, 1928
Fungi Imperfecti Moniliales Moniliaceae *Aspergillus fumigatus* (Fresenius). Aspergillosis " Brooder pneumonia "	Aves Struthioniformes Struthionidae	*Struthio camelus* Linn.	Ostrich.....	Enzootic Lab. Tests	° °	° +	° °	° °	+ °	° °	Walker, 1915
	Sphenisciformes Spheniscidae	*Spheniscus demursus* Linn.	Jackass penguin..	Sporadic	°	+	°	°	°	°	Coles, 1951
		Aptenodites pathagonica Miller	King penguin....	Sporadic	°	+	°	°	°	°	Abrams, 1964
	Galliformes Phasianidae	*Gallus domesticus* Linn.	Fowl.....	Enzootic	°	+	°	°	°	°	Curson, 1921; Abrams, 1964
	Meleagridae..	*Meleagris gallopavo* Linn.	Turkey.....	Enzootic	°	+	°	°	°	°	Curson, 1964
Histoplasma capsulatum Darling Histoplasmosis	Hominidae...	*Homo sapiens* Linn.	Man.....	Sporadic	°	+	+	°	+	°	Simson & Barnetson, 1942; Lurie, 1949; Murray & Brandt, 1951; Mochi & Edwards, 1952; Jackson, 1952; Murray, Lurie, Kaye, Komins, Borok & Way, 1957; Klugman & Lurie, 1963; Wolpowitz & Van Eeden, 1963

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

TABLE 3.—*Thallophyta* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Histoplasma capsulatum	*Carnivora* Canidae	*Canis familiaris* Linn.	Dog.....	Sporadic	°	+	°	°	°	°	Smit, 1963
	Rodentia Muridae	*Mus musculus* Linn.	Mouse.....	Lab. Tests	°	+	°	°	°	°	Borok, 1960
		Mystomys albicaudatus (A. Smith).	White-tailed rat..	Lab. Tests	°	+	°	°	°	°	Borok, 1960
Trichophyton mentagrophytes (Robin) Blanchard, 1896.	Hominidae...	*Homo sapiens* Linn.	Man.....	Endemic	°	+	°	°	°	°	Anon., 1947–1961
		Zoological name not recorded	Monkey.....	Field tests	°	+	°	°	°	°	Lurie & Way, 1957
Dermatomycosis	Caviidae.....	*Cavia porcellus* Linn.	Guinea-pig.....	Field test	°	+	°	°	°	°	Lurie & Way, 1957
	Muridae.....	*Mus musculus* Linn.	Mouse.....	Field test	°	+	°	°	°	°	Lurie & Way, 1957
	Leporidae....	*Lepus cuniculus* Linn.	Rabbit.....	Field test	°	+	°	°	°	°	Lurie & Way, 1957
Trichophyton gypseum Bodin, 1902.	Equidae.....	*Equus caballus* Linn.	Horse.....	Sporadic	°	+	°	°	°	°	Jansen, 1953
Trichophyton equinum Gedoelst, 1902.	Hominidae...	*Homo sapiens* Linn.	Man.....	Sporadic	°	°	°	+	°	°	Marais & Olivier, 1963
Sporotrichum beurmanni Matruchot and Ramond, 1905. Sporotrichosis	Hominidae...	*Homo sapiens* Linn.	Man.....	Endemic	+	+	°	°	°	°	Pijper & Pullinger, 1927; Dangerfield & Gear, 1941; Du Toit, 1942; Neser, 1945; Anon., 1939, 1947, 1948; Anon., 1947

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TABLE 3.—*Thallophyta* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Sporotrichum schenkii Matruchot, 1910.	Hominidae...	*Homo sapiens* Linn.	Man.....	Endemic	+	+	°	°	°	°	Neser, 1946; Anon., 1951–1961; Loewenthal, 1959
	Equidae.....	*Equus caballus* Linn.	Horse.....	Sporadic	°	+	°	°	°	°	Robinson & Parkin, 1929
Sporotrichum sp.	Equidae.....	*Equus caballus* Linn.	Horse.....	Sporadic	°	+	°	°	°	°	Thorold, 1951
Microsporum canis (Bodin, 1902). Dermatomycosis	Hominidae...	*Homo sapiens* Linn.	Man.....	Endemic	+	+	°	°	°	°	Anon. 1950–1961; Neser, 1951
Microsporum audouinii (Gruby, 1843).	Hominidae...	*Homo sapiens* Linn.	Man.....	Endemic	°	+	°	°	+	°	Gray, 1935, 1936; Anon., 1947–1959
Microsporum gypseum (Guirat, 1928).	Hominidae...	*Homo sapiens* Linn.	Man.....	Sporadic	°	+	°	°	°	°	Anon., 1947–1955
		Zoological name not recorded	Monkey.....	Field test	°	+	°	°	°	°	Lurie & Way, 1957

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

(D) Protozoa

Members of the phylum Protozoa, causing zoonoses in South Africa, are listed in the appended Table 4. The classification used for these organisms is that proposed by Doflein & Reichenow (1952–1953). The class Mastigophora is represented by seven, Rhizopoda by one, Sporozoa by twelve and Ciliata by one species. Protozoa of undetermined position are listed with the Sarcosporidia and include *Sarcocystis* spp., *Besnoitia* spp. and *Toxoplasma gondii*. It will be seen that many of the recorded Protozoa have a wide host range, and that systematic studies have shown that both the *Babesia* spp. and *Theileria* spp., which were once believed to be host specific, are stenoxenous parasites.

The listed Protozoa, particularly the pathogenic *Trypanosoma* spp. and *Theileria* spp. have been responsible for serious losses. In the case of nagana chemotherapy, as a control measure, is at its best only palliative while in East Coast fever no specific remedies are available for curing affected animals. For this reason attention has been paid to the eradication of nagana vectors by chemical means, and to the prevention of ticks acquiring the infectious agent from reacting and recovered East Coast fever cattle. Spraying of the primary tsetse fly foci (Hluhluwe, Mkuzi and Umfolozi Game Reserves) with DDT and BHC aerosols from aeroplanes, and systematic dipping of cattle in arsenical dips together with quarantine measures and the slaughter of cattle on infected farms towards the end of the campaign, have been crowned with success. The chief vector of nagana (*Glossina pallidipes*) was eradicated completely thus eliminating the periodic epizootics in Zululand (Du Toit, 1954). East Coast fever was finally eradicated in 1954. These campaigns were state-aided, and the total costs, over a period of 50 years, were more than R100,000,000.

Class: Mastigophora

Order: Protomonadina

Family: Eumonadidae

Histomonas meleagridis produces black-head in turkeys. It is not responsible for a zoonosis in South Africa. Although the vector is widely distributed the disease occurs only sporadically.

Family: Trypanosomidae

Trypanosoma brucei is the first pathogenic trypanosome described in Zululand. It is highly pathogenic for horses and mules. Equine nagana has not been responsible for serious losses because the presence of horsesickness did not encourage their introduction on a large scale into Zululand.

Domestic and wild ruminants and the pig are highly resistant but dogs are very susceptible. The disease terminates fatally in artificially infected black-backed jackal, cats, rock rabbits, laboratory animals and the indigenous multimammate mouse.

T. congolense has been responsible for serious losses only in cattle. Small domestic ruminants, pigs and solipeds are highly resistant to the Zululand strains but fatal cases have been recorded in dogs. The disease terminates fatally in artificially infected domestic and wild carnivores, rock rabbits and laboratory animals. Natural infections have been encountered in apparently healthy zebras and antelopes.

T. simiae has been responsible for a few sporadic outbreaks in domestic pigs in Zululand. Two strains of different virulence have been isolated. The one strain produced a 90 per cent and the other a 10 per cent mortality when passaged in Large White pigs. The former strain has been maintained by serial passage for more than 600 generations in rabbits. Subinoculations at different passage levels showed that there was no decrease in its virulence for pigs.

T. vivax has not been responsible for serious losses in cattle. It has been determined by the writer that a splenectomized ox retained the infection for 10 years. Three antelopes and a warthog were found to harbour a natural infection. Sheep proved to be susceptible but *T. vivax* could not be demonstrated in artificially infected goats. All attempts to infect laboratory animals with the Zululand strains have failed.

T. equiperdum is still fairly widely distributed in South and South West Africa. Serological tests have shown that the incidence of dourine is higher in horses than in donkeys, and extremely low in mules. The infectious agent has been demonstrated microscopically in a naturally infected mare and a stallion.

It has been possible to infect guinea-pigs and rats with the local strain after changing its tissue affinity to that for blood by serial passages in solipeds.

Order: Polymastigina
Family: Tetramitidae

Trichomonas foetus has been diagnosed fairly frequently in cattle. It is not responsible for a zoonosis but is recorded in reply to the O.I.E. questionnaire.

Class: Rhizopoda
Order: Amoebina
Family: Amoebidae

Entamoeba histolytica is fairly prevalent in man in the south coastal regions of Natal. It appears that the nutritional state of individuals has a direct bearing on its pathogenicity. Unbalanced diets promote its virulence. The disease has also been encountered sporadically in inland regions. Its presence in the pig has been recorded once.

Class: Sporozoa
Order: Piroplasmidae
Family: Babesidae

Babesia bigemina is widely distributed in the blue tick infested regions. It has only been encountered in cattle. Attempts to infect the blesbuck, duiker, eland and black wildebeest have failed. Experimental observations by Enigk & Friedhoff (1963) have shown that the Sudanese gazelle (*Gazella soemmeringi* Cretzschmar) is susceptible. It is thus possible that indigenous antelopes, other than those tested, may serve as carriers.

Babesia bovis has a distribution similar to that of *B. bigemina*. It has only been recorded from cattle. Our knowledge about the stenoxenous properties of *Babesia* spp. suggests that the relationship between *B. bovis* and *B. irvinsmithi* be determined.

B. trautmanni has been recorded from pigs in the northern and south eastern Transvaal were wild pigs are known to occur. The demonstration of the susceptibility of the bush pig by Shone & Philip (1960) in Southern Rhodesia suggests that this species or the warthog could have served as the source of infection in the Transvaal.

B. caballi has been recorded from domestic solipeds and from a naturally infected zebra in the Eastern Transvaal.

B. equi is a common infection in domestic solipeds, and has been demonstrated several times in blood smears derived from zebras in Zululand.

B. canis is widely distributed in South Africa. In recent years its incidence has receded in urban areas where modern acaricides are applied for the control of vectors.

Natural infections have occurred at Onderstepoort, when black-backed jackals and Cape hunting dogs were exposed to a *Rhipicephalus sanguineus* infestation in a kennel.

B. felis has been diagnosed fairly frequently in domestic cats. It is suspected that wild cats serve as reservoirs of this protozoon.

Aegyptianella pullorum can be expected to occur in domestic fowls, ducks and geese when they are exposed on fowl tampan infested premises. It is difficult to assess its virulence in natural outbreaks because the vector is also responsible for the transmission of tick paralysis, which in uncomplicated cases often terminates fatally. The wide host range in domestic birds suggests that the relationship between *A. pullorum* and the *Aegyptianella* sp. of the jackass penguin be determined.

Family: Theileridae

Theileria parva has been responsible for serious losses in South Africa from 1902 to 1954. It has been possible to confirm the experiments conducted in Kenya that the African and Indian buffalo are susceptible.

T. mutans causes a benign disease unless complicated by brown tick toxicosis (Thomas & Neitz, 1958). It has been determined that after tick infestation sporozoites and schizonts will develop in sheep and goats. It still needs to be determined whether a submicroscopic infection of the endoglobular parasites will develop in these animals; a microscopic infection was not seen. The African buffalo can serve as a carrier of *T. mutans*.

T. lawrencei is restricted to localities frequented by the African buffalo. Outbreaks of Corridor disease involving either a few or several hundred head of cattle have been encountered along the borders of the Hluhluwe Game Reserve and Kruger National Park. The mortality rate varied from 50 to 80 per cent. Young buffalo calves may also die from this disease. In South Africa, Corridor disease is arrested by separation of cattle from buffaloes. The erection of a substantial fence on the boundary of the Kruger National Park has proved to be an effective control measure.

Sarcosporidia
(Parasites of undetermined position)

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Sarcocystis spp. have been found with almost regular monotony in skeletal muscles and myocardium of domestic ruminants, pigs and horses. Surveys have shown that they also occur in antelopes, wild carnivores and rodents. The source of the infection and the mode of transmission are unknown.

Although specific names have been assigned to many *Sarcocystis* spp., it is not clear whether all are valid species. This uncertainty is supported by the successful transmission of *S. tenella* to mice (Koegel, 1950). Most evidence favours their inclusion with the Protozoa but claims have been made that they may be fungi.

Besnoitia besnoiti is widely distributed in cattle in the Transvaal. Isolated cases have also been diagnosed in South West Africa. Clinically recognizable infections occur in about 10 per cent of cases. Depending upon the severity of the clinical manifestations bulls develop either a temporary or a permanent sterility. Sheep and goats develop an inapparent disease after an artificial infection but even then a temporary sterility occurs in rams and billy goats. An artificial or natural transmission by biting flies usually results in severe clinical symptoms in rabbits; guinea-pigs only contract an inapparent infection.

B. bennetti has been recorded in horses, mules and donkeys in the Transvaal but only in the former species in Natal and the Eastern Cape Province. Severe clinical manifestations have been recorded in a limited number of solipeds.

Toxoplasma gondii has an extremely wide host range. Clinical manifestations have been observed in man, dogs, black-backed jackals, a Cape hunting dog, ferrets and laboratory animals. The carrier state in the ox, pig, horse and donkey has been determined by serological tests.

Class: Ciliata

Order: Spirotricha

Family: Bursaridae

Balantidium coli occurs as a widely distributed but harmless intestinal infection in swine. It exerts its pathogenicity in man and usually appears as an occupational disease. Its presence has been recorded once in a vervet monkey.

