

## **Annual report of the Sudan Veterinary Service.**

### **Contributors**

Sudan. Veterinary Service.

### **Publication/Creation**

[Khartoum] : [publisher not identified], [1939]

### **Persistent URL**

<https://wellcomecollection.org/works/e629dpnk>

### **License and attribution**

This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.



Wellcome Collection  
183 Euston Road  
London NW1 2BE UK  
T +44 (0)20 7611 8722  
E [library@wellcomecollection.org](mailto:library@wellcomecollection.org)  
<https://wellcomecollection.org>

Im. 10448

STRICTLY CONFIDENTIAL

AC. 12

FOR OFFICIAL USE ONLY

ANNUAL REPORT  
OF THE  
SUDAN VETERINARY SERVICE  
1939.



WELLS
LIBRARY
+
Ann Rep
V28
.HS86
\$94
1939



22501562118

SECTION I.

Diseases of Animals ...

SECTION II.

Trade in Livestock and  
Livestock Products ...

SECTION III.

Improvement of Livestock ...

SECTION IV.

Education ANNUAL REPORT  
OF

THE SUDAN VETERINARY SERVICE  
FOR THE YEAR 1939

SECTION V.

Miscellaneous ...


APPENDIX I.

Financial ...

APPENDIX II.

Report of ...





Digitized by the Internet Archive  
in 2019 with funding from  
Wellcome Library

	Page
<u>SECTION I.</u>	
Diseases of Animals ...	3
<u>SECTION II.</u>	
Trade in Livestock and Livestock Products	11
<u>SECTION III.</u>	
Improvement of Livestock ...	20
<u>SECTION IV.</u>	
Education ... ..	24
<u>SECTION V.</u>	
Miscellaneous ... ..	25
<u>APPENDIX I.</u>	
Financial Statement ...	25
<u>APPENDIX II.</u>	
Report of the Senior Research Officer	30

SECTION I.

3 Diseases of Animals ...

SECTION II.

11 Trade in Livestock and Livestock Products

SECTION III.

20 Improvement of Livestock ...

SECTION IV.

24 Education ...

SECTION V.

25 Miscellaneous ...

APPENDIX I.

25 Financial Statement ...

APPENDIX II.

26 Report of the Senior Research Officer

S T A F F

DISTRIBUTION OF BRITISH STAFF ON 31ST DECEMBER, 1939.

NAME	DESIGNATION	STATION
Captain H.B. Williams, O.B.E., M.R.C.V.S.	Director	Khartoum
Dr. S.C.J. Bennett, D.Sc., M.R.C.V.S.	Asst. Director and Senior Research Officer	Khartoum
Mr. J.T.R. Evans, B.Sc., M.R.C.V.S.	Veterinary Research Officer	Malakal
Captain C.P. Fisher, M.R.C.V.S.	Senior Veterinary Inspector	Khartoum
Captain T. Menzies, M.R.C.V.S. D.V.S.M. (Vict.)	"	El Fasher
Captain L.E. Prichard, O.B.E., M.R.C.V.S.	"	Wad Medani
Mr. W.H. Glanville, M.R.C.V.S.	Veterinary Inspector, Head- quarters and Registrar Veterinary School	Khartoum
Mr. J.E. Furney, M.R.C.V.S.	Veterinary Inspector	Kassala
Mr. I.A. Gillespie, M.R.C.V.S.	"	El Obeid
Mr. A.W. Chalmers, M.R.C.V.S.	"	Kosti
Mr. P. Durran, M.R.C.V.S.	"	Shendi
Mr. J.D.M. Jack, M.R.C.V.S.	"	Malakal
Mr. J.K. Thomson, M.R.C.V.S., D.V.S.M.	"	Wad Medani
Mr. P.Z. Mackenzie, M.R.C.V.S.	"	El Obeid
Mr. H.A. McLoghry	Superintendent	Khartoum
Mr. P.A.C. Kennedy, F.R.M.S.	Laboratory Assistant	Khartoum
Mr. C.B. Barrett.	Chief Storekeeper	Khartoum



No.	Name	Address
1	...	...
2	...	...
3	...	...
4	...	...
5	...	...
6	...	...
7	...	...
8	...	...
9	...	...
10	...	...
11	...	...
12	...	...
13	...	...
14	...	...
15	...	...
16	...	...
17	...	...
18	...	...
19	...	...
20	...	...
21	...	...
22	...	...
23	...	...
24	...	...
25	...	...
26	...	...
27	...	...
28	...	...
29	...	...
30	...	...
31	...	...
32	...	...
33	...	...
34	...	...
35	...	...
36	...	...
37	...	...
38	...	...
39	...	...
40	...	...
41	...	...
42	...	...
43	...	...
44	...	...
45	...	...
46	...	...
47	...	...
48	...	...
49	...	...
50	...	...

ESTABLISHMENT OF NON-BRITISH CLASSIFIED STAFF, 1939.

2	Veterinary Overseers
2	Animal Husbandry Officers
1	Head Clerk
8	Clerks
3	Book-keepers
1	Sarrafi
1	Store-keeper
14	Head Stockmen
1	Southern Supervisor
4	Southern Stockmen.

UNCLASSIFIED STAFF AS AT 31.12.1939.

61	Stockmen
1	Carpenter
2	Storemen
4	Motor Drivers
9	Messengers
70	Veterinary Attendants
5	Shoeing Smiths
2	Pump Drivers
1	Ghaffir

In addition to the above there are large numbers of Tribal Veterinary Retainers, chiefly in the Native Administrations, who are supervised by Province Veterinary Inspectors.

UNCLASSIFIED STATE AND LOCAL CLASSIFIED STATE, 1975

- 2 Veterinary Laboratory of P...
- 3 Animal Husbandry Division
- 4 Health Dept.
- 5 State
- 6 Food Safety
- 7 Federal
- 8 State
- 9 H. Jackson
- 10 Wildlife Department
- 11 Northern District

UNCLASSIFIED STATE AND LOCAL CLASSIFIED STATE, 1975

- 12 Southern
- 13 Center
- 14 Division
- 15 Food Safety
- 16 Veterinary
- 17 Veterinary Assistant
- 18 County Health
- 19 Food Safety
- 20 Health

In addition to the above there are large numbers of other unclassified documents, chiefly in the State Administration, and are supervised by various Veterinary Inspectors.

Mr. H. Kieran was engaged on first appointment on 9.1.1939 and was posted to Kordofan Province. At the outbreak of War his request to be allowed to resign was granted, and he proceeded on final leave in November. The vacant post in Kordofan was filled by Mr. P.Z. Mackenzie, who arrived in the Sudan on first appointment on 21st October, 1939.

In December, Mr. R.C. Couldrey, the President of the Sudan Resources Board, accompanied by Captain H.B. Williams, Director Sudan Veterinary Service, visited Egypt and there, amongst other matters, discussed with the Egyptian Authorities concerned a scheme for regularising and improving the conditions governing the supply and sale of Sudan live-stock in Egypt.

Captain Williams also proceeded to Palestine to examine the possibility of opening up a trade in Sudan live-stock to that country. The Palestinian Authorities have agreed to lift the embargo on Sudan cattle, instituting in its place permission to import for immediate slaughter, and trade negotiations are now proceeding between the Palestinian importers and the Sudan Chamber of Commerce.

Mr. H. Kibben was engaged on first appointment on 2.1.1939 and was posted to Kordofan Province. At the outbreak of the war his request to be allowed to resign was granted, and he proceeded on final leave in November. The vacant post in Kordofan was filled by Mr. I. A. Mackenzie, who arrived in the Sudan on 1st October, 1939.

In December, Mr. H. C. Douglas, the President of the Sudan Research Board, accompanied by Captain H. B. Williams, Director Sudan Veterinary Service, visited Egypt and there, amongst other matters, discussed with the Egyptian authorities concerned a scheme for regulating and improving the conditions governing the supply and sale of Sudan live-stock in Egypt.

Captain Williams also travelled to Palestine to examine the possibility of opening up a trade in Sudan live-stock to that country. The Palestine authorities have agreed to lift the embargo on Sudan cattle, permitting in its place permission to import for immediate slaughter, and trade negotiations are now proceeding between the Palestine Importers and the Sudan Chamber of Commerce.

SECTION IDISEASES OF ANIMALS.I. DISEASES OF CATTLECattle Plague

Although of a low virulence the disease was widespread. Reports of outbreaks were received from all cattle rearing districts except those of Northern Province.

In all cases where outbreaks were immediately reported to Veterinary representatives, thus making it possible to enforce routine methods of control, i.e. serumisation of all in-contacts followed by deliberate mixing of serumised and diseased beasts and vaccination of a circle of cattle round the infected herd, the mortality was light and the disease was prevented from spreading further afield.

The Senior Veterinary Inspector, Kordofan Province, reports that :-

"Rinderpest vaccine is very popular with most tribes. The Messeria claim that they have improved on the technique of vaccination. Towards the end of the prescribed period, as the temporary immunity fades, they put their cattle in contact with infected beasts. Natural infection results in many cases and permanent immunity follows. It is said that the death rate is very low as a result of this practice. The inhabitants of the Nuba Mountains are gradually gaining confidence in veterinary activities, but owners are still suspicious in many hills and reports of outbreaks often come in too late to be of any use. However, more extensive use is being made of prophylactics by chiefs and heads of communities, usually for the benefit of their private herds, but no doubt the practice will spread to their people later on."

SECTION I

DISEASES OF CATTLE

I. DISEASES OF CATTLE

Cattle Plague

Although a low virulent form of disease was identified in the Province of Ontario in 1872, it has since been reported from all parts of the Province except those of Northern Ontario.

In all cases where outbreaks have immediately reported to the Provincial Government, the animals it possible to secure within a few days of contact, but the possibility of all in-contact, followed by deliberate stamping out, and the disease being and vaccination of a circle of cattle round the infected herd, the mortality was high and the disease was spread to the surrounding further fields.

The General Veterinary Inspector, Kingston Province, reports that:

"Cattle plague is a very serious and contagious disease. The infection does not pass from one animal to another as the rule of the present period, as the majority of the cases, but only in contact with infected animals. Natural infection results in very severe and permanent lameness. It is not the death rate is very low as a result of this practice. The importance of the disease to the Province is gaining consideration in view of the fact that the cattle are still numerous in the Province and are of value to the Province. However, more extensive use is being made of prophylactic measures and the Province is gradually lessening the amount of private practice and the practice will be less in the future."

The following summarises the activities of this Service in the control of outbreaks of Cattle Plague during 1935.

Province	Out-breaks	Infected	Deaths	Serumised	Vaccinated
Kordofan	286	96989	1723	12642	59630
Darfur	189	85643	731	26974	63515
Gezira	184	20264	239	5926	5234
White Nile Area	250	70330	1058	19624	1914
Northern	1	150	1	116	-
Khartoum	5	1515	37	-	1428
Kassala	52	9008	269	2420	15
Upper Nile	16	2367	28	1692	391
Total	985	290266	4113	69394	132127

The mortality in the above outbreaks was approximately 1.4 per cent.

In addition to that used at the actual seat of outbreaks, approximately 40,000 doses of cattle plague serum and over 30,000 doses of cattle plague vaccine were used prophylactically for immunising cattle for export, for safeguarding Government and Mission herds and, in many instances, for creating barriers of immune cattle round outbreaks in those districts where cattle were of sufficient economic value to justify the cost of using large quantities of prophylactics.

In the face of difficulty in obtaining an adequate supply of the Upper Nile Province Cattle, which for many reasons are the most suitable for serum making, the Research Officer and his staff at Malakal did excellent work, and far exceeded expectations, in producing over 113,000 doses of serum, whilst the Khartoum Laboratory staff under the Senior Research Officer in turning out a record of nearly 165,000 doses of vaccine, provided sufficient for normal requirements and for use in substitution of a large portion of the 1936 serum which was discarded for technical reasons.



The following summarizes the activities of this Service in the control of rinderpest in this Province during 1953.

Province	Number of Cattle	Number of Buffaloes	Number of Goats	Number of Sheep	Number of Pigs
Kordofan	1,200,000	100,000	500,000	200,000	100,000
Darfur	1,500,000	150,000	700,000	300,000	150,000
Senar	1,000,000	100,000	500,000	200,000	100,000
White Nile	1,200,000	100,000	500,000	200,000	100,000
Anech	1,000,000	100,000	500,000	200,000	100,000
Northem	1,000,000	100,000	500,000	200,000	100,000
Khartoum	1,000,000	100,000	500,000	200,000	100,000
Kassala	1,000,000	100,000	500,000	200,000	100,000
Upper Nile	1,000,000	100,000	500,000	200,000	100,000
Total	10,000,000	1,000,000	5,000,000	2,000,000	1,000,000

The mortality in the above countries was approximately 1.4 per cent.

In addition to the work at the actual seat of outbreak, approximately 10,000 doses of vaccine were used and over 20,000 doses of cattle serum vaccine were used prophylactically for imported cattle for export. For safeguarding imported or local herds and, in many instances, for creating herds of immune cattle found elsewhere in Sudan, 100,000 doses of vaccine were of sufficient amount to provide the best of using large quantities of prophylactic.

In the case of rinderpest in Senar, an adequate supply of the Upper Nile Province cattle which for many reasons are the best available for serum making, the Government of Senar and the State of Khartoum did excellent work, and the rinderpest vaccine, in producing over 75,000 doses of serum, at the Khartoum Laboratory while the State Government of Senar is turning out a record of nearly 10,000 doses of vaccine, provided sufficient for normal requirements and for use in substitution of a large portion of the 100,000 doses which was discarded for seasonal reasons.

Contagious Bovine Pleuro-pneumonia.

The incidence was everywhere light and, as was the case last year in the Northern Sudan, was chiefly confined to merchant-owned trade cattle. Only Northern Province, where there are no trade cattle to spread the disease, remained free of infection. In Kassala Province, which up to January of this year had been free of disease for six years, the Veterinary Inspector attributed the five reported outbreaks to infection brought in by trade cattle en route to Eritrea.

The following table shows outbreaks other than those amongst trade cattle :-

Province	Outbreaks	Infected	Deaths	Vaccinated
Kordofan	34	5499	39	-
Darfur	2	220	-	220
Gezira	22	2279	67	2125
White Nile Area	9	3373	18	3356
Northern	-	-	-	-
Khartoum	-	-	-	-
Kassala	5	1046	40	674
Upper Nile	4	714	9	603
Total	76	13133	175	11905

Approximately 35,000 doses of vaccine were used, 11,905 on the cattle of infected herds, 8,950 on trade cattle registered for export and the remainder on the protection of animals of economic importance.