TABLE 4.—*Protozoa*

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Mastigophora Protomonadina Eumonadidae *Histomonas meleagridis* (Smith, 1895). Black-head of turkeys	Aves Galliformes Meleagridae	*Meleagris gallopavo* Linn.	Turkey.....	Sporadic	+	+	+	+	+	°	Jowett, 1911; Coles, 1950; Abrams, 1964
	Nematoda Ascaroidea Heterakidae	*Heterakis gallinae* (Gmelin).	Common three-lipped poultry worm	Enzootic	+	+	+	+	+	°	Abrams, 1964
Trypanosomidae *Trypanosoma brucei* Plimmer and Bradford, 1899. Nagana	Mammalia Perissodactyla Equidae	*Equus caballus* Linn.	Horse.....	Sporadic	°	°	+	°	°	°	Bruce, 1895; Parkin, 1930*a*, 1931*a*
		Equus asinus Linn.	Donkey.....	Sporadic	°	°	+	°	°	°	Bruce, 1895
		E. caballus X *E. asinus*	Mule.....	Sporadic	°	°	+	°	°	°	Bruce, 1895
	Artiodactyla Bovidae	*Bos taurus* Linn.	Ox.....	Sporadic	°	°	+	°	°	°	Bruce, 1895
		Capra hircus Linn.	Goat.....	Lab. Tests	°	+	°	°	°	°	Theiler, 1901
		Ovis aries Linn.	Sheep.....	Lab. Tests	°	+	°	°	°	°	Theiler, 1901
		Gorgon taurinus (Burchell).	Blue wildebeest..	Sporadic	°	°	+	°	°	°	Bruce, 1895
		Raphicerus campestris (Thunberg).	Steenbuck.....	Sporadic	°	°	+	°	°	°	Bruce, 1895
		Redunca arundinum Bodaert.	Reedbuck.....	Sporadic	°	°	+	°	°	°	Bruce, 1895

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

TABLE 4.—*Protozoa* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Trypanosoma brucei	Bovidae.....	*Strepsiceros strepsiceros* (Pallas).	Kudu.....	Sporadic	°	°	+	°	°	°	Bruce, 1895
		Syncerus caffer (Sparrman).	African buffalo..	Sporadic	°	°	+	°	°	°	Bruce, 1895
		Tragelaphus scriptus (Pocock).	Bushbuck.....	Sporadic	°	°	+	°	°	°	Bruce, 1895
	Suidae.....	*Sus scrofa* Linn.	Domestic pig.....	Sporadic Lab. Tests	° °	° °	+ +	° °	° °	° °	Curson, 1928*a*
	Carnivora Canidae	*Canis familiaris* Linn.	Dog.....	Sporadic Lab. Tests	° °	° °	+ +	° °	° °	° °	Bruce, 1895
		Crocuta crocuta (Erxleben).	Spotted hyaena...	Sporadic	°	°	+	°	°	°	Bruce, 1895
		Thos mesomelas (Schreber).	Black-spotted jackal	Lab. Tests	°	+	°	°	°	°	Neitz, 1950
	Felidae.....	*Felis catus* Linn.	Domestic cat.....	Lab. Tests	°	°	+	°	°	°	Curson, 1928*a*
	Hyracoidea Procaviidae	*Procavia capensis* (Pallas).	Rock rabbit, hyrax	Lab. Tests	°	+	°	°	°	°	Neitz, 1950
	Rodentia Caviidae	*Cavia porcellus* Linn.	Guinea-pig.....	Lab. Tests	°	+	°	°	°	°	Parkin, 1930*b*
	Muridae.....	*Mastomys natalensis* (A. Smith).	Multimammate mouse	Lab. Tests	°	°	+	°	°	°	Curson, 1928*a*
		Mus musculus Linn.	Mouse.....	Lab. Tests	°	°	+	°	°	°	Curson, 1926, 1928*a*
		Rattus norvegicus (Berkenhout).	Albino rat.....	Lab. Tests	°	°	+	°	°	°	Curson, 1928*a*

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TABLE 4.—*Protozoa* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Trypanosoma brucei	Lagomorpha Leporidae	*Lepus cuniculus* Linn.	Rabbit.....	Lab. Tests	°	°	+	°	°	°	Curson, 1928*a*
	Insecta Diptera Muscidae	*Glossina austeni* Newst.	Tsetse fly.....	Enzootic	°	°	+	°	°	°	Curson, 1928*a*, Bedford, 1926; Du Toit, 1954
		Glossina brevipalpis Newst.	Tsetse fly.....	Enzootic	°	°	+	°	°	°	Curson, 1928*a*; Bedford, 1926; Du Toit, 1954
		Glossina pallidipes Aust.	Tsetse fly.....	Enzootic	°	°	+	°	°	°	Curson, 1928*a*; Bedford, 1926; Du Toit, 1954; Whitnall, 1932, 1934
Trypanosoma congolense Broden, 1904. Nagana	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	°	°	+	°	°	°	Theiler, 1909; Shilston, 1913; Curson, 1924, 1928*a*; Robinson, 1930; Parkin, 1930*a*, 1931*c*
		Capra hircus Linn.	Goat.....	Sporadic Lab. Tests	° °	° °	+ +	° °	° °	° °	Curson, 1928*a*
		Ovis aries Linn.	Sheep.....	Lab. Tests	° °	° +	+ °	° °	° °	° °	Curson, 1928*a* Parkin, 1931*b*
		Connochaetes gnou (Zimmermann).	Gnu, black wildebeest	Lab. Tests	°	+	°	°	°	°	Neitz, 1950
		Strepsiceros strepsiceros (Pallas)	Kudu.....	Sporadic	°	°	+	°	°	°	Neitz, 1931
		Taurotragus oryx (Pallas)	Eland.....	Sporadic	°	°	+	°	°	°	Harris, 1937
		Tragelaphus scriptus (Pocock).	Bushbuck.....	Sporadic	°	°	+	°	°	°	Neitz, 1931

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TABLE 4.—*Protozoa* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Trypanosoma congolense	Suidae.....	*Sus scrofa* Linn.	Domestic pig....	Sporadic Lab. Tests	° °	° °	+ +	° °	° °	° °	Curson, 1928*a*
	Equidae.....	*Equus caballus* Linn.	Horse.....	Sporadic	°	°	+	°	°	°	Curson, 1928*a*
		Equus asinus Linn.	Donkey.....	Sporadic	°	°	+	°	°	°	Curson, 1928*a*
		Equus burchelli (Gray).	Zebra.....	Sporadic	°	°	+	°	°	°	Neitz, 1931
	Canidae.....	*Canis familiaris* Linn.	Dog.....	Sporadic Lab. Tests	° °	° °	+ +	° °	° °	° °	Curson, 1928*a*
		Otocyon megalotis (Desmarest).	Long-eared fox..	Lab. Tests	°	+	°	°	°	°	Neitz, 1950
		Thos mesomelas (Schreber).	Black-backed jackal	Lab. Tests	°	+	°	°	°	°	Neitz, 1950
	Felidae.....	*Felis catus* Linn.	Domestic cat.....	Lab. Tests	°	°	+	°	°	°	Curson, 1928*a*
	Caviidae.....	*Cavia porcellus* Linn.	Guinea-pig.....	Lab. Tests	°	+	°	°	°	°	Robinson, 1930
	Muridae.....	*Mus musculus* Linn.	Mouse.....	Lab. Tests	°	+	°	°	°	°	Curson, 1926
		Rattus norvegicus (Berkenhout).	Albino rat.....	Lab. Tests	°	+	°	°	°	°	Robinson, 1930
	Procaviidae..	*Procavia capensis* (Pallas).	Rock rabbit.....	Lab. Tests	°	+	°	°	°	°	Neitz, 1950
	Insecta Diptera Muscidae	*Glossina austeni* Newst.	Tsetse fly.....	Enzootic	°	°	+	°	°	°	Curson. 1928*a*; Bedford, 1926; Du Toit, 1954

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

TABLE 4.—*Protozoa* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Trypanosoma congolense	Insecta Diptera Muscidae	*Glossina brevipalpis* Newst.	Tsetse fly.....	Enzootic	°	°	+	°	°	°	Curson, 1928*a*; Bedford, 1926; Du Toit, 1954
		Glossina pallidipes Aust.	Tsetse fly.....	Enzootic	°	°	+	°	°	°	Curson, 1928*a*; Bedford, 1926; Du Toit, 1954
Trypanosoma simiae Bruce *et al.*, 1911. Nagana.....	Suidae.....	*Sus scrofa* Linn.	Domestic pig.....	Sporadic	°	°	+	°	°	°	Kluge, 1945; Pettigrew, 1955
	Leporidae....	*Lepus cuniculus* Linn.	Rabbit.....	Lab. Tests	°	+	°	°	°	°	Neitz & Bigalke, 1956
Trypanosoma vivax Ziemann, 1905 Nagana.....	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic Lab. Tests	° °	° +	+ °	° °	° °	° °	Curson, 1921, 1924, 1928*a* Du Toit, 1929; Parkin, 1931*c*
		Ovis aries Linn.	Sheep.....	Lab. Tests	°	°	+	°	°	°	Curson, 1928*b*
		Strepsiceros strepsiceros (Pallas)	Kudu.....	Sporadic	°	°	+	°	°	°	Neitz, 1933
		Sylvicapra grimmia Linn.	Duiker.....	Sporadic	°	°	+	°	°	°	Curson, 1928*a*
		Tragelaphus scriptus (Pocock)	Bushbuck.....	Sporadic	°	°	+	°	°	°	Neitz, 1933
	Suidae.....	*Phacochoerus aethiopicus* (Pallas)	Warthog.....	Sporadic	°	°	+	°	°	°	Curson, 1928*a*
	Insecta Diptera Muscidae	*Glossina austeni* Newst.	Tsetse fly.....	Enzootic	°	°	+	°	°	°	Curson, 1928*a*; Bedford, 1926; Du Toit, 1954
		Glossina brevipalpis Newst.	Tsetse fly.....	Enzootic	°	°	+	°	°	°	Curson, 1928*a*; Bedford, 1926; Du Toit, 1954
		Glossina pallidipes Aust.	Tsetse fly.....	Enzootic	°	°	+	°	°	°	Curson, 1928*a*; Bedford, 1926; Du Toit, 1954

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TABLE 4.—*Protozoa* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Trypanosoma equiperdum Doflein, 1901. Dourine.....	Equidae.....	*Equus caballus* Linn.	Horse.....	Enzootic	+	+	+	+	+	+	Lyon, 1914; Andrews, 1916; Walker, 1918; Robinson, 1926; Van Rensburg, 1935; Parkin, 1948; Neitz, 1964
		Equus asinus Linn.	Donkey.....	Enzootic	+	+	+	+	°	+	Robinson, 1926; De Kock, Robinson & Parkin, 1939; Parkin, 1948; Neitz, 1964
		E. caballus X *E. asinus*	Mule.....	Sporadic	+	+	°	+	°	+	Robinson, 1926; De Kock, Robinson & Parkin, 1939; Parkin, 1948; Neitz, 1964
	Canidae.....	*Canis familiaris* Linn.	Dog.....	Lab. Tests	°	+	°	°	°	°	Walker, 1918; Parkin, 1948; Haig & Lund, 1948
	Rodentia Caviidae	*Cavia porcellus* Linn.	Guinea-pig.....	Lab. Tests	°	+	°	°	°	°	Haig & Lund, 1948
	Muridae.....	*Mus musculus* Linn.	Mouse.....	Lab. Tests	°	+	°	°	°	°	Haig & Lund, 1948
		Rattus norvegicus (Berkenhout).	Albino rat.....	Lab. Tests	°	+	°	°	°	°	Haig & Lund, 1948
	Lagomorpha Leporidae..	*Lepus cuniculus* Linn.	Rabbit.....	Lab. Tests	°	+	°	°	°	°	Haig & Lund, 1948
Polymastigina Tetramitidae *Trichomonas foetus* Riedmüller, 1928. Genital trichomoniasis	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	+	+	+	+	+	°	Robinson, 1937; 1946; Thorold, 1950

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TABLE 4.—*Protozoa* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Rhizopoda Amoebina Amoebidae *Entamoeba histolytica* Schaudinn, 1903. Amoebiasis	Primates Hominidae	*Homo sapiens* Linn.	Man.....	Sporadic	+	°	°	°	°	°	Barnetson, 1942–1943; Neser, 1944–1947
					°	°	+	°	°	°	Porter, 1917, 1928, 1930; Buchanan, 1935–1947; Anon., 1948–1953
					°	°	+	°	°	°	Elsdon-Dew, 1947, 1949, 1952, 1956, 1958; Elsdon-Dew, Horner & Cameron, 1946; Elsdon-Dew & Freedman, 1952; Elsdon-Dew & Maddison, 1952; Elsdon-Dew & Horner, 1958; Armstrong, Wilmot & Elsdon-Dew, 1949; Freedman, 1958
					°	°	°	?	°	°	?
					°	°	°	°	+	°	Gray, 1935–1941; Harrington 1942–1955
	Artiodactyla Suidae	*Sus scrofa* Linn.	Domestic pig.....	A single case	°	+	°	°	°	°	Schulz, 1949
Sporozoa Piroplasmidea Babesidae *Babesia bigemina* (Smith and Kilborne, 1893). Bovine babesiosis, Redwater	Artiodactyla Bovidae	*Bos taurus* Linn.	Ox.....	Enzootic	+	+	+	+	+	°	Koch, 1898; Hutcheon, 1898; Edington, 1900; Theiler, 1903–04
	Arachnida Acarida Ixodidae	*Boophilus decoloratus* (Koch).	Blue tick.....	Enzootic	+	+	+	+	+	°	Koch, 1898; Theiler, 1908, 1909
		Rhipicephalus appendiculatus Neum.	Brown ear tick..	Enzootic	°	+	+	°	+	°	Theiler, 1909
		Rhipicephalus evertsi Neum.	Red-legged tick...	Enzootic	+	+	+	+	+	°	Theiler, 1909

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TABLE 4.—*Protozoa* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Babesia bovis (Babès, 1888).	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	°	+	+	+	+	°	Neitz, 1941
Babesia irvinsmithi Martinaglia, 1936.	Bovidae.....	*Ozanna grandicornis* (Hermann).	Sable antelope...	Sporadic	°	+	°	°	°	°	Martinaglia, 1930, 1936
Babesia trautmanni Knuth and Du Toit, 1921. Porcine babesiosis	Suidae.....	*Sus scrofa* Linn.	Domestic pig.....	Sporadic	°	+	°	°	°	°	Canham & Osborne, 1947; Naude, 1962
Babesia caballi (Nuttall, 1910).	Perissodactyla Equidae	*Equus caballus* Linn.	Horse.....	Enzootic	°	+	+	°	+	°	Du Toit, 1919; De Kock, 1918; Henning, 1956
Equine babesiosis Biliary fever		*Equus asinus* Linn.	Donkey.....	Enzootic	°	+	°	°	°	°	Jansen, 1950; Dennig & Bigalke, 1961
		E. caballus X *E. asinus*	Mule.....	Enzootic	°	+	°	°	°	°	Fantham, 1921
		Equus burchellii (Gray).	Zebra.....	Sporadic	°	+	°	°	°	°	Van Niekerk, 1962
Babesia equi (Laveran, 1901). Equine babesiosis Equine nuttalliosis Biliary fever		*Equus caballus* Linn.	Horse.....	Enzootic	°	+	+	°	+	° +	Theiler, 1901, 1909; Hutcheon, 1903; Eassie, 1905; Goodall, 1914; Wiltshire, 1883; Rickmann, 1900, 1902
		Equus asinus Linn.	Donkey.....	Enzootic	°	+	+	°	°	°	Dale, 1903; Theiler, 1905
		E. caballus X *E. asinus*	Mule.....	Enzootic	°	+	+	+	+	°	Theiler, 1905
		Equus burchellii (Gray).	Zebra.....	Apparently enzootic	°	+	+	°	°	°	Theiler, 1909; Neitz, 1931, 1933
	Ixodidae.....	*Rhipicephalus evertsi* Neum.	Red-legged tick...	Enzootic	+	+	+	+	+	°	Theiler, 1905–1906