Foot-and-Mouth Disease.

The routine artificial infection of all cattle intended for export to Egypt was carried out in the early rains and in consequence no case of foot-and-mouth disease was seen in the quarantines throughout the year.

Controlling Bovine Pleuropneumonia

The incidence was everywhere light and, as was the case last year in the Northern District, was chiefly confined to government-owned trade cattle. Only Northern Province, where there are no trade cattle, reported the disease, remaining free of infection. In Southern Province, which up to January of this year had been free of disease for six years, the Veterinary Inspector attributed the five reported outbreaks to infection brought in by trade cattle en route to Bulawayo.

The following table shows outbreaks elsewhere other than those amongst trade cattle:

Province	Cattle	Outbreaks	Cattle	Outbreaks
Kordofan	21	2	21	2
Bahr	230	1	230	1
Gozia	225	2	225	2
White Nile Area	258	1	258	1
Northern	-	-	-	-
Khartoum	-	-	-	-
Sennar	67	1	67	1
Upper Nile	60	1	60	1
Total	1102	10	1102	10

Approximately 25,000 doses of vaccine were used, 11,000 on the cattle of infected herds, 6,500 on trade cattle registered for export and the remainder on the protection of animals of economic importance.

Foot-and-mouth disease

The routine practice of infection of all cattle intended for export to Egypt was carried out in the early rains and in consequence no cases of foot-and-mouth disease was seen in the district throughout the year.

Anthrax.

No positive case was observed in the Sudan in 1935, but the Egyptian Authorities reported a case in a Sudanese sheep at Alexandria Quarantine. This animal had left the Sudan some weeks previously.

Trypanosomiasis.

The Veterinary Inspector, Upper Nile Province, reports :-

"This disease is more extensive in the Upper Nile than was previously supposed. In the early part of the year investigations were carried out in the north of Bor district following a large number of deaths from an unknown disease. Symptoms of sick animals indicated trypanosomiasis, and T. uniforme was discovered in blood smears submitted to the Laboratory. No tse-tse fly was discovered in the district."

In Gezira Province isolated cases occurred near the Dinder river in Sennar district.

Three cases of T. congolense were diagnosed in the station transport bulls at Kadugli, Nuba Mountains.

Mange.

Psoroptic mange was prevalent amongst the working oxen of the Gezira cotton growing areas. The policy is to destroy those severely affected and only undertake the treatment of minor cases.

Liver Fluke.

That this disease was more prevalent than usual in Upper Nile Province following the heavy rains of 1938 was shown by the number of cases reported from Malakal slaughter house, where, of 752 cattle slaughtered 181 were infected with liver fluke.

In the drier pastoral areas of Northern Sudan these parasites are rarely seen in slaughtered cattle.

Amphibian

No positive case was observed in the Sudan in 1951, but the Egyptian authorities reported a case in a Sudanese report of Alexander's (1951). This animal had left the Sudan some weeks previously.

Trypanosomiasis

The Veterinary Inspector, Upper Nile Province reports:

"This disease is more extensive in the Upper Nile than was previously supposed. In the early part of the year investigations were carried out in the north of the district following large numbers of deaths of unknown disease. Trypanosomiasis was diagnosed in blood smears examined in the Laboratory. No other fly was discovered in the district."

In Gassia Province isolated cases occurred near the Dinder river in Gassia District.

Three cases of T. congolensis were diagnosed in the station-transport bullock at Kadugli, Gassia Mountains.

Lung

Pneumonic plague was prevalent among the working oxen of the Gassia cotton growing areas. The policy is to destroy those severely affected and only undertake the treatment of milder cases.

Liver Fluke

That this disease was more prevalent than usual in Upper Nile Province following the heavy rains of 1951 was shown by the number of cases reported from Malakal. Alligator house, north of the cattle slaughterhouse was infested with liver flukes.

In the other seasonal areas of Malakal Gassia these parasites are rarely seen in the water courses.

H o v e n.

The lateness of the rains in the cotton growing areas of Gezira Province caused many deaths amongst animals, particularly sheep, and numbers of those that survived the famine period when grazing was practically non-existent died of hoven from eating ravenously of the green fodder available after the ripening of the early grain crops.

Blackquarter.

This disease was reported from Soderi, Talodi and Dilling areas of Kordofan Province. Laboratory reports on smears from Hawazma cattle dead of the disease confirmed the diagnosis.

Bovine Farcy.

Commonly observed in Nuba cattle and Arab owned animals grazing in the Nuba Mountains districts of Kordofan Province.

2. DISEASES OF CAMELS.Trypanosomiasis.

Rainfalls well above the average in most camel rearing areas during 1938 and 1939 resulted in more cases of trypanosomiasis than usual being brought to our notice.

That infection was particularly high amongst Government-owned camels in Kassala and Gezira Provinces can only be attributed to the keeping of those animals for the performance of their duties during the rains in areas where fly vectors are prevalent. Nomad camel owners who move their herds slowly Northwards to fly-free areas at the onset of the rains escape heavy infection.

The following remarks by the Senior Veterinary Inspector, Kordofan Province, on Naganol treatment in his Province are of interest :-

"Naganol was not made available to native camel owners in the Province until 1934.

"Despite the fact that the drug had been in use for the treatment of Army and Police camels over a period of years, and that the Arab camel owners, therefore, must have known of its use, there was no great eagerness at first to bring camels for treatment.

The incidence of the disease in the cotton growing areas of the Province has been very low since the introduction of the disease in 1908. The disease was first reported in the Province in 1908 and since that time it has been reported from various parts of the Province. The disease is caused by the virus of the disease and is transmitted by the cotton fly.

Blackfly

This disease was reported from the Province in 1908 and since that time it has been reported from various parts of the Province. The disease is caused by the virus of the disease and is transmitted by the blackfly.

Bovine

Commonly observed in the Province and also in the Province. The disease is caused by the virus of the disease and is transmitted by the cow.

HYPERAEMIA

Hyperaemia is a disease of the Province and is caused by the virus of the disease. It is transmitted by the fly and is characterized by a high fever and a general prostration of the animal.

The disease is caused by the virus of the disease and is transmitted by the fly. It is characterized by a high fever and a general prostration of the animal. The disease is common in the Province and is also found in the Province.

The disease is caused by the virus of the disease and is transmitted by the fly. It is characterized by a high fever and a general prostration of the animal.

The disease is caused by the virus of the disease and is transmitted by the fly. It is characterized by a high fever and a general prostration of the animal.

The disease is caused by the virus of the disease and is transmitted by the fly. It is characterized by a high fever and a general prostration of the animal. The disease is common in the Province and is also found in the Province.

"In October, 1934, the drug was introduced to the Kabbabish and then to the Kawahla tribe at Um Gozein. Thirty-four camels were produced by the two Nazirs for treatment as a demonstration. All except two proved to be suffering from trypanosomiasis and were duly treated. The efficacy of the new drug was at once apparent and demands gradually increased. At first the treatment was carried out in distant areas by the Veterinary Inspector personally and by the Head Stockman at tribal gatherings, or special visits were made by arrangement with the tribal authorities to various centres after the rains. After a time the needs of the camel owners could not be satisfied in this way as there was a constant demand over the greater part of the year. Stockmen in the camel owning areas were trained in the administration of the drug and now Naganol is available at El Obeid, Bera, Soderi, Nahud and Um Ruaba.

"During the first few years it was noticed that the camels brought for treatment were nearly all genuine trypanosome cases. During the last two years tests have shown that many camels are not infected at all. It is little use telling a camel owner that his camel is not suffering from trypanosomiasis, as he has supreme confidence in his own diagnosis and the popularity of Naganol has suffered in no way. Despite the fact that supplies were interrupted owing to the war and that no treatment was given for two months the total issues for the year have been greater than ever, over 9,000 doses."

Sales of Naganol to Arab camel owners once more show a large expansion despite the fact that for a period of some weeks after the outbreak of War all demands for treatment could not be met owing to delay in delivery of a consignment of the drug on order at the time.

The figure given in the following table show how increasingly popular this successful form of treatment for trypanosomiasis is becoming :-

Sale of Naganol on Payment

	<u>Doses.</u>
1936 ... ..	9,000 (approx.)
1937 ... ..	10,813
1938 ... ..	13,440
1939 ... ..	17,818

Range.

The fact that there has for some years been a continued decrease in the number of cases of psoroptic mange reported in Government owned camels shows that our camel policemen are gradually learning that it pays to look out for skin disease and have it promptly treated.



"In October, 1954, the case was introduced to the Kaposi and then to the Jewish side at the Soviet. Thirty-four cases were followed by the two Hertz for treatment as a demonstration. All except two proved to be either the lymphoma or the carcinoma and were fully treated. The other two were not treated. At once appeared and later gradually improved. At first the treatment was carried out in a clinic where by the veterinary inspector personally and by the head of the local government, or special visits were made by emergency and with the special authorities to various districts after the trial. After a time the heads of the cases were held out to patients in the way as there was a constant demand for the greater part of the year. Attention in the case during these years turned to the establishment of the case and not reported in a review of the case, Robert, Hertz, and others.

"During the first few years it was noticed that the cases treated for these years were all cases of lymphoma cancer. During the last two years cases have been found many times and not limited at all. It is a little bit for the cases that this cancer is not entirely from lymphoma cancer, but he has expressed some doubts in his own opinion and the opinion of Kaposi and others in an early stage of the last that some cases interrupted during the war and that no treatment was given for the reason the local names for the cases have been treated from over 5,000 cases.

"Cases of Kaposi in Arab areas occur once also show a large expansion during the last few years for of some weeks after the outbreak of the all cases for treatment could not be carried out in delay in delivery of a constant of the case of cancer of the skin.

"The figure given in the following table show the incidence of lymphoma cancer in the last few years for lymphoma cancer in the case of cancer of the skin.

Table of Incidence of Lymphoma Cancer

Year	Number of Cases
1950	1,200 (approx.)
1951	1,300
1952	1,400
1953	1,500
1954	1,600

12345

The fact that there has been a continued increase in the number of cases of lymphoma cancer reported in Government owned areas shows that our cases reported are probably increasing and it pays to look out for skin disease and have it properly treated.

Strongylosis.

Many cases of infestation with Haemonchus longistipes were observed amongst the police camels of the irrigated areas of Gezira Province and little success was obtained with medical treatment until nicotine sulphate was used. All cases, unless of very debilitated animals, are said to respond well to treatment with this drug.

DISEASES OF EQUINES.Horse sickness.

Since there were no deaths from horse sickness amongst the 335 horses and 182 mules vaccinated in Gezira Province, the Senior Veterinary Inspector of the Province is abundantly justified in reporting that "the disease is now completely under control." It certainly is a very different state of affairs to pre-vaccination days when the mortality amongst the animals owned by the staff of the Sudan Plantations Syndicate and Kassala Cotton Company was particularly heavy, and proves that the vaccine must have a strong potency against the particular strain or strains of virus responsible for horse sickness in the Gezira Province.

In Port Sudan, which one would consider less likely to be visited by this disease than any other town in the Sudan, six of the very small number of horses kept there died of horse sickness in January.

In Darfur Province, which is the centre of the horse breeding industry, few cases were reported during the year, but in Kordofan Province two of twenty-three horses and mules vaccinated died. Deaths of vaccinated animals during their owners' absence on leave may occur through syces not observing the early symptoms and carrying on with exercise, with fatal results.

Nine cases in horses and five cases in mules occurred in Khartoum and Omdurman and in addition many deaths were reported from outlying districts. Losses have not been so heavy for a great number of years, which is remarkable in view of the poor rainfall this year.

Epizootic Lymphangitis.

In 1937 following the Unit's visit to the Fung districts of Gezira Province cases of epizootic lymphangitis were observed amongst the animals of the Sudan Horse on its return to Shendi and in practically all instances the affected animals showed eye lesions. Despite the endeavours of the Veterinary Inspector and the co-operation of the Army Officers it was found impossible to prevent the occurrence of new cases, although they were few in number, or to find a satisfactory explanation for the continued appearance of eye lesions.

Many cases of infection with Strophyloma  
longistipes were observed among the Sudanese of the  
affected areas of Gezira Province and little success was  
obtained with medical treatment until antibiotic therapy  
was used. All cases, unless of very debilitated animals,  
and said to respond well to treatment with this drug.

DISEASES OF HORSES

Horse sickness

Since there were no deaths from horse sickness among  
the 355 horses and 182 mules vaccinated in Gezira Province,  
the Senior Veterinary Inspector of the Province is abundantly  
justified in reporting that "the disease is now completely  
under control." It certainly is a very different matter  
to put vaccination down as the normally accepted means of  
control of the Sudan Pleurocytic lymphoma and  
Kansala Cotton Company was particularly heavy, and proves  
that the vaccine must have a strong potency against the  
pathogenic strain or strains of virus responsible for horse  
sickness in the Sudan Province.

In Port Sudan, which one would consider less  
likely to be visited by this disease than any other town  
in the Sudan, six of the very small number of horses kept  
there died of horse sickness in January.

In Darfur Province, which is the centre of the  
horse breeding industry, few cases were reported during  
the year, but in Kordofan Province two of twenty-three  
horses and mules vaccinated died. Losses of vaccinated  
animals during their owners' absence or leave may occur  
through spots not observing the early symptoms and carrying  
on with exercise, with fatal results.

Five cases in horses and five cases in mules  
occurred in Khartoum and Gedaref and in addition  
cases were reported from other districts. Losses  
have not been so heavy for a great number of years, which  
is remarkable in view of the heavy rainfall this year.

Epizootic lymphangitis

In 1937 following the Unit's visit to the Bahr  
district of Gezira Province cases of epizootic lymphangitis  
were observed among the animals of the Sudan Horse on  
the return to Khartoum and in practically all instances the  
affected animals showed eye lesions. During the  
endeavour of the Veterinary Inspector and the cooperation  
of the Army Officers it was found impossible to prevent  
the occurrence of new cases, although they were few in  
number, or to find a satisfactory explanation for the  
continued appearance of eye lesions.

4. DISEASES OF CANINES.R a b i e s.

The campaign against uncared for and stray dogs has been intensified, and in Gezira Province alone 2,570 dogs were accounted for. In addition vermin in the shape of hyenas and jackals - amongst the commonest carriers of this dreaded disease - have been destroyed in large numbers.

Of the 154 specimens submitted to the Stack Memorial Research Laboratory for diagnosis 38 were from positive cases : 25 dogs, 7 donkeys, 2 goats, 1 mule, 1 cat and 2 camels.

The following table shows the seasonal and topographical distribution of cases :-

Province	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Northern	-	-	-	1	-	-	-	-	-	-	4	-	5
Gassala	-	-	-	-	-	1	3	-	-	2	-	-	6
Khartoum	-	-	-	-	2	-	-	-	-	-	-	-	2
Gezira	1	-	-	1	1	2	3	-	3	1	1	-	13
Kordofan	-	-	-	-	1	1	-	-	-	-	-	-	2
Darfur	-	1	1	-	1	-	-	-	-	-	-	1	4
Upper Nile	-	-	-	-	-	-	-	-	-	-	2	-	2
Equatoria	-	-	-	-	1	1	1	-	-	-	-	1	4
<b>Total.</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>6</b>	<b>5</b>	<b>7</b>	<b>-</b>	<b>3</b>	<b>3</b>	<b>7</b>	<b>2</b>	<b>38</b>



SECTION II.TRADE IN LIVESTOCK AND LIVESTOCK PRODUCTS1. EXPORT AND IMPORT TRADE.Cattle.

Total exports of cattle via Wadi Halfa and Port Sudan Veterinary Quarantine Stations, at 8,057 valued at £.33,987, show a welcome increase of 801 and £.437 over those for 1938. For the first eight months of the year with cotton prices at a low level in Egypt trade was sluggish, but soon after the outbreak of war, when other sources of supply became uncertain, there were slightly increased demands, which at the end of the year appeared to have settled down to a steady trade of three full consignments of 350 head each a month, half to Cairo and half to Alexandria.

Since trade became normal after the unsettled period following the 1914-18 war the Sudan has annually supplied approximately half the beef imported into Egypt on hoof, and when on the outbreak of hostilities in September of this year supplies from other sources ceased it appeared probable that the Sudan's exports would increase 100%, but this has not proved to be the case, probably because in sympathy with a depressed market for Egyptian Cotton, the price of beef fell at the end of the summer to such a low level that many Egyptian producers did not sell their marketable stock of cattle. Later on, however, after the outbreak of War prices improved and these cattle were marketed in addition to the normal sales of slaughter cattle, to the exclusion of a percentage of imported beasts. Any further rise in beef prices may also tempt Egyptian breeders to sell some of their breeding stock and so further extend the period during which imports will be affected.

In December, the Director Sudan Veterinary Service accompanied the President of the Sudan Resources Board to Egypt to discuss with the Egyptian Authorities the cattle trade in general. Meetings were held under the auspices of the Minister of Commerce and Industry.

The one salient point that emerged from discussions at these meetings was that Egypt during the period 1.8.39 to 31.7.40 would require no more than 12,000 head of cattle from the Sudan.

SECTION II

TRADE IN LIVESTOCK AND LIVESTOCK PRODUCTS

EXPORT AND IMPORT TRADE

Cattle

Total exports of cattle via West Nile and Port Sudan Veterinary Quarantine Stations, at £3.57 valued at £2,55,507, show a welcome increase of 101 and 1.57 over those for 1935. For the first eight months of the year with cotton prices at a low level in Egypt trade was sluggish, but soon after the outbreak of war, when other sources of supply became uncertain, there were slightly increased demands, which at the end of the year appeared to have settled down to a steady trade of three full consignments of 50 head each a month, half to Cairo and half to Alexandria.

Since trade became normal after the unsettled period following the 1941-42 war the Sudan has annually supplied approximately half the beef required into Egypt on foot, and when on the outbreak of hostilities in September of this year supplies for other sources ceased it was estimated probable that the Sudan's exports would increase 100%, but this has not proved to be the case, probably because in sympathy with a depressed market for Egyptian cotton, the price of beef fell the end of the summer to such a low level that very Egyptian producers did not sell their available stock of cattle. Later on, however, after the outbreak of war prices improved and these cattle were marketed in addition to the normal sales of slaughter cattle, in the absence of a percentage of imports. Any further rise in beef prices may also tempt Egyptian producers to sell some of their breeding stock and so further extend the period during which imports will be affected.

In December, the Director Sudan Veterinary Service requested the President of the Sudan Revenue Board to Egypt to discuss with the Egyptian Authorities the cattle trade in general. Meetings were held with the assistance of the Minister of Commerce and Industry.

The one salient point that emerged from discussions at these meetings was that Egypt during the period 1.1.35 to 31.12.35 would require no more than 12,000 head of cattle from the Sudan.

The possibility of effecting sales of Sudan cattle at Cairo and Alexandria on a live weight basis was debated and met the approval of both the Egyptian and Sudan Authorities, but the business men in the trade failed to agree to this, the only innovation which could possibly infuse fresh life into the trade.

The Director, Sudan Veterinary Service, also visited Palestine in December to discuss trade between the two countries in live animals and animal products.

### S h e e p .

Compared with 1938, this year's total exports of 15,377 sheep valued at £.13,680 via Wadi Halfa and Port Sudan Veterinary Quarantine Stations was an increase of 13,537 head and £.11,834. There were small demands for sheep in the early part of the year; 1,555 head were exported up to the end of March, but from then until the end of August export ceased entirely. Immediately war broke out, however, not only did normal sources of supply to Egypt fail, but she was also faced with increased demands for the supply of mutton on hoof to new Units stationed within her frontiers. Exports consequently rose from 1,685 in the month of September to 5,454 in December. Fortunately despite increased sales there has been no spectacular rise in sheep prices in the Sudan, and, provided prices can be kept at a reasonable level, Egyptian demands should continue to increase during the coming year. The long-legged fat-tailed haired sheep which constitutes the bulk of those exported can be bought in numbers, in prime condition, and produces good mutton; being also a hardy beast it loses little condition on its long and arduous journey to the Egyptian markets.

#### A. Numbers and values of cattle and sheep exported via Wadi Halfa and Port Sudan Veterinary Quarantine Stations during the last three years:

Year	Cattle	Sheep	Value at Port of export
1937	8,985	5,417	£.45,729
1938	7,256	1,840	35,356
1939	8,057	15,377	47,667

January and June 10, 1939  
 October and December 5, 1937  
 total of 15,377 during the year.



The possibility of offering prices of Sudan cattle at Cairo and Alexandria on a live weight basis was debated and not the approval of both the Egyptian and Sudan authorities, but the business was in the trade failed to agree to this, the only innovation which would possibly infuse fresh life into the trade.

The Director, Sudan Veterinary Services, also visited Palestine in December to discuss trade between the two countries in live animals and animal products.

Summary

Compared with 1955, this year's total exports of 15,777 sheep valued at £2,457,000 via Wadi Halfa and Port Sudan Veterinary Quarantine Stations was an increase of 15,557 head and £1,170,000. There were small demands for sheep in the early part of the year; 7,555 head were exported up to the end of March, but fell back until the end of August export ceased entirely. Immediately after broke out, however, not only did demand for sheep of supply to Egypt fall, but she was also faced with increased demands for the supply of mutton on meat to new Wadi Halfa Stationed at this port. Exports consequently rose from 1,000 in the month of September to 5,450 in December. Fortunately despite increased sales there has been no spectacular rise in sheep prices in the Sudan, and provided prices can be kept at a reasonable level, Egyptian demands should continue to increase during the coming year. The long-legged fat-tailed haired sheep which competes in the bulk of those exported can be bought in numbers, in good condition, and produces good mutton; being also a hardy breed it loses little condition on its long and arduous journey to the Egyptian markets.

A. Numbers and value of cattle and sheep exported via Wadi Halfa and Port Sudan Veterinary Quarantine Stations during the last three years:

Year	Cattle	Sheep	Value at Port Sudan
1957	8,202	5,457	£2,457,000
1956	7,200	4,600	£1,700,000
1955	6,000	3,500	£1,200,000

B. Numbers of Cattle imported during last three years.

Year	French Equatorial Africa	Abyssinia	Total
1937	1,754	171	1,925
1938	3,024	1	3,025
1939	2,462	11	2,473

C. Origin of cattle exported during the last three years.

Province	1937	1938	1939
Kordofan & Darfur	6,118	5,151	6,963
Gezira	1,044	699	629
Khartoum	202	132	271
Northern	1,545	1,420	156
Total	9,309	7,252	8,059

C a m e l s.

For the first five months of 1939 there was a brisk demand for Sudan camels in Egypt and prices ruled high, the exceptionally fat female camels realising up to £.15. Approximately, 10,300 head were sold during this period, of which 8,200 were fat females. The fact that the hump of the fat female camel is considered a great delicacy and commands a high premium over meat from any other part of the camel's body largely accounts for the high percentage of females sold. In sympathy with a depressed cotton market demands from all centres in Egypt ceased abruptly in June and it was not until October that the trade responded to an upward trend in the prices of cotton and other agricultural products. The news that prices were improving quickly spread to the Sudan and by the end of the year arrivals on the Egyptian markets were exceptionally heavy, over 2,000 camels being sold during the last fourteen days of December. Between January and June 10,320 camels were sold and between October and December 6,867, a total of 17,187 during the year.

B. Numbers of cattle reported during last three years

Year	Arabia	Abysinia	Total
1937	1,775	171	1,946
1938	2,031	1	2,032
1939	2,462	11	2,473

C. Origin of cattle reported during the last three years

Province	1937	1938	1939
Kordofan & Darfur	2,110	2,111	2,363
Gozala	1,044	332	622
Khartoum	202	132	271
Northern	1,145	1,440	1,16
Total	4,501	4,015	4,432

D. Cattle

For the first five months of 1939 there was a brisk demand for Sudanese cattle in Egypt and prices ruled high, the exceptionally low price of 10,000 head remaining up to 2,750. Approximately 40,000 head were sold during this period, of which 2,000 were fat animals. The fact that the bulk of the fat animals were sold in a great hurry and commands a high premium over those from any other part of the country's body largely accounts for the high percentage of fat animals. In sympathy with a depressed cotton market demand from all sources in Egypt ceased abruptly in June and it was not until October that the trade responded to an upward trend in the prices of cotton and other agricultural products. The news that prices were improving quickly spread to the Sudan and by the end of the year activities on the Egyptian markets were exceptionally heavy, over 2,000 animals being sold during the last four days of December. Between January and June 1939 of the year sold, and between October and December 1939 a total of 1,107 during the year.

### Hides and Skins.

During the first eight months of the year there was a marked falling off in demands and prices for both hides and skins owing to lack of confidence in European markets during a period of political unrest. Following the outbreak of war, however, Sudan prices quickly responded to increased demands, particularly from America and Near Eastern countries, and by the end of the year prices of both hides and skins had advanced by fully 30%.

Although demands are now good and prices profitable exporters are faced with shipping difficulties, as it is understood that most hides and skins destined for America are being transhipped en route at a foreign port where they are frequently held for considerable periods. Mails too are uncertain and add to the length of time which it takes to complete sales. Despite these difficulties exporting merchants for the first time for over a year appear satisfied with the profits they are making, although they still assert that the Sudan hides and skins are being sold more cheaply than those of the same quality from any other country. If this is true, and it probably is, the fault must surely lie with those of our exporters who have not in the past rigidly supplied their customers with the quality of goods asked for. Unfortunately, whenever there is a rising market people with little or no knowledge of the technical side of the hide and skin trade come into the exporting trade and despatch consignments which do not come up to specification, and so give our products a bad name on foreign markets. This can only be prevented by a system of Government grading of all hides and skins exported.

Tonj and Aweil districts of Equatoria Province continue to supply well-prepared hides in increasing quantities; a proof of the keen interest taken by the District Commissioners of the respective districts in the campaign for improved methods of hide preparation. The quality of hides arriving from these areas is now well established and they are eagerly sought after by Omdurman buyers for export.

Those arriving from Bor district of Upper Nile Province show a marked improvement, but arrivals from Nasir district where the best cattle in the South are to be found are still of poor quality.

Hides and Skins

During the first eight months of the year there was a marked falling off in hides and skins for both hides and skins owing to lack of confidence in European markets during a period of political unrest. Following the outbreak of war, however, prices quickly responded to increased demands, particularly from America and West European countries, and by the end of the year prices of both hides and skins had advanced by fully 50%.

Although Canada has now good and perfect profitable exportation facilities with shipping facilities, as it is understood that both hides and skins destined for America are being transported on routes of a foreign character they are generally held for considerable periods. It is also understood that the length of time which it takes to complete sales. Despite these all conditions regarding purchases for the first time for over a year were satisfied with the quality they are seeking, although they still assert that the Sudan hides and skins are not sold more cheaply than those of the good quality for any other country. It is true and is probably so, but I will not quarrel with those of our exporters who have not in the past rightly supplied their customers with the quality of goods asked for. Unfortunately, whenever there is a falling market price with little or no knowledge of the technical side of the hides and skin trade one may find exporters who are not so conscientious which do not come up to the standard and so give our products a bad name on foreign markets. This can only be prevented by a system of government grading of all hides and skins exported.

That and Avonl districts of Saskatchewan Province continue to supply well-graded hides in increasing quantities; a proof of the keen interest taken by the District Commissioners of the respective districts in the campaign for improved methods of hide preparation. The quality of hides arriving from these areas is now well established and has the eagerly sought after by Canadian buyers for export.

Those arriving from the district of Upper Nile Province show a marked improvement, but arrivals from their district where the best cattle in the South are to be found are still of poor quality.

The Veterinary Inspector, Upper Nile Province,  
reports as follows :-

"The improvement of the Province hides has been given much attention but, so far, tangible results are only apparent in Bor district. Here auctions of hides were held which helped to convince the Dinka that he would get more for a well-prepared hide.

"Although many districts now have considerable numbers of tribesmen trained in the art of flaying (Zeraf Island has over a hundred) there seem to be three main factors retarding the production of a good hide.