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TABLE 4.—*Protozoa* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Babesia canis (Piana and Galli-Valerio, 1895).	Carnivora Canidae	*Canis familiaris* Linn.	Dog.....	Enzootic	°	+	+	+	+	°	Hutcheon, 1896, 1899; Robertson, 1901; Theiler, 1903–1904; Lounsbury, 1901; Malherbe & Parkin, 1931; Malherbe, 1956; Belonje, 1944
Canine babesiosis, Biliary fever		*Lycaon pictus* (Temminck).	Cape hunting dog	Sporadic	°	+	°	°	°	°	Neitz, 1964
		Thos mesomelas (Schreber).	Black-backed jackal	Sporadic Lab. Tests	°	+	°	°	°	°	Neitz & Steyn, 1947
	Ixodidae.....	*Haemaphysalis leachi* (Audouin)	Dog tick.....	Enzootic	°	+	+	+	+	°	Lounsbury, 1901
		Rhipicephalus sanguineus (Latreille)	Tropical dog tick	Enzootic	°	+	+	°	°	°	Neitz, 1956
Babesia felis Davis, 1929.	Felidae.....	*Felis catus* Linn.	Domestic cat.....	Sporadic	°	+	°	+	+	°	Jackson & Dunning, 1937; MacNeil, 1937; Parkin, 1926; Boardman, 1936; Brownlee, 1951; Robinson, 1963
Aegyptianella pullorum Carpano, 1929	Aves Galliformes Phasianidae	*Gallus domesticus* Linn.	Fowl.....	Enzootic	°	+	°	°	°	°	Robinson & Coles, 1932; Coles, 1933
Aegyptianellosis	Anseriformes Anatidae	*Anas platyrhyncha* Linn.	Duck.....	Sporadic	°	+	°	°	°	°	Coles, 1934
		Anser anser Linn.	Goose.....	Sporadic	°	+	°	°	°	°	Coles, 1937
	Arachnida.... Acarida Argasidae	*Argas persicus* (Oken).	Fowl tampan....	Enzootic	°	+	°	°	°	°	Bedford & Coles, 1933

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TABLE 4.—*Protozoa* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Aegyptianella sp. (Relationship to *A. pullorum* not determined)	Spheniscifor-mes Spheniscidae	*Spheniscus demursus* Linn.	Jackass penguin..	Enzootic	°	°	°	+	°	°	Coles, 1941
	Argasidae....	*Argas talaje capen-sis* (Neum.).	Penguin tampan..	Enzootic	°	°	°	+	°	°	Coles, 1941
Theileridae *Theileria parva* (Theiler, 1904).	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic (eradicated 1954)	°	+	+	°	+	°	Theiler, 1904; Neitz, 1956*a*, 1957*a*
East Coast fever		*Bubalus bubalis* Linn.	Indian water buffalo	Lab. Tests	°	+	°	°	°	°	Neitz, 1956*a*, 1957*a*
		Syncerus caffer (Sparrman)	African buffalo...	Lab. Tests	°	+	°	°	°	°	Neitz, 1957*b*
	Arachnida Acarida Ixodidae	*Rhipicephalus appendiculatus* Neum.	Brown ear tick..	Enzootic	°	+	+	°	+	°	Lounsbury, 1903; Theiler, 1905; Neitz, 1956*b*, 1957*a*
		Rhipicephalus capensis Koch	Cape brown tick	Enzootic	°	+	+	°	+	°	Lounsbury, 1906; Theiler, 1907
		Rhipicephalus evertsi Neum.	Red-legged tick...	Enzootic	°	+	+	°	+	°	Lounsbury, 1906; Theiler, 1907
		Rhipicephalus simus Koch	Black pitted tick..	Enzootic	°	+	+	°	+	°	Theiler, 1905; Lounsbury, 1906; Neitz & Jansen, 1950
Theileria mutans (Theiler, 1906).	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	°	+	+	°	+	°	Theiler, 1906; Neitz, 1957*a*
Benign bovine theileriosis		*Capra hircus* Linn.	Goat.....	Lab. Tests	°	+	°	°	°	°	Neitz, 1957*a*
		Ovis aries Linn.	Sheep.....	Lab. Tests	°	+	°	°	°	°	Neitz, 1957*a*
		Syncerus caffer (Sparrman)	African buffalo...	Lab. Tests	°	+	°	°	°	°	Neitz, 1956*a*, 1957*a*

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TABLE 4.—*Protozoa* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Theileria mutans	Ixodidae.....	*Rhipicephalus appendiculatus* Neum.	Brown ear tick..	Enzootic	°	+	+	°	+	°	Theiler, 1911; Neitz, 1938; Neitz & Jansen, 1950
		Rhipicephalus evertsi Neum.	Red-legged tick..	Enzootic	°	+	+	°	+	°	Theiler, 1911
Theileria lawrencei Neitz, 1955.	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	°	+	+	°	°	°	Neitz, Canham & Kluge, 1955; Neitz, 1955, 1956*a*, 1957*a*
Corridor disease		*Syncerus caffer* Sparrman.	African buffalo...	Enzootic	°	+	+	°	°	°	Neitz, 1955, 1956*a*
	Ixodidae.....	*Rhipicephalus appendiculatus* Neum.	Brown ear tick..	Enzootic	°	+	+	°	+	°	Neitz, 1955, 1956*b*, 1957*a*
		Rhipicephalus simus Koch.	Black pitted tick..	Enzootic	°	+	+	°	+	°	Neitz, 1962
Sarcosporidia (Protozoa of undetermined position) - *Sarcocystis blanchardi* Doflein, 1901.	Artiodactyla Bovidae	*Bos taurus* Linn.	Ox.....	Enzootic	+	+	+	+	+	°	Fantham, 1920, 1921, 1923; Viljoen, 1921; Bigalke & Tustin, 1960
		Capra hircus Linn.	Goat.....	Enzootic	+	+	+	+	+	°	Fantham, 1921
Sarcosporidiosis - *Sarcocystis moulei* Neveu-Lemaire, 1912. *Sarcocystis auchenia* Brumpt, 1913.		*Llama glama* Linn.	Lama (Johannesburg Zoological Garden)	Sporadic	°	+	°	°	°	°	Martinaglia, 1936
Sarcocystis tenella Railliet, 1886.		*Ovis aries* Linn.	Sheep.....	Enzootic	+	+	+	+	+	°	Walker, 1918; Viljoen, 1921; Fantham, 1921, 1922; Thomas, 1944

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TABLE 4.—*Protozoa* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Sarcocystis sp...	Bovidae.....	*Oreotragus oreotragus* (Zimmermann).	Klipspringer.....	Apparently enzootic	°	+	°	°	°	°	Viljoen, 1921
Sarcocystis sp...		*Raphicerus capensis* (Thunberg).	Steenbuck.....	Apparently enzootic	°	+	°	°	°	°	Viljoen, 1921
Sarcocystis sp...		*Redunca arundinum* (Boddaert).	Reedbuck.....	Apparently enzootic	°	+	°	°	°	°	Viljoen, 1921
Sarcocystis miescheriana Kühn, 1865.	Suidae.....	*Sus scrofa* Linn.	Domestic pig.....	Enzootic	+	+	+	+	+	° +	Fantham, 1921, 1923; Clark & Jackson, 1942; Gray, 1938. Van der Merwe, 1964
Sarcocystis bertrami Doflein, 1901.	Perissodactyla Equidae	*Equus caballus* Linn.	Horse.....	Apparently enzootic	+	+	+	+	+	°	Walker, 1918, 1920; Viljoen, 1921; Fantham, 1921; Clark & Jackson, 1942
Sarcocystis sp...	Carnivora Viverridae	*Helogale parvula* (Sundevall).	Dwarf mongoose	Apparently enzootic	°	+	+	°	°	°	Viljoen, 1921
Sarcocystis sp...		*Mungo mungo* (Gmelin).	Banded mongoose	Apparently enzootic	°	°	+	°	°	°	Viljoen, 1921
Sarcocystis sp...	Mustelidae...	*Mellivora capensis* (Schreber).	Honey badger, ratel	Apparently enzootic	°	+	°	°	°	°	Viljoen, 1921
Sarcocystis sp...	Rodentia Hystricidae	*Hystrix africae-australis* Peters.	Porcupine.....	Apparently enzootic	°	+	°	°	°	°	Viljoen, 1921
Sarcocystis sp...	Gerbillidae...	*Tatera* sp.	Gerbille.....	Apparently enzootic	°	+	°	°	°	°	Viljoen, 1921
Sarcocystis sp...	Muridae.....	*Thallomys moggi* Roberts.	Mogg's acacia rat	Apparently enzootic	°	+	°	°	°	°	Viljoen, 1921
Besnoitia besnoiti (Marotel, 1913).	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	°	+	°	°	°	+	Hofmeyr, 1945; Pols, 1960; Schulz, 1960; Bigalke & Naude, 1962

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TABLE 4.—*Protozoa* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Bovine besnoitiosis *Besnoitia besnoiti*	Bovidae.....	*Capra hircus* Linn.	Goat.....	Lab. Tests	°	+	°	°	°	°	Pols, 1960
		Ovis aries Linn.	Sheep.....	Lab. Tests	°	+	°	°	°	°	Pols, 1960
	Rodentia Caviidae	*Cavia porcellus* Linn.	Guinea-pig.....	Lab. Tests	°	+	°	°	°	°	Pols, 1960
	Lagomorpha Leporidae	*Lepus cuniculus* Linn.	Rabbit.....	Lab. Tests	°	+	°	°	°	°	Pols, 1954*a*, 1954*b*, 1960; Bigalke, 1960
	Insecta Diptera Muscidae	*Glossina brevipalpis* Newst.	Tsetse fly.....	Lab. Tests	°	+	°	°	°	°	Bigalke, 1960
Besnoitia bennetti Babudieri, 1931.	Equidae.....	*Equus caballus* Linn.	Horse.....	Sporadic	°	+	+	°	°	°	Schulz & Thorburn, 1955; Pols, 1960; Bigalke, 1964
Equine besnoitiosis		*Equus asinus* Linn.	Donkey.....	Lab. Tests	°	+	°	°	°	°	Bigalke, 1964
		E. caballus X *E. asinus*	Mule.....	Sporadic	°	+	°	°	°	°	Bigalke, 1964
Toxoplasma gondii (Nicolle and Manceaux, 1909). Toxoplasmosis	Hominidae...	*Homo sapiens* Linn.	Man.....	Endemic	+	+	+	+	+	°	Klenerman, 1951; Rabkin & Javett, 1952; Bekker, 1954; Fasser, 1955; Spencer, 1957, 1959; Anon., 1958; Gear & Wolstenholme, 1959, 1960, 1961; Edge & Wallace, 1961; Saunders & Thatcher, 1963
	Bovidae.....	*Bos taurus* Linn.	Ox.....	Sporadic	°	+	°	°	°	°	Gear & Wolstenholme, 1959
	Suidae.....	*Sus scrofa* Linn.	Domestic pig.....	Sporadic	°	+	°	°	°	°	Gear & Wolstenholme, 1959
	Equidae.....	*Equus caballus* Linn.	Horse.....	Sporadic	°	+	°	°	°	°	Gear & Wolstenholme, 1959
		Equus asinus Linn.	Donkey.....	Sporadic	°	+	°	°	°	°	Gear & Wolstenholme, 1959

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TABLE 4.—*Protozoa* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Toxoplasma gondii	Canidae.....	*Canis familiaris* Linn.	Dog.....	Sporadic	°	+	°	°	°	°	Spencer, 1957; Smit, 1961
		Lycaon pictus (Temminck)	Cape hunting dog	Sporadic	°	+	°	°	°	°	Hofmeyr, 1956
		Thos mesomelas (Schreber)	Black-backed jackal	Sporadic	°	+	°	°	°	°	Neitz, 1953; Van der Merwe, 1953
	Mustelidae...	*Mustela eversmanni furo* (Linn.)	Ferret.....	Sporadic	°	+	°	°	°	°	Bakker, 1964
	Caviidae.....	*Cavia porcellus* Linn.	Guinea-pig.....	Lab. Tests	°	+	°	°	°	°	Anon., 1958
	Muridae.....	*Mus musculus* Linn.	Mouse.....	Lab. Tests	°	+	°	°	°	°	Gear & Wolstenholme, 1959
Ciliata Spirotricha Bursaridae *Balantidium coli* Malmsten, 1857. Balantidiosis	Primates Hominidae	*Homo sapiens* Linn.	Man.....	Sporadic	+	+	°	°	+	°	Fantham, 1930; Buchanan, 1935, 1937, 1942, 1947; Gray, 1937; Barnetson, 1943; Neser, 1949; Anon., 1949, 1951, 1953; Brede & Van Nieuwenhuysen, 1962
		Cercopithecus aethiops pygerythrus (F. Cuvier)	Vervet monkey...	Sporadic	°	+	°	°	°	°	Fantham, 1930
	Artiodactyla Suidae	*Sus scrofa* Linn.	Domestic pig.....	Enzootic	+	+	+	+	+	°	Fantham, 1919, 1921, 1924, 1930

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(E) Arthropoda

Members of the phylum Arthropoda, which are responsible for zoonoses in South Africa, belong to the classes Insecta and Arachnida. The former class is represented by three and the latter by two species. The classification for the Insecta is that proposed by Mönnig (1934), and that for the Arachnida is based on the scheme presented by Bedford (1932). The available information is listed in the subjoined Table 5. Consideration of the host range and the incidence of the pathogens in them makes it apparent that animals suffer to a far greater extent than man. In him the infections are contracted accidentally while animals serve as their natural habitat.

Class: Insecta
Order: Diptera
Family: Oestridae

Oestrus ovis is a common infestation of sheep but has been found less frequently in the goat and blesbuck. The adult fly deposits her eggs inside the nose after which the larvae migrate to the nasal sinuses where they maintain themselves for periods of up to seven months when they escape and pupate in the soil. *O. ovis* conjunctivitis has been described only once in South Africa, while in North Africa, Southern Europe and North America it appears to be fairly common in man.

Gedoelstia cristata and *G. hässleri* oculo-vascular myiasis.

Fourie & Snyman (1942) described epizootics of " uitpeuloog " (bulging eye disease) in domestic animals in the north western Cape Province and South West Africa. Farmers associated its appearance when blue wildebeest and other antelopes intermingled with domestic ruminants and horses. It was, however, left to Basson (1962, a, b, c, d, e) to discover that the first-stage larvae of the above-mentioned *Gedoelstia* spp. are the causal agents of uitpeuloog. He extended his investigations which showed that not only the eyes but that the vascular system was also involved. He, therefore, proposed the name oculo-vascular myiasis for this disease. In order to present a true reflection on matters dealing with the epidemiology, and on studies on the aetiology, these events will be listed separately in Table 5.

Oculo-vascular myiasis has been responsible for severe losses. Its control is dependent upon arresting contact between domestic stock and antelopes which can serve as perfect hosts for the development of the responsible *Gedoelstia* spp.

Reference to the occurrence of oestrid larvae in the vascular system of the bontebok is included to show that studies on vascular myiasis in antelopes needs further attention.

Class: Arachnida
Order: Acarida
Family: Sarcoptidae

Sarcoptes scabiei causes mange in man and in domestic and wild animals. Bedford (1932) states that this species is represented by seven subspecies and four varieties in South Africa. From his parasite surveys and cross-transmission experiments in domestic animals, it will be seen that the ox is susceptible to five, goat to four, horse to three, pig to three and sheep to two subspecies. He found that man is susceptible to a natural *S. scabiei caprae* infection. He also cites that the subspecies *bubulus*, *caprae*, *equi* and *suis* have been transmitted to human beings in Europe. It is interesting to note that the goat is susceptible to the variety that occurred in a heavily parasitized hartebeest.