- (1) "The unwillingness of an owner to allow anyone to flay his beast's hide. And the equal unwillingness of a trained man to flay any hides other than those from his own beasts.
- (2) "The complete absence of wood for frames in some districts, especially on the toicha (grazing lands flooded during wet season).
- (3) "The fact that small merchants in districts do not make enough, if any, distinction between a well and a badly flayed hide. Most of them say they are willing to give more for a good hide, but very few are prepared to give considerably less for, or even refuse, a hide which can only be classed as rubbish. They say the native will walk to the next shop, and there being so little co-operation between these petty merchants, a sale is effected. The merchant wants the trade and very rightly says that he can dispose of any class of hide. If there is only about 15% per oke difference in the price the small merchant is prepared to offer, then, since I found in several districts the badly prepared hide weighing far more than a similar sized well prepared one, it makes the difference in price too small for the native to consider the extra trouble worth while."

"The following tribesmen were trained at the Hide-flaying school at Malakal during the season November 1938 - May 1939.

<u>Nuers</u>	- Nasir .....	25
	Fangak .....	20
	Western Nuer ...	12
Dinka	- Northern District	6
	Bor.....	33
Shilluk	- .....	19

-----  
115."  
=====

The Veterinary Inspector Upper Nile Province,  
 reports as follows:

The improvement of the Province hides has been  
 given much attention not only for the hides but also  
 are only prepared in the district. There are  
 of hides were held which helped to improve  
 the hides but the people get more for a well-prepared  
 hide.

Although many districts now have considerable  
 numbers of trappers trained in the art of tanning  
 (Sudan hides are over a hundred) there seem to be  
 three main factors retarding the production of a  
 good hide.

(1) The unwillingness of an owner to allow anyone  
 to try his hide. And the great  
 unwillingness of a trader to try any  
 hides other than those from his own district.

(2) The complete absence of wood for tanning in  
 some districts, especially in the interior.  
 (Grassland hides tanned during the season).

(3) The fact that small exporters in districts  
 do not make enough of the distinction between  
 a well and a badly tanned hide. Most of  
 them say they are willing to give more for a  
 good hide, but very few are prepared to give  
 considerably less for an even better, a hide  
 which can only be obtained as a by-product. They  
 say the native will walk to the next shop, and  
 there being no little competition between these  
 petty exporters, a sale is effected. The  
 merchant wants the trade and very rightly says  
 that he can dispose of any class of hide. It  
 is only about 17% per the difference in  
 the price the small merchant is prepared to  
 offer, then, also, I found in several districts  
 the badly prepared hide weighing far more than  
 a better one will prepared one, it makes the  
 difference in price for the native  
 to consider the extra trouble worth while.

The following trappers were trained at the  
 hide-tanning school at Mafek during the  
 season November 1938 - May 1939.

	Hours
.....	22
.....	20
.....	12
.....	12
.....	12
.....	12
.....	12

When on duty in Khartoum, the Animal Husbandry Officer continues to see all hides and skins coming by steamer from the Southern Provinces. Every parcel of hides or skins is inspected and reported on, and a copy of the report is sent to the place of origin so that suggestions and criticisms can be brought to the notice of producers.

In the Northern Sudan hides from Darfur Province alone show any marked improvement. The Southern district of that Province, where auctions are held and modern methods of preparation are gradually spreading, now produces many good quality hides, but the Arab dislikes any innovation which entails more effort, no matter how slight, and would if the district administrative staff relaxed their efforts at this stage quickly revert to his old careless methods of flaying and preparing hides. Unsettling fluctuations in the hide and skin market make it difficult to convince the Arab that he will eventually profit considerably from the little extra labour that goes to the producing of a first quality article.

Export of Hides and Skins, untanned, during 1939.

Article	Quantities in		Value		Approximate	
	Kilos				value per	metric ton
	1939	1938	1939	1938	1939	1938
Hides	:1160,284	:1321,042	:43,273	:59,546	:37.3	:45.1
Sheep skins	:882,415	:790,006	:48,151	:38,281	:54.5	:48.4
Goats skins	:185,768	:104,573	:16,033	:7,001	:86.3	:67.0



than of duty in Kirtland, the Annual Husbandry  
 Officer continues to see all his work and gains coming  
 by account from the Northern District. Every parcel  
 of land or other is inspected and reported on, and  
 a good report is sent to the District Office  
 as the regulations and ordinances are brought to  
 the notice of the people.

In the Northern District the same  
 system of work is followed. The  
 District Office of that District is  
 one with the same methods of  
 inspection, now proposed and good quality  
 of work. The same district and would  
 be the same effect, no matter how  
 in the District administrative work is  
 done at this stage which is to his old  
 methods of doing and reporting  
 District Office is the same and this  
 will be the same as the little  
 eventually work is done in the  
 labor the good to the people of  
 District.

Statistics of Hides and Skins, 1870

Article	Quantity in Hides	Value per unit	Total Value
Beaver	1,000	1.00	1,000.00
Wolverine	500	1.50	750.00
Badger	200	2.00	400.00
Skunk	1,500	0.50	750.00
Other	10,000	0.10	1,000.00
<b>Total</b>	<b>13,200</b>		<b>4,800.00</b>

The following Table shows the weights and prices obtained for air-dried hides prepared at the Veterinary Laboratories during 1939.

No. of bundles	Net okes sold	Price per oke	Total price realised	Remarks
		Ms	£E. Ms	
Sold on 29.3.39				
15	846 $\frac{3}{4}$	66	55.886	Heavy
15	842 $\frac{1}{4}$	66 $\frac{1}{2}$	56.010	Heavy
15	704 $\frac{1}{4}$	88	61.974	Light
6	327	74 $\frac{1}{2}$	24.362	Light
5	252 $\frac{1}{4}$	62 $\frac{1}{2}$	15.766	Damaged
Sold on 7.6.39				
15	886 $\frac{3}{4}$	65	57.622	Heavy
16	967 $\frac{1}{2}$	65 $\frac{1}{2}$	63.371	Heavy
10	397 $\frac{1}{2}$	76	30.210	Light
3	133 $\frac{1}{4}$	64	8.512	Slightly damaged
100	5,357 $\frac{1}{2}$	69 $\frac{7}{8}$	373.713	

1 Oke ..... = 2.75 lbs.

1 Egyptian Pound..... = £1-0-6 Sterling.

These hides were eagerly sought after by exporters and an average price of approximately 69 milliemes an oke in Khartoum was obtained for them this year, whereas the average value of all hides sold to foreign countries was only approximately 49 milliemes an oke, at port of export.

#### Semn (Clarified Butter).

Despite a decrease in value of £E.6 per metric ton, compared with last year's price, exports were up by 134 metric tons and in value by £E.3,211. Egypt increased her purchases by 107 metric tons, Arabia by 27 metric tons and Eritrea by 27 metric tons, whilst British India's purchases fell by over 30 metric tons.

The following table shows the weights and prices obtained for the United States prepared at the Veterinary Laboratories during 1933.

No. of Pounds	Net Gross Weight	Net Price per Cwt	Total Price	Remarks
Sold on 12/23				
15	84 1/2	66	55.65	Heavy
15	82 1/2	66	54.30	Heavy
15	70 1/2	66	46.32	Light
6	37	74	27.38	Light
5	22 1/2	62	13.95	Heavy
Sold on 1/13				
15	68	65	44.25	Heavy
16	70 1/2	65	45.77	Heavy
10	37 1/2	76	28.50	Light
5	13 1/2	64	8.56	Slightly damaged
100	5,337 1/2	65 1/2	348,250	

1 One ...  
1 Egyptian Pound ...

These hides were eagerly sought for export and an average price of approximately \$3.50 was obtained for them last year, whereas the average value of the hides sold for export was only approximately \$2.50 in one lot of export.

Beef (Olariss) Butcher

Despite a decrease in value of ...  
ton, compared with last year's price ...  
by 12 metric tons and in value by ...  
increased net purchased by ...  
27 metric tons and ...  
British India's purchases fell by over 10 metric tons.

The following table shows exports and value :-

Countries exported to	Kilos	£E.
Great Britain	181	9
Egypt	540,858	26,705
Arabia	67,509	3,448
British India	802	43
Abyssinia	15,513	1,013
Eritrea	93,348	4,735
Belgian Congo	7,116	457
	725,327	36,470

Approximately 3,000 lbs. of clarified butter were prepared by the direct method by Omdah Mohammed Defalla in the Abu Zabd Area of Kordofan Province during the rains. In order to obtain ready cash the producer was compelled to sell about one third of this early in the season at the low price of 240 piastres (approx. 49 shillings) a kantar (100 lbs.). Later, part of the remainder was sold locally in El Obeid to Government officials and others at 300 piastres a kantar. Even at this rate little profit remains to the producer when transport costs are considered. The local opinion was that the clarified butter was excellent as a cooking fat and that when solidified in a refrigerator it was equal to any imported tinned butter.

A Government sponsored creamery for the production of clarified butter was operated by Native Administration Authorities in Southern District, Darfur Province, between July 7th and November 30th, 1939. Equipment was loaned by this Service and our Animal Husbandry Officer supervised production. The creamery was first started amongst the Fellata cattle owners at Gided, and there during the period 20th July to 8th October 150,866 lbs. of milk yielded 8,114 lbs. of clarified butter, or approximately 5.4% butter fat. When milk supplies failed at Gided the creamery was moved to Um Kardous where milk was supplied by Fellata, Zaghawa, Habbania and Beni Hussein cattle owners. There during the period 16th October to 20th November 26,027 lbs. of milk produced 1,314 lbs. of clarified butter or just over 5% butter fat yield.

The following table shows exports and value :-

Country	Quantity (Kilos)	Value (Rs.)
British India	1,000	1,000
Arabia	2,000	2,000
British India	3,000	3,000
Arabia	4,000	4,000
British India	5,000	5,000
Arabia	6,000	6,000
British India	7,000	7,000
Arabia	8,000	8,000
British India	9,000	9,000
Arabia	10,000	10,000

Approximately 1,000 lbs. of sterilized butter were prepared by the Government of British India. Details in the above table show that during the period. In order to obtain ready cash the producer was compelled to sell about the end of the year in the season of the low price of 250 pence (approx. 12 shillings) a cwt. (100 lbs.). Part of the butter was sold locally in El Ghab to Government of British India and the rest at 250 pence a cwt. Even so this sale price remains to the producer when transport costs are considered. The local opinion was that the sterilized butter was excellent as a cooking fat and that even sold in a refrigerator it was equal to any imported tinned butter.

A Government sponsored creamery for the production of sterilized butter was operated by British India in the Southern District, Bahr Province, between July 1919 and November 1920. Equipment was leased by the British and the Ministry of Health supervised production. The factory was first started under the British name at Ghab, and then during the period July 1919 to October 1920, 100 lbs. of milk yielded 111 lbs. of sterilized butter or approximately 1.11 lbs. of butter per gallon. When milk supplies failed at Ghab the factory was moved to the Karkosa where it was operated by British India, Karkosa and Bahr Province of the Sudan. There during the period July 1920 to 23rd November 1920, 100 lbs. of milk produced 111 lbs. of sterilized butter or just over 1.11 lbs. of butter per gallon.

2. INTERNAL TRADE.Meat Supplies.

With grazing and water conditions easy in the pastoral areas this year, ample supplies of fat cattle were forthcoming to meet all local slaughter needs.

Poor demands for export sheep up to September caused large numbers to come on the market at reasonable prices for local slaughter. Slaughtering at the largest towns show an increase by 22,425 head compared with last year.

The numbers of animals slaughtered for food in ten of the larger towns during 1939, and the totals for this and the two previous years are given below :-

T o w n	Camels	Cattle	Sheep	Goats
Khartoum	-	3,260	34,880	-
Khartoum North	-	655	10,372	27
Omdurman	167	5,524	43,934	844
Wad Medani	569	2,373	19,960	363
El Obeid	285	4,287	14,616	273
Atbara	28	1,355	13,598	7
Kassala	218	574	16,492	3,189
Gedaref	404	1,053	5,515	197
Wadi Halfa	4	206	4,100	2
Port Sudan	281	1,234	27,324	3,528
Total for 1939	1,956	20,521	150,791	8,430
Total for 1938	2,854	19,222	168,366	11,657
Total for 1937	2,212	20,240	185,822	7,670

INTERNAL TRADE

Meat Supplies

With grazing and water conditions only in the pastoral areas this year, ample supplies of fat cattle were forthcoming to meet all local slaughter needs.

Four demands for export sheep up to September caused large numbers to come on the market at various prices for local slaughter. Slaughterings at the largest towns show an increase by 25,000 head compared with last year.

The numbers of animals slaughtered for food in ten of the larger towns during 1937, and the totals for this and the two previous years are given below:

Town	Cattle	Sheep	Goats
Marion	2,200	24,000	-
Marion North	600	40,375	27
Ordman	2,200	42,200	84
Webb Mountain	2,200	12,000	203
St. George	2,200	40,000	275
Alcoa	2,200	40,000	7
Kassala	2,200	17,000	2,100
Gebaral	1,000	2,000	100
Webb Hills	200	100	2
Port Bogan	1,200	27,000	2,200
<b>Total for 1937</b>	<b>11,000</b>	<b>202,500</b>	<b>6,400</b>
<b>Total for 1936</b>	<b>12,000</b>	<b>180,000</b>	<b>11,000</b>
<b>Total for 1935</b>	<b>12,000</b>	<b>180,000</b>	<b>11,000</b>

SECTION III.IMPROVEMENT OF LIVESTOCKCATTLE.

Propaganda for the elimination of the scrub bull continues, and although many of the more enlightened cattle owners avail themselves of the facilities offered by this Service for the castration of bulls unsuitable for stud purposes, progress has been slow in the true pastoral areas of Kordofan and Darfur where the native, as yet only lightly touched by the advance of education, views with distrust any change in his animal management.

In the riverain districts villagers have in some instances been persuaded, and it has taken a great deal of persuasion too, to club together and purchase stud bulls for their village herds.

In 1930, efforts were made to encourage the cattle-owning tribes of Southern Darfur and Southern Kordofan to infuse fresh blood into their herds, and since the original stocks in these areas were of Western origin it was decided to look to the east for fresh blood. Forty excellent stud bulls were purchased in White Nile Province and distributed half in Southern Darfur and half in Southern Kordofan. Of these issues the Director, Sudan Veterinary Service, wrote at the time :-

"Some time will elapse before it will be possible to assess the true value of the results of the introduction of these bulls but, if these are good and sufficiently striking to impress the natives concerned, it is possible they may suffice to encourage the tribal authorities to undertake further importations of stud bulls from the White Nile Province on their own responsibility."

In August of this year, the District Commissioner, Southern Darfur District, reported as follows on the imported bulls :-

"Their progeny have done well; the products of crosses with the local cattle being distinguished in shape and giving a better yield of milk without seeming to be any less hardy. I have been asked by various cattle owners if they could purchase more of these bulls this season."

Shortly after this the District Commissioner wrote to say that funds were available for the purchase of stud bulls. Ten were bought by this Service in White Nile districts and were despatched on hoof to Darfur.



REPORT OF THE COMMISSIONER

TABLE

Provision for the elimination of the...  
and... of the...  
... of the...  
... of the...  
... of the...  
... of the...  
... of the...

In the... district...  
... of the...  
... of the...  
... of the...

It is...  
... of the...  
... of the...  
... of the...  
... of the...  
... of the...  
... of the...

Both... will...  
... of the...  
... of the...  
... of the...  
... of the...  
... of the...  
... of the...

In... of this...  
... of the...  
... of the...

These...  
... of the...  
... of the...  
... of the...  
... of the...  
... of the...  
... of the...

... of the...  
... of the...  
... of the...  
... of the...  
... of the...  
... of the...

Easier grazing and watering conditions have tended to produce in the White Nile districts a better milker and beef animal than is to be found in Darfur. Therefore, the improved beast produced in Darfur by crossing the White Nile bull with the Southern Darfur district cow can only be expected to do well in those parts of the district most favourable to stock raising or where the owner is prepared to give a supplementary ration, as it cannot be expected to be as resistant to lack of grass and hard conditions as the indigenous animal.

The ill affects of localised inbreeding could be overcome by the exchange of herd bulls between local tribes, but the District Commissioner says that this is unpopular.

The Veterinary Inspector, Northern Province, reports that :-

"At Shendi Agricultural Show about 120 pairs of bulls, entered for the ploughing competition, were afterwards judged for the best pair of working animals and the best breeding bull, and about twenty consolation prizes were also awarded. The prize-winners were of a very high standard. The local type of animal is an excellent one and improvement is entirely concerned with efforts at encouraging better management and feeding.

"Entries at the Merowe Agricultural Show were small, but good types of animals were seen. Inbreeding and generations of under-nourishment have resulted in the production of very under-sized and poor quality animals on the cultivations of Halfa Digheim and Debeira in Halfa District. Introduction of outside blood is a necessity and a start was made when the Omdas of these places each purchased a pair of good bulls at the Shendi Show."

### H o r s e s .

A policy of mechanisation continues in the Sudan Defence Force, and this year the horses of yet another mounted Unit were replaced by balloon tyred motor vehicles. The majority of the horses of this mechanised Unit became available as remounts for other Units, and it was at one time feared that the Sudan Defence Force would require few if any young remount horses from the Arab breeders of Darfur Province. Fortunately the Army and Civil Government Authorities, realising the hardship that would result from such an unlooked for happening, sanctioned purchases in excess of normal requirements at the 1939-40 Horse Shows.

Bestor grazing and wintering conditions have  
 tended to produce in the White Nile districts a  
 better stock and beef animal than is found in  
 Northern Nigeria. The improved beef produced in  
 Northern Nigeria is due to the fact that the  
 Southern Nigeria district cow has only to be exposed to  
 the well in the dry season of the district east of the Nile  
 to stock raising in which the other is prepared to  
 give a supplementary ration, as it cannot be expected  
 to be as resistant to lack of grass and hard conditions  
 as the indigenous animal.

The ill effects of localized overgrazing would be  
 overcome by the exchange of herd bulls between local  
 herds, but the District Commissioner says that this  
 is impossible.

The Veterinary Inspector, Northern Province,  
 reports that:-

At Shendi Agricultural Show about 150 pairs of  
 bulls entered for the ploughing competition,  
 were selected for the best pair of  
 working animals and the best breeding bull, and  
 about twenty consolation prizes were also awarded.  
 The prize animals were of a very high standard.  
 The local type of animal is an excellent one and  
 improvement is entirely concerned with slight  
 at encouraging better management and feeding.

At the Khoros Agricultural Show were mainly  
 but good types of animals were seen. Improvement  
 and generations of under-nourishment have resulted  
 in the production of very inferior stock and poor  
 quality animals on the outskirts of Khartoum.  
 Khartoum and Bahariya in White Nile district. Introduction  
 of outside blood is a necessity and a effort was  
 made when the Sudan of White Nile was purchased  
 a pair of good bulls at the Shendi Show.

REMARKS

A policy of subsidization continues in the Sudan  
 to-day. The Sudan Government has this year the means of yet another  
 subsidy. The subsidy is in the form of a grant to the  
 Sudan Government for the purchase of the Sudan Government  
 it was at the time feared that the Sudan Government  
 would be unable to do so. The Sudan Government  
 and the Sudan Government. The Sudan Government  
 may be able to do so. The Sudan Government  
 the Sudan Government. The Sudan Government  
 for the Sudan Government. The Sudan Government  
 would be able to do so. The Sudan Government

Of the sires in Darfur at the end of the year, nine were imported stallions, government syced and fed, five were imported horses boarded out at a cheap rate with reliable men of the horse breeding tribes and thirty-three were country-breds stationed with the local tribesmen in return for small cash allowances. Two of the nine in the first category who are getting on in age are due to be weeded out during the coming year and will not be replaced.

In Kordofan Province there were seven country-bred tribal stallions and one imported Arab stallion.

The riverain horse breeders were catered for by three Arab stallions stationed at Khartoum and one at Shendi. There is now no thoroughbred stallion in the Sudan. The last one "Singlass", a small compact thoroughbred of good quality, presented to the Government by Mr. J. Gibson some years ago, became unfit for service during the year and was put down.

The following information was obtained from the Senior Veterinary Inspector, Darfur Province's reports on the four horse shows held during 1939.

The two early shows were held at Idd El Ghanam (Beni Helba, Ta'aisha and Gimr Tribes) January 10th-15th and at Nyala (Fur, Messeria, Birgid, Dagu and Turgam Tribes) January 18th - 22nd.

The horses at these shows were on the whole in very good condition despite scarcity of grain and fodder due to widespread losses from locusts : In fact only at Idd El Ghanam was there any noticeable falling off in the standard of condition of any section of those shown - the mares there not being quite as fat as usual.

The tribes that attend these shows are almost sedentary and so the young stock benefits from not having to make the long seasonal marches which fall to the lot of the youngsters reared by the Tribes attending the Southern shows. The foals and yearlings were in excellent condition, particularly those seen at Nyala.

The policy of giving subsidies to owners of mares such as are considered suitable to mate with Arab stallions for the production of a supply of country-bred sires continues to give good results. Over fifty subsidies were paid out at these shows.

Of the one hundred horses purchased fifty-four were sired by Government sires and from the latter four of outstanding merit were selected as tribal stallions.

Of the nine in Berlin at the end of the year nine were imported stallions, Government owned and five were imported horses purchased at a cheap rate with reliable men of the horse breeding tribes and thirty horses were county-owned stallions with the local tribesmen in return for small cash allowances. Two of the nine in the first category who are getting an eye are due to be worked out during the coming year and will not be replaced.

In Kachin Province there were seven county-owned stallions and one imported Arab stallion.

The Kachin horse breeders were catered for by three Arab stallion stations at Khaton and one at Mandalay. There is now an unimproved stallion in the Sudan. The last one "Singapore" a small county-owned stallion of good quality, presented to the Government by Mr. J. Gibson some years ago, became unfit for service during the year and was put down.

The following information was obtained from the Senior Veterinary Inspector, Kachin Province's reports on the four horse shows held during 1935.

The two early shows were held at 1st El Ghannan (Bent Haida, 2nd Haida and 3rd Haida) January 10th-12th and at Haida (1st, 2nd, 3rd, 4th, 5th and 6th) (1935 - 1936).

The horses at these shows were of the whole in very good condition despite scarcity of grain and fodder due to widespread losses from locusts. In fact only at 1st El Ghannan was there any noticeable falling off in the standard of exhibition of the section of those shown - the names being not being quite as far as usual.

The tribes had attended these shows and almost nobody saw the young stock besides those not having to make the long seasonal marches which fall to the lot of the youngsters reared by the tribes attending the Southern shows. The girls and yearlings were in excellent condition, particularly those born at Haida.

The policy of giving subsidies to owners of Arab stallions has been considered suitable to date with Arab stallions for the production of a supply of county-bred Arab stallions to give good results. Over fifty subsidies were paid out at these shows.

Of the one hundred horses purchased fifty-four were Arab stallions and from the latter four of outstanding merit were selected as trial stallions.

The two late shows were held at Sibdu (Rizeigat and Maalia Tribes) November 27th - December 2nd and at Abu Sala'a (Habbania, Fellata, Messalat and Beigo Tribes) December 3rd - 9th.

The general condition of the animals was again good although it was a poor grain year. Foals, yearlings and two-year-olds sired by imported and country-bred sires totalling over 1,200 were paraded in good condition and appeared well grown.

Fifty-four horses were purchased, thirty-one for the Sudan Defence Force, eleven for the Police, seven for Officials and five outstanding horses for use as tribal stallions.

The two late shows were held at 8:30 (Hillsdale) and 9:00 (Hillsdale) November 25th - December 2nd and at 8:30 (Hillsdale) November 25th - December 2nd and at 9:00 (Hillsdale) November 25th - December 2nd.

The general condition of the country was again good although it was a poor year for the country and the year-ends stated by inspectors and country-ends since 1900 were 1,300 were 1,300 in good condition and appeared well grown.

Twenty-four horses were purchased, thirty for the Cuban Defense Force, fifteen for the Police, seven for officials and five outstanding horses for use as trial animals.

SECTION IV.Education.

The school year was divided into two terms of twelve and twenty-one weeks respectively, the first lasting from 7th January to 30th March and the second from 22nd July to 14th December. The three students under tuition, in December successfully passed their professional examinations in pathology, materia medica, nutrition and dietetics, and hygiene and stable management. The external examiner in pathology favourably commented on the general excellence of the students' work in this subject.

While seeing practice with the Senior Veterinary Inspector, Kordofan Province, during the summer vacation the students toured widely amongst the cattle, sheep and camel owning tribes in the pastoral areas, and in December accompanied the Veterinary Inspector, Kosti, through the cattle and sheep raising areas of Kosti and Dueim districts.



SECTION IV.

Education

The school year was divided into two terms of twelve and twenty-one weeks respectively. The first term began on January 10th and the second term began on July 1st. The school year was divided into two terms of twelve and twenty-one weeks respectively. The first term began on January 10th and the second term began on July 1st. The school year was divided into two terms of twelve and twenty-one weeks respectively. The first term began on January 10th and the second term began on July 1st.

This being practice with the State Veterinary Inspector, Gordon, during the summer vacation the student found widely upon the cattle, sheep and small swine in the local areas, and in December accompanied the Veterinary Inspector, Ross, through the cattle and sheep raising areas of West and Dale districts.

SECTION V.MISCELLANEOUS.Grazing and Watering.

Following the good rains and high Nile of 1938 conditions were generally favourable for live-stock during the first half of 1939, but during the latter half almost famine conditions prevailed in the Northern Sudan which suffered from poor and ill-spaced rains and an exceptionally low Nile. The true pastoral areas, however, lying between latitude 12° and 16°, with few localised exceptions provided excellent grazing and water in plenty throughout the year, and the condition of live-stock remained so good that it was possible to export fat cattle to Egypt during every month of the year.

The Veterinary Inspector, Northern Province, reports :-

"Early in the year the Province was enjoying excellent feeding conditions in the riverain districts as a result of the high Nile of 1938. Extensive lubia crops, besides a good natural growth of grass in the basins, were to be seen in all districts.

"The condition of animals in Merowe and Dongola districts was seen in January to be well above the standard of a year previously. Again, their condition in June, although poor, was still benefitting from the plentiful lubia supplies and the usual summer starvation period was to some extent postponed. Unfortunately, the temporary improvement in feeding conditions was soon to be followed in all districts by a very lean time as a result of the exceptionally low Nile of this year. By the end of the year grazing was scarce in the basins and also in the pastoral areas away from the Nile where the rains were light and ill-spaced."

Grazing in Khartoum Province was well above the average for the first six months of the year, but this autumn, following light rains (only three inches in the vicinity of Khartoum compared with eighteen inches last year) has brought famine conditions for stock. Serious losses are to be expected amongst the flocks of sheep and goats which supply the native population of Khartoum, Khartoum North and Omdurman with milk, as their owners are mostly poor people who during a sequence of good grazing years have collected far more animals than they will be able to buy food stuffs for now that free grazing is unobtainable.

SECTION V.  
MISCELLANEOUS.

Grazing and Watering.

Following the good rains and high Nile of 1938 conditions were generally favorable for five stock during the first half of 1939, but during the latter half almost famine conditions prevailed in the Northern Sudan which resulted from poor and ill-spaced rains and an exceptionally low Nile. The two pastures areas, however, lying between latitudes 12° and 13° with few localized exceptions provided excellent grazing and water in plenty throughout the year, and the condition of live-stock remained so good that it was possible to export fat cattle to Egypt during every month of the year.

The Veterinary Inspector, Northern Province, reports:-

Early in the year the Province was enjoying excellent feeding conditions in the riverain districts as a result of the high Nile of 1938. Extensive lucerne crops, besides a good natural growth of grass in the pastures, were to be seen in all districts.

The condition of cattle in Marawa and Dongola districts was seen in January to be well above the standard of a year previously. Again, their condition in June, although poor, was still benefiting from the plentiful lucerne supplies and the usual summer starvation period was to some extent postponed. Unfortunately, the temporary improvement in feeding conditions was soon to be followed in all districts by a very lean time as a result of the exceptionally low Nile of this year. By the end of the year grazing was scarce in the pastures and also in the pastoral areas away from the Nile where the rains were light and ill-spaced.

Grazing in Eastern Province was well above the average for the first six months of the year, but this autumn, following light rains (only three inches in the vicinity of Khartoum compared with eighteen inches last year) had brought famine conditions for stock. Serious losses are to be expected amongst the flocks of sheep and goats which supply the native population of Khartoum, Khartoum North and Gadarif with milk as their owners are mostly poor people who during a sequence of good grazing years have collected fat cows and animals that they will be able to buy food stuffs for now that free grazing is unobtainable.