Consideration of the variation in the susceptibility of animals does not necessarily mean that some subspecies have a wider host range than others. It would appear that the nutritional state influences the degree of susceptibility.

Cnemidocoptes mutans causes scaly leg in fowls and turkeys. Its presence is promoted by the indiscriminate purchase of birds and faulty poultry management.

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TABLE 5.—*Arthropoda*

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Insecta Diptera Oestridae *Oestrus ovis* Linné, 1761.	Artiodactyla Bovidae	*Ovis aries* Linn.	Sheep.....	Enzootic	+	+	+	+	+	+	Mönnig, 1934; Maybin, 1936; Du Toit, & Clark 1935; Du Toit & Fiedler, 1956
		Capra hircus Linn.	Goat.....	Sporadic	?	?	?	?	?	°	Mönnig, 1934
		Damaliscus albifrons (Burchell).	Blesbuck.....	Sporadic	+	°	°	°	°	°	Mönnig, 1934
First-stage larvae in man	Primates Hominidae	*Homo sapiens* Linn.	Man.....	Sporadic	°	+	°	°	°	°	Du Toit & Meyer, 1960
Gedoelstia cristata (Rodhain and Bequaert, 1913).	Bovidae.....	*Gorgon taurinus taurinus* (Burchell)	Blue wildebeest..	Enzootic	°	°	°	°	°	+	Basson, 1962*e*
First-stage larvae in these ruminants but development to mature larvae in *G. taurinus* and *A. caama*		*Alcelaphus caama selbornei* (Lydekker).	Hartebeest.....	Enzootic	°	°	°	°	°	+	Basson, 1962*e*
		Oryx gazella Linn.	Gemsbuck.....	Sporadic	°	°	°	°	°	+	Basson, 1962*e*
		Bos taurus Linn.	Ox.....	Enzootic	°	°	°	°	°	+	Basson, 1962*e*
		Capra hircus Linn.	Goat.....	Enzootic	°	°	°	°	°	+	Basson, 1962*e*
		Ovis aries Linn.	Sheep.....	Enzootic Lab. Tests	°	°	°	°	°	+	Basson, 1962*e*
Gedoelstia hässleri (Gedoelst, 1915).	Bovidae.....	*Gorgon taurinus taurinus* (Burchell)	Blue wildebeest...	Enzootic	°	°	°	°	°	+	Basson, 1962*e*
First-stage larvae in these ruminants, but development to mature larvae in the two wild ruminants		*Alcelaphus caama selbornei* (Lydekker)	Hartebeest.....	Enzootic	°	°	°	°	°	+	Basson, 1962*e*
		Bos taurus Linn.	Ox.....	Enzootic	°	°	°	°	°	+	Basson, 1962*e*
		Ovis aries Linn.	Sheep.....	Enzootic	°	°	°	°	°	+	Basson, 1962*e*
		Capra hircus Linn.	Goat.....	Enzootic	°	°	°	°	°	+	Basson, 1962*e*

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

TABLE 5.—*Arthropoda* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Specific oculo-vascular myiasis Uitpeuloog, Blouwildebees-oog Aetiology: *Gedoelstia* spp. as determined by Basson, 1962*d* (*vide supra*)	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	°	°	°	+	°	+	Fourie & Snyman, 1942; Cooper, 1948; Henning, 1956; Basson, 1962*a*, 1962*b*. 1962*c*, 1962*d*
		Capra hircus Linn.	Goat.....	Enzootic	°	°	°	+	°	+	Fourie & Snyman, 1942; Henning, 1956; Basson, 1962*a*, 1962*b*, 1962*c*, 1962*d*
		Ovis aries Linn.	Sheep.....	Enzootic	°	°	°	+	°	+	Fourie & Snyman, 1942; Cooper, 1948; Henning, 1956; Basson, 1962*a*, 1962*b*, 1962*c*, 1962*d*
				Lab. Tests	°	°	°	°	°	+	Basson, 1962*d*
		Gorgon taurinus taurinus (Burchell).	Blue wildebeest..	Enzootic	°	°	°	+	°	+	Fourie & Snyman, 1942; Cooper, 1948; Henning, 1956; Basson, 1962*c*, 1962*d*
				Lab. Tests	°	°	°	°	°	+	Basson, 1962*d*, 1962*e*
		Antidorcas marsupialis marsupialis (Zimmermann).	Springbuck.....	Sporadic	°	°	°	°	°	+	Basson, 1962*e*
		Raphicerus campestris steinhardti (Zukowsky).	Steenbuck.....	Sporadic	°	°	°	°	°	+	Basson, 1962*e*
	Perissodactyla Equidae	*Equus caballus* Linn.	Horse.....	Sporadic	°	°	°	+	°	+	Fourie & Snyman, 1942; Henning, 1956; Basson, 1962*e*
Oestrid larvae... (Identity not established)	Bovidae.....	*Damaliscus pygargus* (Pallas).	Bontebok.....	Sporadic vascular myiasis	°	°	°	+	°	°	Wessels, 1937

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

TABLE 5.—*Arthropoda* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Arachnida Acarida Sarcoptidae *Sarcoptes scabiei bubulus* (Oudemans).	Artiodactyla Bovidae	*Bos taurus* Linn.	Ox.....	Enzootic	+	+	+	+	+	°	Bedford, 1932
		Capra hircus Linn.	Goat.....	Lab. Tests	°	+	°	°	°	°	Bedford, 1932
	Suidae.....	*Sus scrofa* Linn.	Domestic pig.....	Lab. Tests	°	+	°	°	°	°	Bedford, 1932
Mange.....	Perissodactyla Equidae	*Equus caballus* Linn.	Horse.....	Lab. Tests	°	+	°	°	°	°	Bedford, 1932
Sarcoptes scabiei caprae Fürstenburg.	Bovidae.....	*Capra hircus* Linn.	Goat.....	Enzootic	+	+	+	+	+	°	Bedford, 1932; Du Toit & Bedford, 1932
		Bos taurus Linn.	Ox.....	Lab. Tests	° °	° +	+ °	° °	° °	° °	Shilston, 1915 Bedford, 1932
		Ovis aries Linn.	Sheep.....	Lab. Tests	° °	° +	+ °	° °	° °	° °	Shilston, 1915 Bedford, 1932
	Suidae.....	*Sus scrofa* Linn.	Domestic pig.....	Lab. Tests	° °	° +	+ °	° °	° °	° °	Shilston, 1915 Bedford, 1932
	Equidae.....	*Equus caballus* Linn.	Horse.....	Lab. Tests	°	+	°	°	°	°	Bedford, 1932
	Primates Hominidae	*Homo sapiens* Linn.	Man.....	Sporadic	°	+	°	°	°	°	Bedford, 1932
Sarcoptes scabiei equi Raspail.	Equidae.....	*Equus caballus* Linn.	Horse.....	Enzootic	+	+	+	+	+	°	Bedford, 1932
	Bovidae.....	*Bos taurus* Linn.	Ox.....	Lab. Tests	°	+	°	°	°	°	Bedford, 1932
		Capra hircus Linn.	Goat.....	Lab. Tests	°	+	°	°	°	°	Bedford, 1932
Sarcoptes scabiei megnini Bedford.	Bovidae.....	*Ovis aries* Linn.	Sheep.....	Sporadic	+	+	+	+	+	°	Bedford, 1932
		Bos taurus Linn.	Ox.....	Lab. Tests	°	+	°	°	°	°	Bedford, 1932
		Capra hircus Linn.	Goat.....	Lab. Tests	°	+	°	°	°	°	Bedford, 1932

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

TABLE 5.—*Arthropoda* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Sarcoptes scabiei precox Canestrini.	Lagomorpha Leporidae	*Lepus cuniculus* Linn.	Rabbit.....	Enzootic	+	+	+	+	+	°	Bedford, 1932
Sarcoptes scabiei suis Gerlach.	Suidae.....	*Sus scrofa* Linn.	Domestic pig.....	Sporadic	+	+	+	+	+	°	Bedford, 1932
	Bovidae.....	*Bos taurus* Linn.	Ox.....	Lab. Tests	°	+	°	°	°	°	Bedford, 1932
Sarcoptes scabiei strepsiceros Bedford.	Bovidae.....	*Strepsiceros strepsiceros* (Pallas)	Kudu.....	Sporadic	°	°	°	°	+	°	Bedford, 1932
Sarcoptes scabiei var.	Bovidae.....	*Alcelaphus caama* (G. Cuvier)	Hartebeest.....	Sporadic	°	+	°	°	°	°	Bedford, 1932
		Capra hircus Linn.	Goat.....	Lab. Tests	°	+	°	°	°	°	Bedford, 1932
Sarcoptes scabiei var.	Bovidae.....	*Gorgon taurinus* (Burchell)	Blue wildebeest..	Sporadic	°	+	°	°	°	°	Bedford. 1932
Sarcoptes scabiei var.	Bovidae.....	*Raphicerus campestris* (Thunberg)	Steenbuck.....	Sporadic	°	°	°	+	°	°	Bedford, 1932
Sarcoptes scabiei var.	Carnivora. Canidae	*Vulpes chama* (A. Smith).	Silver jackal.....	Sporadic	°	°	°	°	+	°	Bedford, 1932
		Thos mesomelas (Schreber)	Black-backed jackal	Sporadic	°	+	°	°	°	°	Bigalke & Du Toit, 1963
Cnemidocoptes mutans (Robin). Scaly leg	Aves Galliformes Phasianidae	*Gallus domesticus* Linn.	Fowl.....	Enzootic	+	+	+	+	+	°	Bedford, 1932
	Meleagridae..	*Meleagris gallopavo Linn.*	Turkey.....	Sporadic	?	?	?	?	?	°	Bedford, 1932

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

(F) Platyhelminthes

Members of the phylum Platyhelminthes responsible for zoonoses and those of the phylum Mollusca which serve as intermediate hosts in South Africa, are listed in Table 6 (*a*). The classification used for the helminthes is that presented by Mönnig (1934). It will be seen that the class Trematoda is represented by nine and the Cestoda by twenty species. The classification employed for the fresh-water snails is that proposed by Malek (1962).

In his check-list on worm parasites of domestic animals, Mönnig (1928) states that the source of materials was derived from animals autopsied at Onderstepoort and hence little information became available on the distribution of the various species. He, therefore, appealed to veterinarians to assist in parasitic worm surveys. Since then the Department of Helminthology of the Institute at Onderstepoort has accumulated a great deal of information, particularly on the distribution of important pathogens in domestic stock and, when possible, also from wild animals. Surveys on the *Schistosoma* spp. of man and animals have been a combined effort by parasitologists from Onderstepoort, the South African Institute for Medical Research, and the Council for Scientific and Industrial Research of South Africa.

Class: Trematoda

Order: Amphistomata

Family: Paramphistomidae

Calicophoron calicophorum, *Cotylophoron cotylophorum* and *Paramphistomum microbothrium* are responsible for diseases commonly referred to as paramphistomiases. These are produced by the immature stages of the conical flukes during their sojourn in the large and small intestines and during their migration towards the rumen and reticulum. Infections are characterized by sporadic epizootics of acute gastroenteritis which may result in severe losses in cattle and sheep.

From the appended Table 6 (*a*) it becomes apparent that a fairly large number of antelopes are susceptible. However, their low incidence in most of the stock breeding regions indicates that they do not serve as an important source of infection.

Family: Fasciolidae

Fasciola hepatica and *F. giganticum* have a wide distribution. These parasites have been encountered in domestic but not in wild animals in South Africa. Depending upon the degree of the parasitaemia fasciolases may be responsible for serious direct and indirect losses.

F. hepatica has been recorded in several human beings.

Family: Schistosomatidae

Schistosoma spp. constitute a very important problem in man and animals in South Africa. It has been estimated by medical authorities that approximately two million people living in the endemic regions in Transvaal, Natal and the Eastern Cape Province (about 100,000 square miles in extent) are suffering from bilharziasis. Severe outbreaks of schistosomiases have also been encountered in cattle and sheep within this region.

Chemotherapy is of value but not a solution of the problem. Although efficient molluscicides are available their application in ponds, rivers, dams and irrigation schemes connected with them in the endemic areas is far more than a difficult task.

Surveys on the distribution and investigations on the control of fresh-water snails are in progress.

TABLE 6 (*a*).—*Platyhelminthes*

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Trematoda Amphistomata Paramphistomidae *Calicophoron calicophorum* (Fischoeder, 1901).	Mammalia Artiodactyla Bovidae	*Bos taurus* Linn.	Ox.....	Enzootic	° +	+ +	° +	° +	° +	° °	Mönnig, 1928 Swart, 1954, 1964
		Ovis aries Linn.	Sheep.....	Enzootic	° +	+ +	° +	° +	° +	° °	Mönnig, 1928 Swart, 1964
		Aepycerus melampus (Lichtenstein).	Impala.....	Sporadic	°	+	°	°	°	°	Ortlepp, 1961
		Alcelaphus caama (G. Cuvier).	Red hartebeest..	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961
		Antidorcas marsupialis (Zimmermann).	Springbuck.....	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961
		Connochaetes gnou (Zimmermann)	Black wildebeest	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961
		Connochaetes taurinus (Burchell).	Blue wildebeest...	Sporadic	°	°	°	°	°	+	Ortlepp, 1961; Swart, 1964
		Damaliscus albifrons (Burchell)	Blesbuck.....	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961
		Ozanna equina (Desmarest).	Roan antelope...	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961
		Ozanna grandicornis (Hermann)	Sable antelope...	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961
	Gastropoda Pulmonata	Species not determined	Fresh-water snail	Enzootic	+	+	+	+	+	°	Swart, 1964
Cotylophoron cotylophorum Fischoeder, 1901.	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	°	+	+	°	°	°	Le Roux, 1930; Ortlepp, 1930
		Ovis aries Linn.	Sheep.....	Enzootic	+	+	+	°	°	°	Le Roux, 1930; Ortlepp, 1930

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.
* = Locality recorded as South Africa

TABLE 6 (*a*).—*Platyhelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Cotylophoron cotylophorum	Bovidae.....	*Alcelaphus caama* (G. Cuvier).	Red hartebeest....	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961
		Damaliscus lunatus (Burchell)	Sassaby.....	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961
		Syncerus caffer (Sparrman).	African buffalo...	Sporadic	°	°	+	°	°	°	Curson, 1928; Le Roux, 1930; Ortlepp, 1961
	Pulmonata...	Species not determined	Fresh-water snail	Enzootic	+	+	+	+	+	°	Swart, 1964
Paramphistomum microbothrium Fischoeder, 1901.	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	° +	+ +	° +	° +	° +	° °	Mönnig, 1928, 1944; Swart, 1954 Swart, 1964
		Capra hircus Linn.	Goat.....	Enzootic	° +	+ +	° +	° +	° +	° °	Mönnig, 1944 Swart, 1964
		Ovis aries Linn.	Sheep.....	Enzootic	° +	+ +	° +	° +	° +	° °	Mönnig, 1928, 1944; Swart, 1954; Swart & Reinecke, 1962*a*, 1962*b*; Horak, 1962*a*, 1962*b*; Horak & Clark, 1963 Swart, 1964
		Damaliscus pygargus (Pallas)	Bontebok.....	Sporadic	°	°	°	+	°	°	Ortlepp, 1961; Swart, 1964
		Syncerus caffer (Sparrman).	African buffalo...	Sporadic	°	+	°	°	°	°	Ortlepp, 1961; Swart, 1964
	Pulmonata Planorbidae	*Bulinus* (*Bulinus*) *tropicus* Krauss.	Fresh-water snail	Enzootic	+	+	+	+	+	°	Swart & Reinecke, 1962*a*, 1962*b*; Horak, 1962*a*. 1962*b*; Horak & Clark, 1963
Distomata Fasciolidae *F. hepatica*	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	° +	+ +	° +	° +	° +	° °	Mönnig, 1928, 1944 Swart, 1964

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

* = Locality recorded as South Africa.