The Senior Veterinary Inspector, Kordofan Province, writes as follows on conditions in his Province :-

"Heavy rains during 1938 resulted in exceptionally good grazing conditions throughout the spring of 1938. The Northern area of Dar Humr was an exception and there grain was scarce. A reflection of this was the poor condition of the horses at this year's Humr Show.

"The rains were again good in 1939 and some rain-fed lakes, Rahad for instance, will carry ample water till the rains of 1940.

"Good grass and plentiful water in the areas frequented by the owners of export cattle have kept their animals in good condition throughout the dry season.

"The Northern wet season grazing grounds of the Humr unfortunately again held light rains, and cattle had to begin to move South to the river far earlier than usual this winter. Round Lake Keilak the rain-fall was plentiful and water and grazing subsequently good."

The decision to delay the opening of the White Nile Dam from Mid-February to mid-March caused a certain amount of alarm amongst local population South of the Dam who feared that there would not be sufficient time between the emptying and filling of the reservoir to allow of them sowing and harvesting even a quick-growing crop, and also, that owing to extended submersion the roots of the grasses and plants which on a low Nile provide grazing for flocks and herds would be destroyed. When the Dam was opened, however, not only were crops grown and harvested on the land exposed as the river fell but also good grazing was provided at the time of the year when it is usually most scarce.

#### Buildings.

In 1938 the main block of stables at Wad Medani Veterinary Hospital was found to be unsafe and financial approval was obtained for its replacement by a new building containing twenty loose boxes. Building operations started in February and were completed by October.

The British Veterinary Laboratory, London  
writes as follows on condition of his  
horses:

"How horses during 1925 suffered in exceptionally  
poor feeding conditions throughout the course of  
the year. The horses were of low condition and  
exhaustion was their main trouble. The  
condition of the horses was poor throughout the  
year at this year's year end."

The horses were again good in 1926 and some rain-  
fed lakes, which for instance, will carry ample  
water till the rains of 1926.

"Good grass and plentiful water in the areas  
furnished by the owners of export cattle have  
kept their animals in good condition throughout  
the year end."

The horses who remain grazing grounds of the  
year unfortunately again have light rains, and  
cattle had to be taken to move water to the river  
for earlier than usual this winter. Behind lake  
Keller the water was plentiful and water and  
feeding subsequently good."

The decision to delay the opening of the  
Wharfe was from mid-February to mid-March caused  
a certain amount of harm amongst local population  
South of the dam who feared that there would not be  
sufficient time between the opening and falling of  
the reservoir to allow of sowing and harvesting  
even a quick-growing crop, and also that owing to  
extended suspension the roots of the grasses and plants  
which in a few days provide grazing for livestock and  
herds would be destroyed. When the dam was opened,  
however, not only were crops grown and harvested on  
the land exposed as the river fell but also good grazing  
was provided at the time of the year when it is  
usually most scarce.

Discussion

In 1926 the main block of stables at Yed Island  
Veterinary Hospital was found to be unsafe and  
structural approval was obtained for its replacement  
by a new building containing twenty four boxes.  
Building operations started in February and were  
completed by October.

The architect has successfully embodied in his plans the best of the many suggestions offered by those interested in the erection of stabling designed to meet conditions prevailing in the Gezira, and in the finished building has provided accommodation which is airy and cool in hot weather, protected from cold winds in the winter months, with complete protection against mosquitoes and other flies, and since iron has been used throughout for the construction of doors, windows and other fittings for which wood is usually employed, warping and destruction by white ants have been eliminated.

### Veterinary Hospitals.

#### Khartoum Veterinary Hospital and Forge.

Out-patients	3,587
In-patients	4,194
Pairs of shoes fitted	1,517
Pairs of shoes removed	74
Rasping of feet etc.	601

Mechanisation of Army and Civil Transport has caused a further decrease in the number of horses and mules in Khartoum and thus a corresponding decrease in the number of patients treated at the Veterinary Hospitals.

In order to meet the needs of small owners of mules and horses, used in hired transport work, for a cheap shoe with a long life the Senior Veterinary Inspector, Khartoum, is arranging for the forge staff to make a good hard-wearing shoe from bar iron which will be sold at a reasonable price.

#### Wad Medani Veterinary Hospital.

Out-patients	15,188
In-patients	470

Lameness and injuries comprised the majority of cases treated during the year.

The Gezira area is the one place in the Sudan where the horse continues to hold its own in the face of advance of mechanised transport, as it is still found to be the most satisfactory form of conveyance for the inspectorate of the Sudan Plantations Syndicate and Kassala Cotton Company in the performance of their duties on the cotton growing lands.

The architect has successfully embodied in his plans the best of the many suggestions offered by those interested in the erection of a building designed to meet conditions prevailing in the desert, and in the limited building has provided accommodations which in any and every hot weather, protected from cold winds in the winter months, with complete protection against mosquitoes and other flies, and since there has been need throughout for the construction of doors, windows and other fittings for which wood is usually employed, warping and destruction by white ants have been eliminated.

Veterinary Hospital

Eastern Veterinary Hospital and Garage

Out-patients	3,287
In-patients	1,124
Pairs of shoes fitted	1,317
Pairs of shoes removed	1
Hanging of feet etc.	61

Mechanization of Army and Civil Transport has caused a further decrease in the number of horses and mules in Mesopotamia and thus a corresponding decrease in the number of patients treated at the Veterinary Hospital.

In order to meet the needs of small owners of mules and horses, used in hired transport work, for a cheap and with a long life the British Veterinary Inspector, Mesopotamia, is arranging for the sale of a good hand-wearing shoe from the stock which will be sold at a reasonable price.

Mad Madani Veterinary Hospital

Out-patients	12,100
In-patients	470

Lameness and injuries comprised the majority of cases treated during the year.

The British area in the Sudan is the one place where the horse continues to hold its own in the face of advance by mechanized transport, as it is still found to be the most satisfactory form of conveyance for the inspectors of the Sudan Protection Syndicate and Katsala Oil and Company in the performance of their duties in the Sudan, owing to the

Sudan Defence Force Animals.

Veterinary Inspectors report that the usual high standard of stable management was maintained in all Mounted Units in the Sudan Defence Force. With the exception of the outbreak of epizootic lymphangitis, first noted in the 1938 Annual Report of the Sudan Veterinary Service and which still continues sporadically, there were no outbreaks of disease worth noting and the general condition of the animals throughout the year may be said to have been excellent.

Acknowledgements.

In concluding this summary of the work of the Veterinary Service during the year, I would thank my staff for their good work and for the loyal support which they have never failed to give me.

It is again a pleasure to record an appreciation of the help given to this Service by Provincial Staffs and by all other Departments and Services, when called upon. Their assistance has contributed, largely, to any success that has attended our efforts to control disease and to improve animal management in the Sudan.

Khartoum  
28th February, 1940.

(Sgd.) H.B. Williams.

Ab.

DIRECTOR, SUDAN VETERINARY SERVICE.



Veterinary inspectors report that the usual high standard of stable management was maintained in all establishments in the Sudan Defense Force. With the exception of the outbreak of epizootic lymphangitis, first noted in the 1955 Annual Report of the Sudan Veterinary Service and which still continues sporadically, there were no outbreaks of disease worth noting and the general condition of the animals throughout the year may be said to have been excellent.

Acknowledgments

In concluding this report for the year, I would like to express my appreciation to the Sudan Veterinary Service for their good work and for the loyal support which they have never failed to give me.

It is again a pleasure to record an appreciation of the help given to this Service by Provincial Staff and by all other Departments and Services, which has enabled them to carry out their duties. Their assistance has contributed largely to my success and has attended our efforts to control disease and to improve animal management in the Sudan.

(Sgd.) H. S. Williams.

DIRECTOR, SUDAN VETERINARY SERVICE.

ADJUTANT GENERAL  
SUDAN DEFENSE FORCE

AD.

APPENDIX I.

The following figures show the actual Revenue and Expenditure of the Sudan Veterinary Service for the past three years :-

	1937	1938	1939
	£E.	£E.	£E.
1. <u>REVENUE</u> ... ..	9,030	8,378	9,552
2. <u>EXPENDITURE</u> :			
<u>Chapter I - Personnel &amp; Personal Allowances</u>	26,678	27,493	26,891
<u>Chapter II - Services</u>	10,199	10,157	11,278
<u>Chapter III - Extraordinary Expend.</u>	855	158	65
TOTAL	37,732	37,808	38,234

(Signed) H.B. Williams.

Ab.

DIRECTOR, VETERINARY SERVICE.

APPENDIX I

The following figures show the actual Revenue and Expenditure of the Indian Veterinary Service for the year 1937-38.

	1937-38	1936-37	1935-36
<b>REVENUE</b>	2,522	8,378	2,522
<b>EXPENDITURE</b>			
Chapter I - Personnel & Personal Allowances	26,678	27,423	26,678
Chapter II - Services	10,125	10,125	11,278
Chapter III - Miscellaneous Expend.	655	158	65
<b>TOTAL</b>	37,458	37,706	38,021

(Signed) H. B. Williams.  
DIRECTOR, VETERINARY SERVICE.

A. STAFF AND GENERAL.

Under this section there is nothing new to report, as the mobilization of the staff and the purely departmental duties carried out were as in earlier years. Mr. J. T. M. [?], who was recalled from leave at the outbreak of war, was unable to rejoin the Malakal laboratory on account of his return being much earlier than usual, and he was temporarily lent to the Post and Telegraph Department where he was engaged in the Censorship Section for about two months. The Senior Research Officer was largely engaged in administrative duties in his additional capacity of Assistant Director, and all other members of the staff were fully occupied with routine duties to the virtual exclusion of research. A few small investigations were undertaken, which can hardly be dignified with the name of research.

ANNUAL REPORTOFTHE SENIOR RESEARCH OFFICER1 9 3 9.

P. [?]

The main items of routine work have been:-

- I. Preparation and issue of cattle plague vaccines (Malakal).
- II. Preparation and issue of cattle plague vaccines (Khartoum and Malakal).
- III. Issue of cattle plague virus for "para-vaccination" material on agona cattle plague (Khartoum).
- IV. Preparation and issue of contagious bovine pleuro-pneumonia vaccine (Khartoum).
- V. Issue of foot-and-mouth disease virus (Khartoum).
- VI. Issue of diagnostic materials and of material for the control of canal trypanosomiasis (Khartoum).
- VII. Distribution of novel influenza vaccine, which is prepared from Egypt (Khartoum).
- VIII. Examination of pathological specimens (Khartoum and Malakal).

Short notes will be given of each of these.

ANNUAL REPORT

THE BENTON RESEARCH OFFICE

1933

A. STAFF AND GENERAL.

Under this section there is nothing new to report, as the constitution of the staff and the purely departmental duties carried out were as in earlier years. Mr. J.T.R. Evans, who was recalled from leave at the outbreak of war, was unable to reopen the Malakal laboratory on account of his return being much earlier than usual, and he was temporarily lent to the Posts and Telegraphs Department where he was engaged in the Censorship Section for about two months. The Senior Research Officer was largely engaged in administrative duties in his additional capacity of Assistant Director, and all other members of the staff were fully occupied with routine duties to the virtual exclusion of research. A few small investigations were undertaken, which can hardly be dignified with the name of research.

The year's work has been exacting and uninteresting, and its general level of intensity has slightly risen. Nevertheless all members of the staff have worked well, and have successfully answered all calls made on them.

B. ROUTINE WORK.

The main items of routine work have been :-

- I. Preparation and issue of cattle plague antiserum (Malakal.)
- II. Preparation and issue of cattle plague vaccine (Khartoum and Malakal).
- III Issue of cattle plague virus for "serum-simultaneous" immunisation against cattle plague (Khartoum).
- IV. Preparation and issue of contagious bovine pleuro-pneumonia vaccine (Khartoum).
- V. Issue of foot-and-mouth disease virus (Khartoum).
- VI. Issue of diagnostic materials and of Naganol for the control of camel trypanosomiasis (Khartoum).
- VII. Distribution of horse-sickness vaccine, which is purchased from Kenya (Khartoum).
- VIII. Examination of pathological specimens (Khartoum and Malakal).

Short notes will be given of each of these.

A. STAFF AND GENERAL

Under this section there is a list of names of staff members and their positions. The text is mirrored and difficult to read, but appears to list various roles such as 'Assistant Director', 'Inspector', and 'Deputy Inspector'. It also mentions 'The year's work has been... and the year's work has been...'. The text is oriented upside down.

B. ROUTINE WORK

- The main lines of routine work have been:
- I. Preparation and issue of cattle plague notices (Malakal).
  - II. Preparation and issue of cattle plague notices (Koror).
  - III. Issue of cattle plague notices for "non-epidemic" areas of cattle plague (Koror).
  - IV. Preparation and issue of contact notices (Koror).
  - V. Issue of foot-and-mouth disease notices (Koror).
  - VI. Issue of diagnostic material and contact notices (Koror).
  - VII. Distribution of virus stocks (Koror).
  - VIII. Examination of pathological specimens (Koror).
- Short notes will be given of each of these.

### I. CATTLE PLAGUE SERUM.

This is the largest single routine item, and absorbs virtually the whole energies of the Malakal Veterinary Laboratory. The maximum output of the laboratory (which, incidentally, has never yet been attained) is calculated to be 125,000 full doses of 50 c.c. (6,250 litres) if all circumstances throughout the season are favourable. In practice some limiting factor always intervenes, and the past year's output of 113,232 doses (5661.6 litres) was a very creditable performance on the part of Mr. Evans and his staff.

The main limiting factor, as in all earlier seasons was the difficulty of obtaining sufficient suitable cattle; and this in a very densely stocked Province. The system of bartering serum and vaccine for cattle, to which reference was made in last year's Report, did not improve matters to the extent that was hoped, since only 85 cattle were obtained in this way as against 992 purchased. The kind of barter that seems to have a stronger local appeal is the exchange of used (immune) cattle for potentially susceptible ones, the reason for which is doubtless that this transaction does not involve a reduction in the number of cattle owned. 133 such exchanges were effected. However, it was ultimately necessary to purchase only 298 cattle from outside the Upper Nile Province as compared with 802 in the preceding year, and a considerable saving in transport charges was thus made.