TABLE 6 (*a*).—*Platyhelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Fasciola hepatica Linnaeus, 1758.	Bovidae.....	*Capra hircus* Linn.	Goat.....	Enzootic	° +	+ +	° +	° +	° +	° °	Mönnig, 1944 Swart, 1964
		Ovis aries Linn.	Sheep.....	Enzootic	° +	+ +	° +	° +	° +	° °	Mönnig, 1928, 1944 Swart, 1964
	Equidae.....	*Equus caballus* Linn.	Horse.....	Sporadic	°	°	°	°	+	°	Swart, 1964
	Hominidae...	*Homo sapiens* Linn.	Man.....	Sporadic	°	+	°	°	°	°	Anon., 1950–1952
	Pulmonata Lymnaeidae	*Lymnaea* (*Galba*) *truncatula* Müller.	Fresh-water snail	Enzootic	+	+	+	+	+	°	Swart, 1964
Fasciola gigantica Gobbold, 1885	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	° +	+ +	° +	° +	° +	° °	Mönnig, 1928, 1944 Swart, 1964
		Capra hircus Linn.	Goat.....	Enzootic	° +	+ +	° +	° +	° +	° °	Mönnig, 1944 Swart, 1964
		Ovis aries Linn...	Sheep.....	Enzootic	° +	+ +	° +	° +	° +	° °	Mönnig, 1928, 1944 Swart, 1964
	Lymnaeidae..	*Lymnaea natalensis* (Krauss)	Fresh-water snail	Enzootic	+	+	+	+	+	°	Swart, 1964
Schistosomatidae *Schistosoma haematobium* (Bilharz, 1852) Weinland, 1858.	Hominidae...	*Homo sapiens* Linn.	Man.....	Endemic	°	+	+	°	+	°	Dormer, 1942; Cawston, 1943, 1944, 1945, 1946; Kieser, 1946; Van Wezel, 1951; Annecke & Peacock, 1951; Pitchford, 1952, 1954; Annecke, Pitchford & Jacobs, 1955; Marks, 1956, 1958; Freedman & Elsdon-Dew, 1958; Brink, Botha, Combrink & Erasmus, 1959; Brink, Paillard, Du Plessis, Botha & Coetzer, 1961

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

TABLE 6 (*a*).—*Platyhelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Schistosoma haematobium	Muridae.....	*Mus musculus* Linn.	Mouse.....	Lab. Tests (Feebly pathogenic)	°	+	°	°	°	°	Lurie & De Meillon, 1956
	Pulmonata Planorbidae	*Bulinus* (*Physopsis*) *africanus* (Krauss).	Fresh-water snail	Endemic	°	+	+	°	+	°	Cawston, 1946, 1947; Annecke, Pitchford & Jacobs, 1955; Marks, 1956, 1958; Mayat, 1959
Schistosoma mansoni Sambon, 1907.	Hominidae...	*Homo sapiens* Linn.	Man.....	Endemic	°	+	+	°	+	°	Dormer, 1942; Cawston, 1943, 1945, 1947; Kieser, 1946; Van Wezel, 1951; Annecke & Peacock, 1951; Pitchford, 1952, 1954; Annecke, Pitchford & Jacobs, 1955; Marks, 1956, 1958; Brink, Botha, Combrink & Erasmus, 1959; Mayat, 1959; Brink, Paillard, Du Plessis, Botha & Coetzer, 1961
	Cercopithecidae	*Cercopithecus aethiops pygerythrus* (F. Cuvier).	Vervet monkey...	Lab. Tests	°	+	°	°	°	°	Lurie, De Meillon & Stoffberg, 1952; Lurie & De Meillon, 1956
	Bovidae.....	*Ovis aries* Linn.	Sheep.....	Lab. Tests	°	+	°	°	°	°	Lurie & De Meillon, 1952
	Muridae.....	*Mus musculus* Linn.	Mouse.....	Lab. Tests	°	+	°	°	°	°	Lurie, De Meillon & Stoffberg, 1952; Lurie & De Meillon, 1956; De Meillon, England & Lämmler, 1956
		Mastomys natalensis (A. Smith).	Multimammate mouse	Lab. Tests	°	+	°	°	°	°	Lurie & De Meillon, 1956

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

TABLE 6 (*a*).—*Platyhelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Schistosoma mansoni	Planorbidae..	*Biomphalaria pfeifferi* (Krauss).	Fresh-water snail	Endemic	°	+	+	°	+	°	Lurie & De Meillon, 1956; De Meillon, England & Lämmler, 1956; Marks, 1958; Brink, Paillard, Du Plessis, Botha & Coetzer, 1961
Schistosoma bovis (Sonsino, 1876)	Hominidae...	*Homo sapiens* Linn.	Man.....	Sporadic	°	+	°	°	°	°	Lurie, De Meillon & Stoffberg, 1952; Kisner, Stoffberg & De Meillon, 1953
	Cercopithecidae	*Cercopithecus aethiops pygerythrus* (F. Cuvier).	Vervet monkey...	Lab. Tests	°	+	°	°	°	°	Bersohn & Lurie, 1953; Lurie & De Meillon, 1956
	Caviidae.....	*Cavia porcellus* Linn.	Guinea-pig.....	Lab. Tests	°	+	°	°	°	°	Lurie & De Meillon, 1956
	Muridae.....	*Mus musculus* Linn.	Mouse.....	Lab. Tests	°	+	°	°	°	°	Bersohn & Lurie, 1953; Lurie & De Meillon, 1956
		Mastomys natalensis (A. Smith).	Multimammate mouse	Lab. Tests	°	+	°	°	°	°	Lurie & De Meillon, 1956
	Planorbidae..	*Bulinus* (*Physopsis*) *africanus* (Krauss).	Fresh-water snail.	Lab. Tests	°	+	°	°	°	°	Bersohn & Lurie, 1953; Kisner, Stoffberg & De Meillon, 1953; Lurie & De Meillon, 1956

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

TABLE 6 (*a*).—*Platyhelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Schistosoma mattheei Veglia and Le Roux, 1929.	Hominidae...	*Homo sapiens* Linn.	Man.....	Endemic	°	+	°	°	°	°	Pitchford, 1959
	Bovidae.....	*Bos taurus* Linn.	Ox.....	Endemic	°	+	+	°	+	°	Veglia & Le Roux, 1929; Le Roux, 1929*a*, 1929*b*; Strydom, 1963
		Capra hircus Linn.	Goat.....	Endemic	°	+	°	°	°	°	Pitchford, 1959
		Ovis aries Linn.	Sheep.....	Endemic Lab. Tests	° °	+ +	+ °	° °	+ °	° °	Veglia & Le Roux, 1929 Le Roux, 1929*a*, 1929*b*
		Aepycerus melampus (Lichtenstein).	Impala.....	Sporadic	°	+	°	°	°	°	Ortlepp, 1961; Krüger, 1964
		Connochaetes taurinus (Burchell).	Blue wildebeest...	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961
	Caviidae.....	*Cavia porcellus* Linn.	Guinea-pig.....	Lab. Tests	°	+	°	°	°	°	Le Roux, 1929*b*
	Muridae.....	*Rattus norvegicus* (Berkenhout).	Albino rat.....	Lab. Tests	°	+	°	°	°	°	Le Roux, 1929*b*
	Planorbidae..	*Bulinus* (*Physopsis*) *globosus* (Morelet).	Fresh-water snail	Field obs. and Lab. Tests	° °	° +	° °	° °	+ °	° °	Le Roux, 1929*b*
		Bulinus (*Physopsis*) *africanus* (Krauss).	Fresh-water snail	Field obs. and Lab. Tests	°	+	+	°	+	°	Porter, 1938

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Class: Cestoda

Order: Cyclophillidea

Family: Anoplocephalidae

Anoplocephala magna and *A. perfoliata* are infrequent parasites of domestic and wild solipeds [*vide infra*—Table 6 (*b*)]. Their pathogenicity is dependent upon the degree of parasitaemia and nutritional state of the host. It is interesting to note that the first mentioned species also parasitizes the square-lipped rhinoceros which shows no ill effects.

Moniezia expansa and *M. trigonophora*, commonly known as milk worms, are encountered frequently in young lambs, kids and calves and sometimes also in adult ruminants. Infected young animals become unthrifty and emaciated, particularly when the nutritional state of suckling ewes and cows is poor. Several antelopes have been found to be parasitized.

Thysaniezia giardi has been encountered in young and adult domestic ruminants and two antelopes. Although it is the most common tapeworm in cattle, the degree of parasitaemia is usually low. Symptoms are thus not commonly seen.

Avitellina centripunctata has been recorded from the three domestic ruminants and seven antelopes. It appears to be a relatively harmless parasite but heavy infections produce severe symptoms.

Stilesia hepatica is a common infection of the bile ducts of cattle, sheep and goats. It has been recorded also from six antelopes. It is a harmless cestode but according to Du Toit & Mönnig (1936) severe infections render livers unsuitable for human consumption.

Dipylidium caninum, which has a world-wide distribution, is well represented in South Africa. It has been recorded from domestic and wild carnivores and also from man. It may exert its pathogenicity in heavily parasitized hosts. Dog fleas serve as its intermeditate host.

Inermicapsifer madagascariensis, also known as the murine tapeworm, has been described from six wild rodents but not from the black and brown rat. Two cases in children have been described by Ortlepp (1961) in South Africa. Observations on rodents and man are of parasitological interest.

Family: Taeniidae

Taenia gaigeri has so far only been observed in its larval stage in a goat in South Africa.

Taenia serialis is apparently not very harmful for the dog. The larval stage, *Coenurus serialis* was found in a hare, and transmission was successful when the parasitized meat was fed to a dog. Infected hares are not fit for human consumption.

Taenia hydatigena has been seen often in dogs and sometimes in the black-backed jackal. The larval stage has been encountered frequently in domestic ruminants and pigs and causes *hepatitis cysticercosa*. The severity of the symptoms is dependent upon the degree of parasitaemia. Severe infections may have a fatal termination. Natural infections have been found in five antelopes.

Taenia multiceps is commonly harboured by dogs, and sometimes by the black-backed jackal. *Coenurus multiceps* develops in the brain and spinal cord of sheep, goats and cattle and produces *coenurosis cerebralis* (gid, sturdy). Four sporadic cases have been described in man in South Africa.

Taenia taeniaeformis parasitizes the cat which may develop digestive disturbances and nervous symptoms. The larval stage occurs in rats which usually develop an inapparent infection. Sometimes it may stimulate the development of malignant growths in rats.

Taenia saginata is a common infection of man. An excellent review on the incidence of *Cysticercus bovis* in slaughtered cattle at various abattoirs in South Africa has been given by Viljoen (1937). The parasitaemia has been found to vary from about 1 to 7 per cent. This tapeworm is of great importance to public health, and is responsible for great economic losses to stock breeders.

Taenia solium is also a common infection in man. Surveys on the incidence of *Cysticercus cellulosae* in South Africa have been made by Viljoen (1937). Records showed that the parasitaemia in slaughtered swine, at different abattoirs, varied from 0·5 to 25 per cent. The public health and economic importance of this tapeworm need not be stressed.

Echinococcus granulosus, *E. lycaontis*, *E. ortleppi* and *E. felidis* have been encountered in domestic and wild carnivores. These animals apparently suffer no ill effects from these worms unless, as seen in dogs harbouring many *E. granulosus* worms, a variable degree of enteritis may be present. The immature stage on the other hand may be highly pathogenic, particularly for man. The pathogenicity depends upon the degree of the parasitaemia in the lungs and liver.

Hydatidosis in animals, as a rule, does not cause severe symptoms, but in man it often leads to serious complications. Hydatid cysts have been recorded from domestic ruminants and pigs, a blue wildebeest, zebra and Cape molerat. Surveys recently conducted by Verster (1962) have shown that the average incidence of hydatidosis in livestock was 0·633 per cent in cattle, 1·798 per cent in sheep and goats and 0·356 per cent in pigs. In addition she found that 89·73 per cent of all cysts and 96·88 per cent of uncalcified cysts of bovine origin were fertile. She cites the observations of Dr. Hesselson, who recorded 17 cases per annum in man over a period of 10 years at the Groote Schuur Hospital, Cape Town, and two cases per annum over 2½ years at the Belville Hospital.

Verster (1962) states that " it is not possible to assign these cysts to any one species. As it has been shown that the hooks of *E. granulosus* continue growing after ingestion by the definitive host, it is possible that the hooks of other species of *Echinococcus* will also continue increasing in size; this continued growth making the identification down to species difficult."

TABLE 6 (*b*).—*Platyhelminthes*

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Cestoda Cyclophyllidae Anoplocephalidae *Anoplocephala magna* (Abilgaard, 1789).	Mammalia Perissodactyla Equidae	*Equus caballus* Linn.	Horse.....	Enzootic	?	+	?	?	?	°	Mönnig, 1928; Gough, 1908; Baer, 1926; Veglia, 1919
		Equus asinus Linn.	Donkey.....	Enzootic	?	+	?	?	?	°	Mönnig, 1928
		Equus burchelli (Gray).	Zebra.....	Sporadic	°	+	°	°	°	°	Mönnig, 1928; Gough, 1908; Baer, 1926
	Rhinocerotidae	*Ceratotherium simum* (Burchell).	White rhinoceros	Sporadic	°	°	+	°	°	°	Mönnig, 1928
Anoplocephala perfoliata (Goeze, 1782).	Equidae.....	*Equus caballus* Linn.	Horse.....	Enzootic	°	+	°	°	°	°	Mönnig, 1928
		Equus asinus Linn.	Donkey.....	Enzootic	°	+	°	°	°	°	Mönnig, 1928
		Equus burchelli (Gray).	Zebra.....	Sporadic	°	°	?+	°	°	°	Mönnig, 1928
Moniezia expansa (Rudolphi, 1810). Milk worm	Bovidae.....	*Bos taurus* Linn.	Ox (calves).....	Enzootic	+	+	+	+	+	°	Mönnig, 1928, 1944; Ortlepp, 1949
		Capra hircus Linn.	Goat (kids).....	Enzootic	+	+	+	+	+	°	Mönnig, 1944
		Ovis aries Linn.	Sheep (lambs)....	Enzootic	+	+	+	+	+	°	Mönnig, 1928, 1944; Ortlepp, 1949
		Antidorcas marsupialis (Zimmermann).	Springbuck.....	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961*a*

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.
* = Locality given as South Africa

TABLE 6 (*b*).—*Platyhelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Moniezia expansa	Bovidae.....	*Guevei caerula* (H. Smith) (=*Cephalophus monticola* Gray).	Blue duiker.....	Sporadic*	°	°	°	°	°	°	Gough, 1908; Mönnig, 1928
		Oreotragus oreotragus (Zimmermann).	Klipspringer.....	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961*a*
		Ozanna equinus (Desmarest).	Roan antelope...	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961*a*
		Ozanna grandicornis (Herrmann).	Sable antelope...	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961*a*
		Raphicerus campestris (Thunberg).	Steenbuck.....	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961*a*
		Sylvicapra grimmia (Linnaeus)	Duiker.....	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961*a*
	Arachnida Acarina Oribatidae	Species responsible as intermediate host needs to be determined	Grass mite.....	Enzootic	+	+	+	+	+	°	Ortlepp, 1949
Moniezia trigonophora St. and Hass., 1892.	Bovidae.....	*Bos taurus* Linn.	Ox (calves).....	Enzootic	+	+	+	+	+	°	Mönnig, 1928, 1944; Ortlepp, 1949
		Capra hircus Linn.	Goat (kids).....	Enzootic	+	+	+	+	+	°	Mönnig, 1944
		Ovis aries Linn.	Sheep (lambs)....	Enzootic	+	+	+	+	+	°	Mönnig, 1928, 1944; Ortlepp, 1949
		Nototragus sharpei (Thomas and Schwann).	Sharpe's grysbok	Sporadic*	°	°	°	°	°	°	Baer, 1925

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* = Locality recorded as South Africa.