Before originally deciding on establishing the laboratory at Malakal experiments had shown that the cattle of the Upper Nile Province were quite suitable for serum production, not only on account of their docility but also in the way they withstood the series of severe operations to which they have to submit, and in the potency of the serum they produce. Experience during more recent years has more than merely confirmed these observations; it has also shown that cattle from other parts of the Sudan are not so suitable. Even those obtained from Equatoria, although equally docile, do not stand up to the surgical manipulation they have to undergo, and it is doubtful whether the serum they yield has quite the same potency. One cannot, therefore, but remark, even at pain of repetition, that it is most disappointing that the Upper Nile Province, with its hundreds of thousands of cattle, which are put to no practical or commercial use, cannot supply the few hundreds that are annually required for the production of serum.

Grazing also was below average, and this fact, which made it necessary to suspend operations slightly earlier than usual, was also partly responsible for the shortfall in output.



STATE OF TEXAS  
COUNTY OF \_\_\_\_\_

This is the report of the committee on the subject of the proposed amendment to the constitution of the State of Texas, which was adopted by the voters at the general election held on the 11th day of November, 1901. The committee was organized on the 1st day of January, 1902, and has since that time been engaged in a study of the subject.

The committee has the honor to report that the proposed amendment is in its opinion a very desirable one, and that it is in its opinion a very desirable one. The committee has also the honor to report that the proposed amendment is in its opinion a very desirable one, and that it is in its opinion a very desirable one. The committee has also the honor to report that the proposed amendment is in its opinion a very desirable one, and that it is in its opinion a very desirable one.

Before the committee has the honor to report that the proposed amendment is in its opinion a very desirable one, and that it is in its opinion a very desirable one. The committee has also the honor to report that the proposed amendment is in its opinion a very desirable one, and that it is in its opinion a very desirable one. The committee has also the honor to report that the proposed amendment is in its opinion a very desirable one, and that it is in its opinion a very desirable one.

Very respectfully,  
The Committee on the Proposed Amendment to the Constitution of the State of Texas.

On the other side of the account is the fact that the Shilluk cattlemen did not, strangely enough, feel it incumbent on them to go on strike; at least one strike, usually easily settled, seemed almost to have become established as an annual social event. The health of the Arab technical assistants was also good according to Malakal standards; all, as usual, had at least one attack of malaria, but temporary deficiencies in staff were evenly spaced and did not seriously interfere with the work.

Towards the end of the year the laboratory was included in the units supplied with the recently installed electricity and water systems. Full advantage of the former cannot yet be taken, since a good deal of non-electrical apparatus is still in good working order, but a mains water supply is proving an appreciable convenience.

Since all the batches of serum prepared were of satisfactory potency, and the addition of traces of acriflavine (see last year's Report) to the carbolic acid used as a preservative proved quite efficient in preventing contamination, the season can be appraised, as, on the whole, a satisfactory one.

## II. CATTLE PLAGUE VACCINE.

There has been no modification in the technique of preparing this product. It consists of an emulsion of all the lymphoidal tissues (except the mesenteric lymphatic glands, which are invariably infected with bacteria) of beasts slaughtered at the height of the thermal phase of cattle plague, emulsified in a sixty per cent. aqueous solution of glycerine, and adjusted so that a "standard" dose of 10 c.c. represents a tissue content of about one gramme per hundred kilogrammes live weight for the average adult beast of the country.

As in earlier years a large proportion of the tissue incorporated was recovered from virus producers used in the Malakal Veterinary Laboratory and sent to Khartoum in an unfinished state. A rather larger quantity than usual, namely 1,065 litres or sufficient for about 100,000 doses in the finished state, was received from this source. Unfortunately this increase was partially offset by a decrease in the number of young cattle received by the Khartoum laboratory from the Medical Service. In this instance, improvements in technique had resulted in an increased yield of smallpox vaccine per beast, with a consequently smaller number of beasts used and subsequently handed over to the Veterinary Laboratory. A few small cattle, other than those discontinued from other items of work, had to be purchased from time to time for vaccine preparation, but in spite of substantially increased demands it was found possible to issue at least sufficient for all reasonable requirements without having to apply for additional funds.

On the other side of the account is the fact that the British Government did not, strangely enough, feel it incumbent on them to go on strike as soon as our strike was called. It is a good thing that the Government did not do so, as it would have been a great advantage to the Government to have had the strike called as an annual event. The fact that the Government did not do so is also a good thing, as it would have been a great advantage to the Government to have had the strike called as an annual event. In fact, the Government did not do so, as it would have been a great advantage to the Government to have had the strike called as an annual event.

Towards the end of the year the laboratory was included in the main building with the recently installed electric and water systems. Full advantage of the former cannot yet be taken, since a good deal of non-electrical work is still in good working order, but a main water supply is proving an appreciable convenience.

Since all the batches of serum prepared were of satisfactory potency, and the addition of traces of acetylamine (see last year's Report) to the cordic acid used as a preservative proved quite efficient in preventing coagulation, the season can be regarded, as on the whole a satisfactory one.

II. CATTLE PLAGUE VACCINE

There has been no modification in the technique of preparing this product. It consists of an emulsion of all the lymphatic glands (except the mesenteric lymphatic glands, which are invariably infected with bacteria) of diseased animals at the height of the terminal phase of cattle plague, contained in a sixty per cent. aqueous solution of glycerine, and adjusted so that a "standard" dose of 10 c.c. represents a tissue content of about one gramme per hundred kilograms live weight for the average adult beast of the country.

As in earlier years a large proportion of the tissue incorporated was recovered from virus producers used in the National Veterinary Laboratory and sent to Harrison in an unfinished state. A rather large quantity was, in fact, nearly 1,000 litres or sufficient for about 200,000 doses in the finished state, was received from this source. In addition, this material was partially offset by a donation of 100 litres of young cattle tissue received by the National Veterinary Laboratory from the National Service, in the summer of 1927. In this material had passed in the summer of 1927 of small-pox vaccine per dose, with a correspondingly smaller number of doses used and subsequently sent to the Veterinary Laboratory. A few small quantities of material were also distinguished from other sources of virus production, purchased from the National Veterinary Laboratory, but in spite of extensive investigations it was found possible to recover only a few litres of virus for reasonable quantities of vaccine. Additional funds

As was anticipated, in consequence of the necessity for discarding a large portion of the serum prepared in 1938, demands for vaccine were much larger than usual, especially in the earlier months before any current season's serum was available. Calculations had originally been made for an issue of about 100,000 doses, but finally 164,784 doses had to be prepared.

### III. CATTLE PLAGUE VIRUS.

As in past years, only small quantities of virus (actually 2,880 doses) have been issued to field officers. Glycerinised lymphoid tissue, maintained in cold storage, is still being used and is continuing to give satisfactory results.

### IV. CONTAGIOUS BOVINE PLEURO-PNEUMONIA VACCINE.

Although still widespread, the disease is undoubtedly giving less trouble than it was several years ago. This year 36,450 doses of vaccine were issued, of which nearly a quarter was used on cattle registered for export. While being a slight increase on last year's low total of 30,040 doses, this quantity is markedly less than the 50,000 or more that were regularly issued some years ago.

Judging from reports received from the field, it seems that widespread vaccination over a number of years has so immunised the herds in bad districts that the disease now appears in the form of a few cases here and there rather than as frank outbreaks. With the reduced chances of incurring substantial casualties, cattle owners are becoming less anxious to report its occurrence, since they wish to avoid the imposition of administrative measures - mainly restrictions of free movement. Thus, while there is no prospect of early eradication, there is no doubt that contagious bovine pleuro-pneumonia is reasonably under control, and with vaccination available it should never again get out of hand.

### V. FOOT-AND-MOUTH DISEASE VIRUS.

This product is issued for the deliberate infection of all cattle registered for export. The rationale of this procedure was fully explained in last year's Report and need not be repeated. So far as it is known, only one type of virus occurs in the Sudan;

As was anticipated, in consequence of the necessity for disposing a large portion of the serum prepared in 1910, orders for vaccine were much larger than usual, especially in the earlier months before any other vaccine serum was available. Calculations now indicate that there for an issue of about 100,000 doses, but actually 125,000 doses had to be prepared.

### III. CATTLE PLAGUE VIRUS

As in past years, only small quantities of virus (actually 2,800 doses) have been issued to field officers. Glycerinated typhoid vaccine, obtained in gold storage, is still being used and is continuing to give satisfactory results.

### IV. CONTAGIOUS BOVINE PLEURO-PNEUMONIA VACCINE

Although still widespread, the disease is undoubtedly giving less trouble than it was several years ago. This year 25,000 doses of vaccine were issued, of which nearly a quarter was used on cattle registered for export. This being a slight increase on last year's total of 20,000 doses, this quantity is markedly less than the 40,000 or more that were regularly issued some years ago.

Judging from reports received from the field, it seems that widespread vaccination over a number of years has so diminished the herd in bad districts that the disease now appears in the form of a few cases here and there rather than as trunk outbreaks. With the reduced chances of importing substantial quantities, cattle owners are becoming less anxious to report its occurrence, since they wish to avoid the imposition of administrative measures - mainly restrictions of free movement. Thus, while there is no prospect of early eradication, there is no doubt that contagious bovine pleuro-pneumonia is reasonably under control, and with vaccination available it should never again get out of hand.

### V. FOOT AND MOUTH DISEASE VIRUS

This problem is raised for the deliberate infection of all cattle registered for export. The rationale of this procedure was fully explained in last year's report and need not be repeated. So far as it is known, only one type of virus occurs in the Indian

or at any rate no beast infected with the virus now in use has ever contracted the disease on subsequent exposure to natural infection.

About 10,000 doses were used, following which no delay on account of foot-and-mouth disease was incurred among cattle exported to Egypt.

#### VI. CAMEL TRYPANOSOMIASIS CONTROL.

The steady annual increase in the demands of private owners for Naganol on payment has resulted in larger issues of this drug and of diagnostic materials than ever before. In fact, during the past seven years, in which naganol has been sold in thousands of doses rather than in hundreds as in the earlier years of its use, each year has shown a substantial increase as compared with its predecessor.

The total issues amounted to 17,783 units, as compared with 12,938 and 14,748 in 1937 and 1938 respectively. The proportion of this that was used on privately owned camels can be gauged from the record that 17,815 doses, or 32 more than issued, were sold during the calendar year. (Stocks in hand in outstations were evidently rather smaller at the end of the year than at the beginning).

The outbreak of war occurred when stocks were almost exhausted and a new supply was actually on order from Germany. This supply did not arrive, and arrangements had to be made to find a substitute. Fortunately this was available in the form of the British-made product "antrypol" which is said to be chemically identical, and to differ only in its registered trade name. Some little delay was inevitable in obtaining supplies, but by the end of the year the situation had again reverted to normal.

#### VII. HORSE SICKNESS VACCINE.

Demands for this product are not sufficiently large to make it worth while undertaking its preparation locally, and supplies continue to be obtained from Kenya. During the year 983 doses were issued as compared with 507 in 1938, and of these 492 were sold to private horse owners as compared with 389 last year. The results of its use continue to be good, and so far as can be ascertained only five vaccinated horses subsequently died of the disease. No more samples of virus were sent to Kenya for study, since the low casualty rate inspired confidence that all local strains must be covered by the vaccine.

or at any rate no horse infected with the virus has in  
any case ever contracted the disease on subsequent  
exposure to natural infection.

About 10,000 doses were used, following which  
no delay on account of foot-and-mouth disease was observed  
among cattle exported to Egypt.

VI. CANINE TYPHOUS LABIIS CONTROL

The steady annual increase in the demands of  
private owners for material on payment has resulted in  
larger issues of this drug and of diagnostic materials  
than ever before. In fact, during the past seven years,  
in which material has been sold in thousands of doses  
rather than in hundreds as in the earlier years of the  
war, each year has shown a substantial increase as  
compared with its predecessor.

The total issues amounted to 17,765 units, as  
compared with 12,218 and 14,748 in 1937 and 1938  
respectively. The proportion of this total was used  
on privately owned animals can be gauged from the records  
that 17,615 doses, or 99 more than issued, were sold  
during the calendar year. (Stocks in hand in quantities  
were evidently rather smaller at the end of the year  
than at the beginning.)

The outbreak of war occurred when stocks were  
almost exhausted and a new supply was actually on order  
from Germany. This supply did not arrive, and  
arrangements had to be made to find a substitute.  
Fortunately this was available in the form of the  
British-made product "antypox" which is said to be  
operationally identical, and to differ only in its  
registered trade name. Some little delay was inevitable  
in obtaining supplies, but by the end of the year  
the situation had again reverted to normal.

VII. HORSE BLOWBOMB VACCINE

Demands for this product are not sufficiently  
large to make it worth undertaking the preparation  
locally, and supplies continue to be obtained from Kenya.  
During the year 505 doses were issued as compared with  
377 in 1936, and of these 422 were sold to private horse  
owners as compared with 58 last year. The results of  
its use continue to be good, and so far as can be ascertained  
only five vaccinated horses subsequently died of the  
disease. No more samples of virus were sent to Kenya  
for study, since the low casualty rate imparted confidence  
that all local strains must be covered by the vaccine.

VIII. SPECIMENS EXAMINED.

The number of specimens submitted for examination from outside sources was 538 as against the very low total of 355 in 1938. As usual few of these were of any particular interest, most conditions diagnosed being quite well known. The following are, however, worthy of brief note :-

- (i) The continued appearance of cryptococcus infections in which lesions are limited to the conjunctiva - seven such being diagnosed, all in horses.
- (ii) Tuberculosis in a bullock slaughtered for food in Khartoum. This disease is so rare in the Sudan that the detection of a case is always worthy of special mention, if only to stress the rarity. The only lesion in the carcass was an old encapsulated abscess in a mesenteric lymphatic gland. The breed of the beast could not be accurately determined, but it may at least be said that it was not one of the large-horned, almost humpless, cattle in which the few earlier tuberculous infections have always been found. Cultures are being made from the material, but as it only became available late in the year, no conclusion is yet available as to the type of tubercle bacterium at issue.
- (iii) The identification of Trypanosoma uniforme in two cattle in the Upper Nile Province. The only interest in this finding is that it is the first time it has actually been placed on record. Trypanosomes of the T.vivax group are not frequently encountered in the Sudan, and such as have been seen have always hitherto had the large dimensions characteristic of T.vivax itself. Measurements of a dozen individuals (trypanosomes were scanty in both instances) in each of these two specimens showed the average length to be about 17 microns, while no individual exceeded 20 microns; there is therefore no doubt as to their having been T.uniforme in a state of purity.
- (iv) A case of blackquarter in a yearling bull which died in Kordofan. Since the only material sent for examination was a few smears of muscle exudate, the exact species of bacterium could not be determined. Blackquarter has a world-wide distribution, and the only justification for remarking on this case is that it appears to be the first one recorded in the Sudan.