TABLE 6 (*b*).—*Platyhelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Mon'ezia trigonophora	Bovidae	*Raphicerus campestris* (Thunberg).	Steenbuck.....	Sporadic*	°	°	°	°	°	°	Baer, 1925
		Sylvicapra grimmia (Linnaeus).	Duiker.....	Sporadic*	°	°	°	°	°	°	Baer, 1925
	Oribatidae...	Species responsible as intermediate host needs to be determined	Grass mite.....	Enzootic	+	+	+	+	+	°	Ortlepp, 1949
Thysaniezia giardi (Moniez, 1879).	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic*	°	°	°	°	°	°	Mönnig, 1928
		Capra hircus Linn.	Goat.....	Enzootic*	°	°	°	°	°	°	Mönnig, 1928
		Ovis aries Linn.	Sheep.....	Enzootic*	°	°	°	°	°	°	Mönnig, 1928
		Alcelaphus caama (G. Cuvier).	Red hartebeest...	Sporadic*	°	°	°	°	°	°	Mönnig, 1928
		Taurotragus oryx (Pallas).	Eland.....	Sporadic*	°	°	°	°	°	°	Gough, 1908
Avitellina centripunctata (Rivolta, 1874). Narrow tapeworm	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic*	°	°	°	°	°	°	Mönnig, 1944
		Capra hircus Linn.	Goat.....	Enzootic*	°	°	°	°	°	°	Mönnig, 1944
		Ovis aries Linn.	Sheep.....	Enzootic*	°	°	°	°	°	°	Mönnig, 1928, 1944
		Nototragus sharpei (Thomas and Schwann).	Sharp's grysbok..	Sporadic*	°	°	°	°	°	°	Baer, 1925; Mönnig, 1928; Ortlepp, 1961*a*
		Oreotragus oreotragus (Zimmermann).	Klipspringer.....	Sporadic*	°	°	°	°	°	°	Baer, 1925; Mönnig, 1928; Ortlepp, 1961*a*

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

* = Locality recorded as South Africa.

TABLE 6 (*b*).—*Platyhelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Avitellina centripunctata	Bovidae.....	*Ozanna grandicornis* (Herrmann).	Sable antelope...	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961*a*
		Ozanna equinus (Desmarest).	Roan antelope...	Sporadic*	°	°	°	°	°	°	Baer, 1925; Mönnig, 1928; Ortlepp, 1961*a*
		Raphicerus campestris (Thunberg).	Steenbok.....	Sporadic*	°	°	°	°	°	°	Baer, 1925; Mönnig, 1928; Ortlepp, 1961*a*
		Sylvicapra grimmia (Linnaeus).	Duiker.....	Sporadic*	°	°	°	°	°	°	Baer, 1925; Mönnig, 1928; Ortlepp, 1961*a*
		Syncerus caffer (Sparrman).	African buffalo...	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961*a*
Stilesia hepatica Wolffhügel, 1903. Liver tapeworm	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic*	°	°	°	°	°	°	Mönnig, 1928, 1944
		Capra hircus Linn.	Goat.....	Enzootic*	°	°	°	°	°	°	Mönnig, 1928, 1944
		Ovis aries Linn.	Sheep.....	Enzootic*	°	°	°	°	°	°	Mönnig, 1928, 1944
		Aepycerus melampus (Lichtenstein).	Impala.....	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961*a*
		Connochaetes taurinus (Burchell).	Blue wildebeest..	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961*a*
		Kobus ellipsiprymnus (Ogilby).	Waterbuck.....	Sporadic*	° °	° °	° +	° °	° °	° °	Ortlepp, 1961*a* Curson, 1928
		Ozanna equina (Desmarest).	Roan antelope...	Sporadic*	°	°	°	°	°	°	Wolffhügel, 1903; Mönnig, 1925; Ortlepp, 1961*a*
		Raphicerus campestris (Thunberg).	Steenbok.....	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961*a*
		Sylvicapra grimmia (Linnaeus).	Duiker.....	Sporadic*	°	°	°	°	°	°	Wolffhügel, 1903; Mönnig, 1928; Ortlepp, 1961*a*

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

* = Locality recorded as South Africa.

TABLE 6 (*b*).—*Platyhelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Dipylidium caninum (Linnaeus, 1758).	Carnivora Canidae	*Canis familiaris* Linn.	Dog.....	Enzootic	○ ○ ○	○ + ○	○ ○ +	○ ○ ○	○ ○ ○	○ ○ ○	Mönnig, 1928 Ortlepp, 1934 Curson, 1928
		Otocyon megalotis (Desmarest).	Long-eared fox...	Sporadic*	○	○	○	○	○	○	Baer, 1925; Mönnig, 1928
		Thos mesomelas (Schreber).	Black-backed jackal	Sporadic*	○	○	○	○	○	○	Gough, 1908; Mönnig, 1928
	Protelidae....	*Proteles cristatus* (Sparrman).	Aardwolf.....	Sporadic*	○	○	○	○	○	○	Baer, 1925; Mönnig, 1928
	Felidae.....	*Felis catus* Linn.	Cat.....	Sporadic	○	○	+	○	○	○	Curson, 1928
	Insecta Siphonaptera Pulicidae	*Ctenocephalides canis* (Curtis).	Dog flea.....	Enzootic	+	+	+	+	+	+	Mönnig, 1934; Verster, 1964
Inermicapsifer madagascariensis (Davaine, 1870).	Hominidae...	*Homo sapiens* Linn.	Man.....	Sporadic	○	+	+	○	○	○	Ortlepp, 1961*b*
	Otomyidae...	*Otomys irroratus* (Brants).	Vlei rat.....	Common*	○	○	○	○	○	○	Baer, 1926
	Muridae.....	*Rattus* (*Aethomys*) *chrysophilis* (De Winton).	Red veld rat....	Common*	○	○	○	○	○	○	Ortlepp, 1961*b*
		Rattus (*Aethomys*) *paedalcus* (Sundeval).	Black-tailed rat...	Common*	○	○	○	○	○	○	Ortlepp, 1961*b*
		Rattus (*Mastomys*) *natalensis* (A. Smith).	Multimammate rat	Common*	○	○	○	○	○	○	Ortlepp, 1961*b*

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* = Locality recorded as South Africa.

TABLE 6 (*b*).—*Platyhelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Inermicapsifer madagascariensis	Muridae.....	*Lemniscomys griselda* (Thomas).	Single-striped grass rat	Common*	°	°	°	°	°	°	Ortlepp, 1961*b*
		Rhabdomys pumilio (Sparrman).	Four-striped rat..	Common*	°	°	°	°	°	°	Ortlepp, 1961*b*
		Saccostomus campestris Peters.	Pouched rat.....	Common*	°	°	°	°	°	°	Ortlepp, 1961*b*
Taeniidae *Taenia gaigeri* Hall, 1916.	Canidae.....	*Canis familiaris* Linn.	Dog.....	Not seen in South Africa	°	°	°	°	°	°	Mönnig, 1928
Coenurus gaigeri (Larval stage)	Bovidae.....	*Capra hircus* Linn.	Goat.....	Only one case	°	+	°	°	°	°	Mönnig, 1928
Taenia serialis (Gervais, 1847).	Canidae.....	Zoological name not recorded	Jackal.....	One case	°	+	°	°	°	°	Ortlepp, 1938
		Canis familiaris Linn.	Dog.....	Lab. Tests	°	+	°	°	°	°	Ortlepp, 1938
Coenurus serialis Larval stage	Leporidae....	Zoological name not recorded	Hare.....	Sporadic	°	+	°	°	°	°	Ortlepp, 1938
Taenia hydatigena Pallas, 1776.	Canidae.....	*Canis familiaris* Linn.	Dog.....	Enzootic	° ° °	+ ? +	° ° °	° ° +	° ° +	° ° °	Baer, 1926; Mönnig, 1928 Ortlepp, 1938 Verster, 1964
		Thos mesomelas (Schreber).	Black-backed jackal	Sporadic	° °	? +	° °	° °	° +	° °	Ortlepp, 1938 Verster, 1964
Cysticercus tennuicollis (Larval stage)	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic*	°	°	°	°	°	°	Mönnig, 1944
		Capra hircus Linn.	Goat.....	Enzootic*	° °	° °	° +	° °	° °	° °	Mönnig, 1928, 1944 Curson, 1928

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* = Locality recorded as South Africa.

TABLE 6 (*b*).—*Platyhelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Cysticercus tennuicollis	Bovidae	*Ovis aries* Linn.	Sheep.....	Enzootic	° °	° +	° °	° +	° °	° °	Mönnig, 1928, 1944 Verster, 1964
		Antidorcas marsupialis (Zimmermann).	Springbuck.....	Sporadic	°	+	°	°	°	°	Mönnig, 1928; Ortlepp, 1961*a*
		Connochaetes gnou (Zimmermann).	Black wildebeest	Sporadic	° +	° °	° °	° °	° °	° °	Ortlepp, 1961*a* Verster, 1964
		Oryx gazella (Linnaeus).	Gemsbuck.....	Sporadic*	° °	° °	° °	° °	° °	° +	Mönnig, 1928 Verster, 1964
		Redunca fulvorufula (Afzelius).	Mountain reedbuck	Sporadic*	°	°	°	°	°	°	Gough, 1908; Mönnig, 1928
		Sylvicapra grimmia (Linnaeus).	Duiker.....	Sporadic*	°	°	°	°	°	°	Gouch, 1908; Mönnig, 1928; Ortlepp, 1961*a*
	Suidae.....	*Sus scrofa* Linn.	Domestic pig.....	Sporadic	°	+	°	°	°	°	Mönnig, 1928; Verster, 1964
Taenia multiceps (Leske, 1780)	Canidae.....	*Canis familiaris* Linn.	Dog.....	—	° +	?+ °	° °	° °	° °	° °	Mönnig, 1928; Ortlepp, 1938 Verster, 1964
		Thos mesomelas (Schreber).	Black-backed jackal	—	+	?+ +	° °	° °	° °	° °	Mönnig, 1928 Verster, 1964
Coenurus multiceps (=*Coenurus cerebralis*) (Larval stage)	Hominidae...	*Homo sapiens* Linn.	Man.....	Sporadic	+	+	°	°	°	°	Anon., 1940; Becker & Jacobson, 1951*a*, 1951*b*
	Bovidae.....	*Bos taurus* Linn.	Ox.....	Sporadic*	°	°	°	°	°	°	Mönnig, 1928, 1944
		Capra hircus Linn.	Goat.....	Sporadic*	°	°	°	°	°	°	Mönnig, 1928, 1944
		Ovis aries Linn.	Sheep.....	Enzootic	° +	?+ °	° °	° +	° +	° °	Mönnig, 1928, 1944 Verster, 1964

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* = Locality recorded as South Africa.

TABLE 6 (*b*).—*Platyhelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Taenis taeniaeformis (Batsch, 1786).	Felidae.....	*Felis catus* Linn.	Domestic cat.....	Sporadic	°	+	°	°	°	°	Mönnig, 1928
Cysticercus fasciolaris (Larval stage)	Muridae.....	*Rattus rattus* Linn.	Black rat.....	Sporadic	°	+	°	°	°	°	Mönnig, 1928
Taenia saginata (Goeze, 1782).	Hominidae...	*Homo sapiens* Linn.	Man.....	Endemic	+	+	+	+	+	+	Mönnig, 1928; Viljoen, 1937; Ortlepp, 1938
Cysticercus bovis (Larval stage)	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	+	+	+	+	+	+	Mönnig, 1928; Viljoen, 1937
Taenia solium Linnaeus, 1758.	Hominidae...	*Homo sapiens* Linn.	Man.....	Endemic	+	+	+	+	+	+	Mönnig, 1928; Viljoen, 1937; Ortlepp, 1938
Cysticercus cellulosae (Larval stage)	Suidae.....	*Sus scrofa* Linn.	Domestic pig.....	Enzootic	+	+	+	+	+	+	Mönnig, 1928; Viljoen, 1937
	Hominidae...	*Homo sapiens* Linn.	Man.....	Sporadic	°	°	+	°	°	°	Verster, 1964
	Canidae.....	*Canis familiaris* Linn.	Dog.....	Sporadic	°	+	°	°	°	°	Neitz & Thomas, 1934
Echinococcus granulosus (Batsch, 1786).	Canidae.....	*Canis familiaris* Linn.	Dog.....	Enzootic	° ° +	° + +	° ° °	° ° +	° ° °	° ° °	Veglia, 1919; Mönnig, 1928; Verster, 1961, 1962 Ortlepp, 1934 Verster, 1964
		Lycaon pictus (Temminck).	Cape hunting dog	Zool. gardens.	°	+	°	°	°	°	Mönnig, 1928
		Vulpes chama (A. Smith).	Silver fox.....	Zool. gardens	°	+	°	°	°	°	Mönnig, 1928
	Felidae.....	*Felis catus* Linn.	Domestic cat.....	Sporadic* Lab. Tests	° °	° +	° °	° °	° °	° °	Veglia, 1919 Verster, 1961

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* = Locality recorded as South Africa.

TABLE 6 (*b*).—*Platyhelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Echinococcus lycaontis Ortlepp, 1934.	Canidae.....	*Lycaon pictus* (Temminck).	Cape hunting dog	Zool. garden	°	+	°	°	°	°	Ortlepp, 1934; Verster, 1961, 1962
Echinococcus ortleppi Lopez-Neyra and Planas, 1943.	Canidae.....	*Canis familiaris* Linn.	Dog.....	Sporadic	°	+	°	°	°	°	Lopes-Neyra & Planas, 1943; Verster, 1961, 1962
Echinococcus felidis Ortlepp, 1937.	Felidae.....	*Leo leo krügeri* Roberts.	Lion.....	Sporadic	°	+	°	°	°	°	Ortlepp, 1937; Verster, 1961, 1962
" Hydatid cysts " of *Echinococcus* spp.	Hominidae...	*Homo sapiens* Linn.	Man.....	Apparently Sporadic	°	°	°	+	°	°	Hesselson, 1961; Verster, 1961
	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	° +	° +	° +	° +	° +	° °	Mönnig, 1928 Verster, 1961, 1962
		Capra hircus Linn.	Goat.....	Enzootic	° +	° +	° +	° +	° +	° °	Mönnig, 1928 Verster, 1961, 1962
		Ovis aries Linn.	Sheep.....	Enzootic	° +	° +	° +	° +	° +	° °	Mönnig, 1928 Verster, 1961, 1962
		Connochaetes taurinus (Burchell).	Blue wildebeest..	Sporadic	°	°	°	°	°	+	Verster, 1962
	Suidae.....	*Sus scrofa* Linn.	Domestic pig.....	Enzootic	° +	° +	° +	° +	° +	° °	Mönnig, 1928 Verster, 1961, 1962
	Equidae.....	*Equus burchelli* (Gray).	Zebra.....	Sporadic	°	°	°	°	°	+	Verster, 1962
	Rodentia Bathyergidae	*Georychus capensis* (Pallas).	Cape molerat....	Sporadic	°	°	°	+	°	°	Verster, 1962

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

(G) NEMATHELMINTHES

Members of the phylum Nemathelminthes, causing zoonoses in South Africa, are listed in the subjoined Table 7 (*b*). The classification used for these metazoa is that proposed by Mönnig (1934). The worms involved all belong to the class Nematoda which is represented by the orders Ascaroidea, Trichinelloidea, Strongyloidea, Spiruroidea and Filaroidea. Of the numerous parasites listed only seven species attack man while more than 60 species have been encountered in either domestic and wild herbivora, carnivora or omnivora. Infection follows either the ingestion of eggs, eggs harbouring larvae or free-living larvae, or the penetration of larvae into the skin of the host. Some worms are viviparous. Certain species require an intermediate host to complete their life cycle.

Many, but not all, of the listed species are pathogenic. The non-pathogenic species are included in this discussion as their presence in hosts serves to reflect the hygienic conditions obtained in mammalian habitations.

Class: Nematoda

Order: Ascaroidea

Family: Ascaridae.

Ascaris lumbricoides is encountered frequently in swine but to a lesser extent in man. The infection is more common in children than in adults. The worms of these hosts are morphologically and serologically indistinguishable but there is evidence that there are biological strains which possess a greater affinity for one species than another. Although cross-infections leading to the development of mature worms in the small intestine does not occur readily or not at all, it is suspected that immature stages of either strain will exert their pathogenicity during their migration in internal organs in both hosts even though the life cycle is not necessarily completed.

A. equorum has been encountered in domestic and wild solipeds. The small intestine is the habitat of the adult worm. There is no evidence of biological strains which show a particular affinity for either horses, mules, donkeys or zebras. The pathogenicity is exerted by the mature worms as well as by the immature stages during their migration in the internal organs of the host.

Toxascaris leonina often parasitizes the small intestine of the dog, and has been recorded also from the Cape hunting dog. Both the mature and immature stages are pathogenic for the host.

Toxocara canis is found often in the small intestine of dogs. Puppies are chiefly affected, and acquire the infection by the intra-uterine route as well as by the ingestion of eggs harbouring fully developed larvae. Human beings, particularly young children, become infected by the accidental ingestion of eggs. This is followed by visceral larva migrans or larval toxocariasis. Epidemiological studies have shown that the home or surroundings where children and pets come in contact with each other results in the development of larval toxocariasis.

T. mystax is a fairly common infection of cats and may, as in the case of *T. canis* produce visceral larva migrans in young children. This form is less common in man than that derived from dogs.

Family: Kathlaniidae

Probstmayria vivipara occurs in the colon of domestic and wild solipeds. The worm is viviparous and hence numerous parasites can be expected in the host. There is no evidence that this species is pathogenic.

Family: Oxyuridae

Oxyuris equi has been described from domestic and wild solipeds as well as from the black rhinoceros. The production of pruritis in the host by egg-laying females is a well known phenomenon. Infection results from the ingestion of eggs containing infective larvae.

Skrjabinema ovis and *S. alata* live in the caecum of sheep. The steenbuck may also be parasitized by these species. They are harmless, and are listed for differential diagnostic reasons as they may be mistaken for immature stages of other nematodes.

Family: Rhabditidae

Strongyloides papillosus has been recorded from the small intestine of domestic ruminants and the springbuck. It is not very pathogenic. Infection results from the ingestion of infective larvae which are also known to penetrate through the skin of the feet of sheep thus providing an entrance for *Sphaerophorus necrophorus* which causes foot-rot (Mönnig, 1934).

Order: Trichinelloidea

Family: Trichinellidae

Trichinella spiralis (Owen, 1833) has not yet been encountered in man and animals in South Africa.

Trichuris globulosa commonly known as a whipworm occurs in the caecum of domestic and wild ruminants including the giraffe. Infection follows the ingestion of eggs harbouring infective larvae. It is not very pathogenic.

Trichuris trichuria is a common infection of the large intestine of children but occurs less frequently in adults. It is widely distributed. Infection results from the ingestion of eggs containing infective larvae. It causes a chronic inflammation of the colon. Infections of swine are not uncommon. Its presence has been recorded also in a vervet monkey.

Capillaria hepatica is primarily parasitic in the liver of rodents. Cochrane *et al.* (1957) found 19 out of 40 rats harbouring this metazoon. In South Africa infections have also been recorded from a dog, meerkats, mice, gerbilles, rabbit, hare and a hedge hog.

Kallichurum & Elsdon-Dew (1961) are of opinion that for a large number of eggs to reach the exterior the rodent carrier must be devoured by a carnivore or a scavenger. As rats are cannibals it is assumed that they would perform this function. Eggs would then reach the exterior by the faeces thus permitting the embryo to be exposed to the environment necessary for its further development. Man most likely becomes infected from the ingestion of rat faeces. Two cases of capillariasis have been described in two very young children. One recovered following treatment (Cochrane & Skinstad, 1960) while the second case died from capillariasis complicated by concurrent diseases. An infection in a dog terminated fatally (Smit, 1960).

Order: Strongyloidea

Family: Strongylidae

Strongylus spp., *Oesophagodontus* sp., *Triodontophorus* spp., *Craterostomum* sp., *Trichonemina* spp., *Poteriostomum* spp., and *Gyalocephalus* sp. are common parasites of the large intestine of domestic solipeds, and have also been recorded from a few zebras (Theiler, 1923).

Eggs of these strongyles are very resistant when exposed to relatively dry conditions. Infection follows the ingestion of larvae. Mixed infections in all solipeds are the rule. This precludes determining the pathogenicity of different species with certainty. Most of the *Trichonemina* spp. attack the superficial layers of the intestinal mucosa while other species, by virtue of their well developed mouthparts, are blood suckers (Mönnig, 1934). Anaemia and digestive disturbances are the result. *Strongylus vulgaris* produces aneurisms in the mesenteric arteries and this causes colic and intermittent weakness of the hindquarters. Foals and young solipeds suffer more than adult animals.

Oesophagostomum columbianum is commonly known as the nodular worm. It has a wide distribution and occurs in the large intestine of sheep, goats and 14 species of antelopes. Infection results from the ingestion of infective larvae. A persistent diarrhoea, progressive emaciation, cachexia and general weakness are common symptoms before death supervenes. Nodular enteritis is often seen at autopsy.

Family: Ancylostomidae

Ancylostoma braziliense often occurs in association with *A. caninum* in the small intestine of dogs and cats. The latter hookworm has been described also from the genet cat and honey badger. The life cycle of both species is the same, and their eggs are morphologically indistinguishable. Infective larvae enter the host through the mouth or the skin. Prenatal infections with a fatal termination within a month after birth are also known to occur in puppies. Larvae exert their pathogenicity during their migration in the internal organs. Adults inflict wounds on the intestinal mucosa, and gorge blood at these sites.

The entrance of larvae of both species through the skin causes marked local reactions in the cutis and subcutis. Cutaneous lesions also occur in man, and there is a tendency for the larvae to persist for long periods in the skin. The lesions are commonly referred to as " creeping eruption " or " sandworm ". The infective larvae of *A. braziliense* are the more common invaders, and produce long linear lesions. In the case of *A. caninum* the larvae produce a bulla with an indurated edge which usually bursts, and after some time another bulla appears some distance from the first. As time progresses further bullae may appear with no visible track (Elsdon–Dew, 1954). It thus becomes apparent that the type of lesion produced permits the identification of the aetiological agent.

Bunostomum trigonocephalum is commonly known as the grassveld hookworm. It occurs in the small intestine of sheep and goats, and has been found also in a reedbuck. Infective larvae gain entrance in the host by ingestion or through the skin, and then migrate in the internal organs. The adult worms are greedy bloodsuckers. Infected animals become anaemic, show inappetence, digestive disturbances, emaciation, anasarca and general weakness. Mortality rate is high.

Gaigeria pachyscelis, the sandveld hookworm, parasitizes sheep and goats. It has been recorded also from three antelope species. In common with other hookworm species larvae migrate through the internal organs, reach the lung, escape into the bronchi, are coughed up and swallowed and then establish themselves in the duodenum as adult worms. They are insatiate blood feeders and produce anaemia, anorexia, cachexia and death. It is the most deadly of sheep worms (Mönnig, 1944).

Family: Trichostrongylidae

Trichostrongylus colubriformes occurs in the proximal region of the small intestine but may also invade the abomasum of domestic and wild ruminants. *T. axei* is an abomasal parasite of domestic and wild ruminants and a gastric parasite of horses. There is no evidence that it parasitizes man in South Africa. *T. falculatus* and *T. rugatus* inhabit the small intestine of domestic and wild ruminants.

Eggs of the *Trichostrongylus* spp. which harbour larvae are resistant and withstand desiccation for more than a year. *T. axei* larvae penetrate the abomasal mucosa or gastric mucosa of horses. Larvae of the other species invade the mucosa of the small intestine. Adult worms are blood suckers. *T. axei* is slightly pathogenic. Cattle rarely suffer but severe reactions terminating fatally can be expected particularly in young sheep and goats.

Ostertagia spp. are commonly referred to as " brown stomach worms ". They are found in the abomasum of small domestic ruminants and several antelopes. *O. ostertagi* also parasitizes cattle. Infection follows the ingestion of infective larvae. The adult worms suck blood and produce anaemia, cachexia, weakness and death in sheep and goats. Cattle may be also severely affected.

Cooperia spp. are usually encountered in the small intestine but may also invade the abomasum of domestic and wild ruminants. The host range, given in Table 7 (*b*), is summarized briefly in the subjoined Table 7 (*a*).

TABLE 7 (*a*).—*Incidence of* Cooperia *spp. in domestic and wild ruminants*

Species	Ox	Sheep	Goat	Antelopes
C. curticei	+	+	+	+++++++++
C. punctata	+	±	—	+++++
C. pectinata	+	±	—	+++++
C. oncophora	+	+	—	—
C. antidorca	—	+E	—	+
C. fuelleborni	—	+E	—	++++
C. hungi	—	+E	—	++++
C. neitzi	—	+E	—	++
C. serrata	—	+E	—	+

+E = Experimental transmission
\+ = Natural infections
± = Rarely seen in sheep

Ortlepp (1964) has reviewed the South African literature and supplemented the available information on the pathogenicity and distribution of *C. curticei*, *C. punctata*, *C. pectinata* and *C. oncophora* of domestic stock with his own observations. He comes to the conclusion that all these species are confined to cattle and that all species with the exception of *C. curticei* only appear exceptionally in sheep. *C. punctata* and *C. pectinata* can be considered to be typical parasites of cattle outside the winter rainfall areas, and *C. oncophora* and *C. curticei* to be parasites of the winter rainfall areas of South Africa.

Infection follows the ingestion of infective larvae. Worms enter the intestinal mucosa and suck blood. The pathogenicity is dependent upon the degree of the parasitaemia. The anaemia that develops is more marked than that produced by trichostrongylosis.

Nematodirus spathiger is a parasite of the small intestine of sheep and goats and sometimes also of cattle. Larvae develop in eggs and hatch only when the infective stage has been reached after two ecdyses. The free larvae are very resistant to desiccation and freezing (Mönnig, 1934). Infection follows the ingestion of infective larvae. It is a relatively harmless parasite but it is known to promote the pathogenicity of other worm species.

Haemonchus contortus parasitizes the abomasum of domestic and wild ruminants. According to Reinecke (1960) and Hobbs (1961) the parasite of cattle in South Africa is in reality *Haemonchus placei* (Place, 1893). Since it has been recorded as *H. contortus* by previous workers the bovine parasite has been listed by this name in the subjoined Table 7 (*b*).

H. contortus has an extremely wide host range which includes the domestic ruminants, 19 antelope species, the giraffe and camel. Infection follows the ingestion of infective larvae. The worms are blood suckers and cause anaemia, emaciation, anasarca, general weakness and death in domestic ruminants. It may also be highly pathogenic for antelopes as evidenced by a fatal infection in a blesbuck from the Rustenburg district.

H. bedfordi has been described from nine antelope species. It has been established that sheep are susceptible to an artificial infection.

Family: Metastrongylidae.

Dictyocaulus arnfieldi occurs in the bronchi of the horse, donkey and zebra. The eggs are coughed up, swallowed and passed through the alimentary tract of the host. The larvae usually do not hatch before the eggs are passed with the faeces. The larvae develop into the infective stage and their ingestion results in the infection of the host. They invade the intestinal wall, migrate to the mesenteric lymph glands and from there via the lymph vessels and blood vessels to the lungs. Although it causes some irritation it appears that this species is not very pathogenic.

D. viviparus inhabits the bronchi of cattle, horse and eland. The life-cycle is similar to that of *D. arnfieldi*. Adult worms are blood suckers and cause a great deal of irritation. Calves are very susceptible, and develop coughing attacks. Severe infections are known to produce pulmonary emphysema. Pneumonia may be a secondary complication.

D. filaria has so far only been encountered in sheep and goats in South Africa. It inhabits the bronchi. Eggs are coughed up and swallowed. The larvae hatch while passing through the alimentary tract. Infective larvae live for serveral months in moist conditions. The life-cycle is similar to that of *D. arnfieldi*. Adult worms are blood suckers, and irritate the bronchial mucosa. Young animals are chiefly affected. Dyspnoea, anaemia, emaciation and diarrhoea are common symptoms.

Muellerius capillaris occurs in the alveoli and pulmonary parenchyma of sheep and goats. Eggs are spread through the lung tissues. Larvae hatch, escape from the lungs, pass through the alimentary tract and are voided with the faeces. They are fairly resistant and continue their life cycle in a snail or slug which they enter by the oral route or through the foot. Sheep and goats become infected by swallowing the intermediate host harbouring infective larvae. They invade the intestinal mucosa and reach the lungs via the blood stream. Infection is usually encountered in animals older than six months. The parasite is not very pathogenic unless a severe infection is present in the host.

Order: Spiruroidea

Family: Spiruridae

Habronema muscae, *H. microstoma* and *H. megastoma* are parasites of domestic and wild solipeds. The former two species occur free in the stomach, rarely in the mucosa, while the latter one appears in tumours of the gastric mucosa. Larvae are voided with the faeces and are then ingested by fly maggots which develop in the manure.

The biological transmission is effected by the adult flies. The vertebrate host usually acquires the infection by the ingestion of flies that fall into the water or food. Cutaneous habronemiasis develops at the sites where infective larvae are deposited on wounds by flies.

The worms are not very pathogenic. Tumours may interfere with the physiological function of the pyloric sphincter. A catarrhal gastritis is a common symptom.

Family: Ascaropidae

Gongylonema pulchrum occurs in the oesophageal mucosa and submucosa of cattle, sheep and goats. It may also appear in the rumen. The eggs of the parasites are voided with the faeces and are swallowed by coprophagous beetles. Larvae hatch in the intermediate host and develop into the infective stage. The vertebrate host acquires the infection when it ingests infected beetles.

G. verrucosum is a parasite of cattle, sheep and goats while *G. mönnigi* occurs in the latter two ruminants. Both species occur in the rumen. Their life cycle is probably the same as that of *G. pulchrum*.

The *Gongylonema* spp. appear to be harmless parasites.

Order: Filaroidea

Family: Filariidae

Setaria equina has been described from the peritoneal cavity of domestic and wild solipeds. The vector has not been established in South Africa. It may produce fibrinous peritonitis but is generally regarded to be of no pathogenic significance.

S. hornbyi has been found in the peritoneal cavity of sheep and six antelopes. The vector is unknown. It appears to be non-pathogenic.

TABLE 7 (*b*).—*Nemathelminthes*

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Nematoda Ascaroidea Ascaridae *Ascaris lumbricoides* Linnaeus, 1758.	Mammalia Primates Hominidae	*Homo sapiens* Linn.	Man.....	Endemic	+	+	+	+	+	+	Buchanan, 1935–1947; Gray, 1935–1939; Harrington, 1942, 1945; Neser, 1944–1954; Anon., 1948–1955; Hirsch, 1954–1955; Kallichurum & Elsdon-Dew, 1961
	Artiodactyla Suidae	*Sus scrofa* Linn.	Domestic pig.....	Enzootic	+	+	+	+	+	+	Mönnig, 1928, 1934
Ascaris equorum Goeze, 1782.	Perissodactyla Equidae	*Equus caballus* Linn.	Horse.....	Enzootic	+	+	+	+	+	°	Gough, 1908; Theiler, 1923; Mönnig, 1928, 1934; Le Roux, 1930
		Equus asinus Linn.	Donkey.....	Enzootic	+	+	+	+	+	°	Mönnig, 1928, 1934; Le Roux, 1930
		E. caballus X *E. asinus*	Mule.....	Enzootic	+	+	+	+	+	°	Mönnig, 1928, 1934; Le Roux, 1930
		Equus burchelli (Gray).	Zebra.....	Sporadic	°	+	°	°	°	°	Gough, 1908; Mönnig, 1928
		Equus zebra (Linn.)	Mountain zebra..	Sporadic	°	°	+	°	°	°	Mönnig, 1926, 1928
Toxascaris leonina (v. Linstow, 1902).	Carnivora Canidae	*Canis familiaris* Linn.	Dog.....	Enzootic	+	+	+	+	+	°	Mönnig, 1928, 1934; Verster, 1964
		Lycaon pictus (Temminck).	Cape hunting dog	Sporadic	°	+	°	°	°	°	Veglia, 1919; Mönnig, 1928
Toxacara canis (Werner, 1782).	Canidae.....	*Canis familiaris* Linn.	Dog.....	Enzootic	+	+	+	+	+	°	Mönnig, 1928; Verster, 1964
	Hominidae	*Homo sapiens* Linn.	Man.....	Endemic	°	°	+	°	°	°	Cochrane, Sagorin & Wilcocks, 1957; Beaver, 1958

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.

TABLE 7 (*b*).—*Nemathelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Toxacara mystax (Zeder, 1800).	Felidae.....	*Felis catus* Linn.	Cat.....	Sporadic	°	°	+	°	°	°	Cochrane, Sagorin & Wilcocks, 1957; Beaver, 1958
	Hominidae...	*Homo sapiens* Linn.	Man.....	Sporadic	°	°	+	°	°	°	Cochrane, Sagorin & Wilcocks, 1957; Beaver, 1958
Kathlaniidae *Probstmayria vivipara* (Probstmayr, 1865).	Equidae.....	*Equus caballus* Linn.	Horse.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928, 1934; Reinecke, 1964
		Equus asinus Linn.	Donkey.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928; Reinecke, 1964
		Equus burchelli Linn.	Zebra.....	Sporadic	°	+	°	°	°	°	Theiler, 1923; Mönnig, 1928
Oxyuridae *Oxyuris equi* (Schrank, 1788).	Perissodactyla Rhinocerotidae	*Diceros bicornis* (Linn.)	Black rhinoceros	Sporadic	°	+	°	°	°	°	Mönnig, 1928
	Equidae.....	*Equus caballus* Linn.	Horse.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928
		Equus asinus Linn.	Donkey.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928
		E. caballus X *E. asinus*	Mule.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928
		Equus burchelli (Gray).	Zebra.....	Sporadic	°	+	+	°	°	°	Mönnig, 1928; Curson, 1928
		Equus zebra (Linn.).	Mountain zebra..	Sporadic	°	+	°	+	°	°	Mönnig, 1926, 1928
Skrjabinema ovis (Skrjabin, 1915).	Bovidae.....	*Ovis aries* Linn.	Sheep.....	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961
		Raphicerus campestris (Thunberg).	Steenbuck.....	Swaziland	°	°	°	°	°	°	Mönnig, 1932; Ortlepp, 1961

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.
* = Locality given as South Africa.

TABLE 7 (*h*).—*Nemathelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Skrjabinema alata Mönnig, 1932.	Bovidae.....	*Ovis aries* Linn.	Sheep.....	Sporadic*	°	°	°	°	°	°	Mönnig, 1932
		Raphicerus campestris (Thunberg).	Steenbuck.....	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961
Rhabditidae *Strongyloides papillosus* (Wedl., 1856).	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	+	+	+	+	+	°	Mönnig, 1934; Reinecke, 1964
		Capra hircus Linn.	Goat.....	Enzootic	+	+	+	+	+	°	Mönnig, 1928, 1934; Reinecke, 1964
		Ovis aries Linn.	Sheep.....	Enzootic	+ °	+ °	+ °	+ +	+ °	° °	Mönnig, 1928, 1934; Reinecke, 1964 Meldal-Johnson, Muller & Thomas, 1960
		Antidorcas marsupialis (Zimmermann).	Springbuck.....	Lab. test	°	+	°	°	°	°	Mönnig, 1931; Ortlepp, 1961
Trichinelloidea Trichinellidae *Trichuris globulosa* (v. Linstow, 1901).	Bovidae.....	*Bos taurus* Linn.	Ox.....	Enzootic	+	+	+	+	+	°	Mönnig, 1934, 1944; Ortlepp, 1937
		Capra hircus Linn.	Goat.....	Enzootic	+	+	+	+	+	°	Mönnig, 1934, 1944; Ortlepp, 1937
		Ovis aries Linn.	Sheep.....	Enzootic	+	+	+	+	+	°	Mönnig, 1934, 1944; Ortlepp, 1937
		Oryx gazella (Linn.).	Gemsbuck.....	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961
		Ozanna grandicornis (Herrmann).	Sable antelope....	Sporadic*	°	°	°	°	°	°	Ortlepp, 1937, 1961
	Giraffidae....	*Giraffa camelopardalis* (Linn.).	Giraffe.....	Sporadic*	°	°	°	°	°	°	Ortlepp, 1961

O. = Orange Free State; T. = Transvaal; N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.
* = Locality given as South Africa.

TABLE 7 (*b*).—*Nemathelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Trichuris trichuria (Linnaeus, 1771).	Hominidae...	*Homo sapiens* Linn.	Man.....	Enzootic	+	+	+	+	+	°	Gray, 1935–1939; Buchanan, 1939–1947; Barnetson, 1942–1943; Harrington, 1942–1955; Neser, 1944–1954; Anon., 1948–1955
	Cercopithecidae	*Cercopithecus aethiops pygerythrus* (F. Cuvier).	Vervet monkey...	Sporadic	°	+	°	°	°	°	Mönnig, 1923
	Suidae.....	*Sus scrofa* Linn.	Domestic pig.....	Enzootic	+	+	+	+	+	°	Mönnig, 1934; Reinekce, 1964
Capillaria hepatica (Bancroft, 1893).	Hominidae...	*Homo sapiens* Linn.	Man.....	Sporadic	°	+	+	°	°	°	Cochrane, Sagorin & Wilcocks, 1957; Cochrane & Skinstad, 1960; Kallichurum & Elsdon-Dew, 1961
	Canidae.....	*Canis familiaris* Linn.	Dog.....	Sporadic	°	+	°	°	°	°	Smit, 1960
	Viverridae...	Species?.....	Meerkat.....	Sporadic*	°	°	°	°	°	°	Cochrane, Sagorin & Wilcocks, 1957
	Rodentia Muridae	Species?.....	Rat.....	Enzootic	°	+	°	°	°	°	Cochrane, *et al.*, 1957; Smit, 1960
		Species?.....	Mouse.....	Sporadic*	°	°	°	°	°	°	Cochrane, *et. al.*, 1957
	Gerbillidae...	Species?.....	Gerbille.....	Sporadic*	°	°	°	°	°	°	Cochrane, *et. al.*, 1957; Smit, 1960
	Lagomorpha Leporidae	*Lepus cuniculus* Linn.	Rabbit.....	Sporadic*	°	°	°	°	°	°	Cochrane, *et. al.*, 1957
		Species?.....	Hare.....	Sporadic*	°	°	°	°	°	°	Cochrane, *et. al.*. 1957
	Lipotyphla...	Species?.....	Hedgehog.....	Sporadic*	°	°	°	°	°	°	Smit, 1960

O. = Orange Free State; T. = Transvaal, N. = Natal; W. = Western Cape Province; E. = Eastern Cape Province; S. = South West Africa.
* = Locality given as South Africa.

TABLE 7 (*b*).—*Nemathelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Strongyloidea Strongylidae *Strongylus equinus* Müller, 1780. *S. edentatus* (Loos, 1900).	Equidae.....	*Equus caballus* Linn.	Horse.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928, 1934
		Equus asinus Linn.	Donkey.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928, 1934
		E. caballus X *E. asinus*	Mule.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928, 1934
Strongylus vulgaris (Loos, 1900).	Equidae.....	*Equus caballus* Linn.	Horse.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928, 1934
		Equus asinus Linn.	Donkey.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928, 1934
		E. caballus X *E. asinus*	Mule.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928, 1934
		Equus burchelli (Gray).	Zebra.....	Sporadic*	°	°	°	°	°	°	Theiler, 1923; Mönnig, 1928
		Equus zebra (Linn.).	Mountain zebra...	Sporadic*	°	°	°	°	°	°	Mönnig, 1928
Oesophagodontus robustus (Giles, 1892).	Equidae.....	*Equus caballus* Linn.	Horse.....	Enzootic	+	+	+	+	+	°	Mönnig, 1928
		E. caballus X *E. asinus*	Mule.....	Enzootic	+	+	+	+	+	°	Mönnig, 1928
Triodontophorus brevicauda Boulenger, 1916.	Equidae.....	*Equus caballus* Linn.	Horse.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928
		Equus asinus Linn.	Donkey.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928

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TABLE 7 (*b*).—*Nemathelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Triodontophorus minor Loos, 1900. *T. serratus* Loos, 1900. *T. tenuicollis* Boulenger, 1916.	Equidae.....	*Equus caballus* Linn.	Horse.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928
		Equus asinus Linn.	Donkey.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928
		E. caballus X *E. asinus*	Mule.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928
		Equus zebra (Linn.).	Mountain zebra...	Sporadic*	°	°	°	°	°	°	Mönnig, 1928
Craterostomum mucronatum Ihle, 1920.	Equidae.....	*Equus caballus* Linn.	Horse.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928
		Equus asinus Linn.	Donkey.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928
		E. caballus X *E. asinus*	Mule.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928
		Equus burchelli (Gray).	Zebra.....	Sporadic*	°	°	°	°	°	°	Mönnig, 1928
		Equus zebra (Linn.).	Mountain zebra...	Sporadic*	°	°	°	°	°	°	Mönnig, 1928
Trichonemina spp.	Equidae.....	*Equus caballus* Linn.	Horse.....	Enzootic	+	+	+	+	+	°	Mönnig, 1928
		Equus asinus Linn.	Donkey.....	Enzootic	+	+	+	+	+	°	Mönnig, 1928
		E. caballus X *E. asinus*	Mule.....	Enzootic	+	+	+	+	+	°	Mönnig, 1928
		Equus burchelli (Gray).	Zebra.....	Sporadic*	°	°	°	°	°	°	Mönnig, 1928
		Equus zebra (Linn.)	Mountain zebra..	Sporadic*	°	°	°	°	°	°	Mönnig, 1928

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TABLE 7 (*b*).—*Nemathelminthes* (continued)

Parasite	Host				Region						Authorities
Class Order Family	Class Order Family	Genus and species	Vernacular name	Incidence	O.	T.	N.	W.	E.	S.	
Poteriostomum spp.	Equidae.....	*Equus caballus* Linn.	Horse.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928
		Equus asinus Linn.	Donkey.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928
		E. caballus X *E. asinus*	Mule.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928
		Equus burchelli (Gray).	Zebra.....	Sporadic*	°	°	°	°	°	°	Theiler, 1923; Mönnig, 1928
Gyalocephalus capitatus Loos, 1900.	Equidae.....	*Equus caballus* Linn.	Horse.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928
		Equus asinus Linn.	Donkey.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928
		E. caballus X *E. asinus*	Mule.....	Enzootic	+	+	+	+	+	°	Theiler, 1923; Mönnig, 1928
Oesophagostomum columbianum (Curtice, 1890).	Bovidae.....	*Ovis aries* Linn.	Sheep.....	Enzootic	+	+	+	+	+	+	Veglia, 1923, 1928; Mönnig, 1928, 1933*a*, 1944; Meldal-Johnson, Muller & Thomas, 1960; Rossiter, 1961; Muller, 1962; Reinecke & Rossiter, 1962; Reinecke, 1964
	Bovidae.....	*Capra hircus* Linn.	Goat.....	Enzootic	+	+	+	+	+	°	Mönnig, 1928, 1944; Reinecke, 1964
		Aepyceros melampus (Lichtenstein).	Impala.....	Sporadic	°	+	°	°	°	°	Mönnig, 1933*b*; Ortlepp, 1961
		Antidorcas marsupialis (Zimmermann).	Springbuck.....	Zool. gardens	°	+	°	°	°	°	Le Roux, 1930; Ortlepp, 1961

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