VIII. BACTERIAL INFECTIONS

The number of specimens submitted for examination on outside sources was 10, as against 100 for total 152 in 1930. An equal law of these cases of the various infections, most conditions being equally well known. The following are, however, worthy of note:

(i) The combined appearance of cryptosporidiosis in which lesions are limited to the conjunctiva - never again being diagnosed, all in horses.

(ii) Tuberculosis as a disease also occurred in food in horses. This disease is not only in the Sudan but the detection of a case is always worthy of special mention, it only to stress the point. The only lesion in the disease was an old encysted abscess in a mesenteric lymphatic gland. The onset of the disease could not be accurately determined, but it was noted to have that it was not one of the large horses, almost hopeless, cattle in which the few earlier tubercular infections have always been found. Cultures are being made from the material, but as it only became available late in the year, no conclusion is yet available as to the type of tubercle bacillus at issue.

(iii) The identification of *Trypanosoma vivax* in two cattle in the Upper Nile Province. The only interest in this finding is that it is the first time it has actually been placed on record. *Trypanosoma vivax* group are not frequently encountered in the Sudan, and only a few have been seen. They have always been found in the large distillers characteristic of *T. vivax* group, measurements of a dozen individuals (trypanosomes were scanty in both instances) in each of these two specimens showed the average length to be about 17 microns, while no individual exceeded 20 microns; there is therefore no doubt as to their being *T. vivax* in the state of purity.

(iv) A case of glandular fever in a young child in which the diagnosis was only confirmed after a few days of illness. The exact species of bacterium could not be determined. Glandular fever has a wide distribution, and the only justification for its appearing in this case is that it appears to be the first one recorded in the Sudan.

- (v) A case of so-called Globidium infection in a horse. The interest in this case lies in its place of origin. Only about half a dozen such infections have been recorded in this country, all of which, including the one now under mention, have occurred in the Nuba Mountains area of southern Kordofan. The case was diagnosed from skin scrapings sent to Khartoum. The horse has since been sent to Khartoum for further observation.

Other less interesting diagnoses included :-

- Horses : Tryp. congolense, Babesia caballi, epizootic lymphangitis, ulcerative cellulitis, ringworm, various septic and helminthic infections.
- Mules : Epizootic lymphangitis and other septic infections
- Donkeys: Epizootic lymphangitis and other septic infections.
- Cattle : Tryp. congolense, Theileria annulata, Actinomyces farcinicus, coccidiosis, miscellaneous septic and helminthic infections.
- Camels : Tryp. evansi, coccidiosis.

#### C. RESEARCH.

Deliberate research again remained entirely in abeyance, but three small items of investigational work were undertaken that may reasonably be recorded under this heading.

#### NAGANOL AND ANTRYPOL.

In an earlier section of this Report it was stated that the British-made compound antrypol is claimed by the makers to be chemically identical with the German-made naganol. In consideration of the scale on which the treatment of camel trypanosomiasis is carried out on pyment, it seemed necessary to confirm its equal curative value. More especially did it seem necessary because a few years ago a sample of antrypol was tested in the field and doubt was expressed as to its equal value. Although it was subsequently discovered that treated camels which appeared to relapse were not beyond suspicion of having been exposed to the

(v) A case of so-called epidemic infection in a horse. The interest in this case lies in its place of origin. Only eight half-bred horses have been recorded in this country, all of which, including the one now under mention, have occurred in the West Midlands area of southern England. The case was diagnosed from skin scrapings sent to Harlow. The horse has also been sent to Harlow for further observation.

Other less interesting diagnoses included:-

- Horses: Typ. conjunctivae, epidemic infection, lymphangitis, ulcerative dermatitis, ringworm, various septic and helminthic infections.
- Mules: Epizootic lymphangitis and other septic infections.
- Donkeys: Epizootic lymphangitis and other septic infections.
- Cattle: Typ. conjunctivae, Thelazia annulata, epidemic infection, oculidialaria, oculidialaria septic and helminthic infections.
- Goats: Typ. conjunctivae, oculidialaria.

C. RESEARCH

Definitive research again remained entirely in abeyance, but three small items of investigational work were undertaken that may reasonably be recorded under this heading.

RESEARCH AND ANALYSIS

In an earlier section of this report it was stated that the British-made compound antigen is claimed by the makers to be chemically identical with the German-made material. In consideration of the scale on which the treatment of canal lymphomatosis is carried out, it seemed necessary to compare the equal sensitive value. More especially did it seem necessary because a few years ago a sample of antigen was tested in the field and both was expressed as to its equal value. Although it was subsequently discovered that treated canals which appeared to respond were not beyond suspicion of having been exposed to the

chance of reinfection, no further tests were carried out because the British manufacturers were at that time unable to quote prices that would compete with those quoted from Germany. With the outbreak of war, and with the German-made product finally off the market, it was thus necessary to carry out a new series of tests. These were undertaken in the Veterinary Laboratory at Khartoum, which is definitely situated outside the zone where reinfection can occur.

Eleven camels, suffering from natural or artificial infections with three strains of T. evansi from different sources, were allowed to develop strong positive reactions to the mercuric chloride test. Nine of these were then given a five gramme dose of antrypol and the remaining two (controls) were given a similar amount of naganol. Observations were not concluded by the end of the year, but up to that time (two months after treatment) no trypanosome was detected in the blood of any camel, and the intensity of reaction of all individuals to the mercuric chloride test had markedly waned. It is intended to conclude the experiment by injecting blood from each camel into experimental animals, and until this has given negative results the case cannot be considered proved. Nevertheless, in consideration of the perfect results to date, the sale of antrypol is being continued with confidence.

#### CAMELS AND FOOT-AND-MOUTH DISEASE.

There has long been some uncertainty as to whether camels are susceptible to foot-and-mouth disease. Certainly no veterinary official at present serving in the Sudan has ever seen a naturally-occurring case, in spite of the close association that frequently occurs between camels and infected cattle, and authorities in certain other countries have denied the camel's susceptibility to artificial infection. Nevertheless, some recently-published text books still leave the unfortunate beast under a cloud of suspicion, and early in the year the movement of camels in Egypt was restricted on account of the existence of foot-and-mouth disease among cattle.

Since the free movement of camels is of the greatest importance to the Sudan, it was thought desirable finally to settle the matter, especially as it could be settled almost without incurring any expenditure by using the camels which are frequently being cast from the Government service.

ance of reinfection, as the latter tests were carried  
it because the British authorities were at that time  
able to quote reports that would compare with those  
of the German authorities. With the object of  
in the German authorities' hands, it was necessary  
was thus necessary to carry out a new series of tests.  
These were undertaken in the Veterinary Laboratory at  
London, which is definitely situated outside the  
the whole reinfection can occur.

Eleven camels, suffering from natural or  
artificial infections with three strains of *T. camelus*  
on different sources, were allowed to develop strong  
active reactions to the various strains of *T. camelus*.  
and were then given a large gamma dose of antyphlog  
and the remaining two (control) were given a similar  
dose of antyphlog. Observations were not concluded  
the end of the year, but up to that time (two months  
later treatment) no typhoid was detected in the  
end of any camel, and the intensity of reaction of  
individuals to the various strains of *T. camelus* had  
markedly waned. It is intended to conclude the  
experiment by injecting blood from each camel into  
experimental animals, and until this has given negative  
results the case cannot be considered proved. Never-  
theless, in consideration of the perfect results so far,  
a case of antyphlog is being continued with confidence.

### CAMELS AND FOOT-AND-MOUTH DISEASE.

There has long been some uncertainty as to  
other camels are susceptible to foot-and-mouth  
disease. Certainly no veterinary official at  
present existing in the Sudan has ever seen a naturally-  
occurring case, in spite of the close association that  
frequently occurs between camels and infected cattle.  
Authorities in certain other countries have denied  
a camel's susceptibility to artificial infection.  
Nevertheless, some recently published text books still  
give the unfortunate beast under a class of susceptibility  
early in the year the movement of camels in Egypt  
is restricted on account of the existence of foot-and-  
mouth disease among cattle.

Since the free movement of camels is of the  
greatest importance to the Sudan, it was thought  
desirable finally to settle the matter, especially as  
could be settled almost without incurring any  
inconvenience by using the camels which are frequently  
sent from the Government service.

Altogether ten camels were tested, living virus being injected either subcutaneously (1), into the epithelium of the tongue (7), or at the junction of the toe-nail and the skin (2). In no case did any symptom or lesion, either general or local, appear. All tests included one or two young cattle which were injected with virus either subcutaneously or into the tongue, and in all of these a typical foot-and-mouth infection developed.

It can, therefore, confidently be stated that camels are not susceptible to foot-and-mouth disease, and that there can consequently be no more point in restricting their movement during an outbreak than there would be in immobilising any other insusceptible object.

#### HORSE SICKNESS.

The few vaccinated horses which subsequently died of natural infection could be easily dismissed by assuming that they represented failures of the vaccine to immunise; in fact it could be taken as cause for satisfaction that the number was so small (5 out of 983). It was, however, recalled that it had been recorded in Kenya that a disease appeared to exist which produced the outward symptoms of horse-sickness but in which the virus could not be demonstrated on the subinoculation of experimental animals; one sample of Sudan material had, in fact, also been the subject of the same observation (see last year's Report). Since one regularly has access to horses which are destined for destruction for surgical or other reasons, it was thought that a few samples of blood from so-called atypical cases of horse sickness, or from vaccinated horses which subsequently died, might usefully be tested on such of these as had no history either of vaccination or of recovery from an earlier attack of the disease. One sample of blood from a vaccinated horse which succumbed, and one from an atypical case were first injected into two apparently clean horses without effect. Later in the year three samples from vaccinated horses which died and three from atypical cases were all injected successively into three horses, again without effect in any case. All the test horses were of pure indigenous breed, and it is known that this type is less susceptible to horse-sickness than the imported types or cross-breeds whose deaths were being investigated. Also no opportunity arose to confirm susceptibility with a known virulent horse-sickness virus because none is normally maintained in stock and none

Altogether ten cases were tested, living virus being injected either subcutaneously (7), into the epithelium of the tongue (2) or at the junction of the toe-nail and the skin (1). In no case did any reaction or lesion, either general or local, appear. All tests included one or two young calves which were injected with virus either subcutaneously or into the tongue, and in all of these a typical foot-and-mouth reaction developed.

It was therefore, confidently to be stated that animals are not susceptible to foot-and-mouth disease and that there can consequently be no case point in attributing their recovery during an outbreak to any virus which would be inactivating any other susceptible agent.

HORSE SICKNESS.

The few vaccinated horses which subsequently died of natural infection could be easily dismissed, assuming that they represented failures of the vaccine to immunize; in fact it could be taken as a rule for vaccination that the number was so small (out of 95). It was, however, recalled that it had been reported in Kenya that a disease appeared which produced the outward symptoms of horse-sickness but in which the virus could not be demonstrated on the administration of experimental tests; one sample of Sudan material had, in fact, been the subject of the same observation (see at year's report). Since one regularly has access to horses which are destined for vaccination for surgical or other reasons, it was thought that a few samples of good form so-called typical cases of horse sickness, or vaccinated horses which subsequently died, might be tested on some of these as had no history prior of vaccination or of recovery from an earlier attack of the disease. One sample of blood from a vaccinated horse which succumbed, and one from an unvaccinated horse which first injected into the experimentally vaccinated horses without effect. Later in the year three unvaccinated horses which died and three vaccinated cases were all injected subcutaneously into the test horses with of pure indigenous virus, and it was known that this type is less susceptible to horse-sickness than the imported types or cross-bred stock which were being investigated. Also no opportunity arose to confirm susceptibility with a known virulent horse-sickness virus because none is normally maintained in stock and none

came to hand at an opportune time. The question cannot therefore be regarded as settled, but since it seems improbable that five native horses, all solidly immune to horse sickness, would be encountered in succession, there is at least justification for wondering whether some other disease, closely resembling horse-sickness in its clinical features, is not a good deal commoner than has hitherto been supposed. It is hoped to pursue the matter further in the future.

#### D. PUBLICATIONS.

Only one paper was published in a scientific journal. Actually this was published so late in 1938 that it could not be noted in the Report for that year.

HOARE, C.A. and BENNETT, S.C.J. Further Observations on the Absence of the Kinetoplast in Trypanosoma evansi. - Parasitology, 1938, Vol.30, pp.529-542.

#### E. SUMMARY.

The volume of usual routine duties of the Research Section rose in the case of every item as compared with 1938, and the staff was continuously and fully occupied in coping with demands.

No new activities were undertaken.

Deliberate research again remained in abeyance, as for several years past, but three small ad hoc series of observations were carried out on camel trypanosomiasis, foot-and-mouth disease, and horse-sickness respectively.

One scientific paper was published.

(Sgd.) S.C.J. Bennett.

SENIOR RESEARCH OFFICER,  
SUDAN VETERINARY SERVICE.

Ab.



case to hand as an epidemic time. The question cannot therefore be regarded as settled, but since it seems improbable that five native horses, all solidly immune to horse sickness, would be encountered in succession, there is at least justification for wondering whether some other disease, closely resembling horse-sickness in its clinical features, is not a good deal commoner than has hitherto been supposed. It is hoped to pursue the matter further in the future.

D. PUBLICATIONS

Only one paper was published in a scientific journal. Actually this was published as late as 1938 but it could not be noted in the Report for that year.

BOARD OF DIRECTORS, B.O.V. Further  
Officers of the Association of the  
B.O.V. (B.O.V. Association overall)  
Vol. 2, pp. 252-253.



The volume of annual routine duties of the Research Section rose in the case of every lion as compared with 1930, and the staff was continuously and fully occupied in coping with demands.

No new activities were undertaken.

Definitive research as it remained in advance as for several years past, but since small ad hoc series of observations were carried out on cases of typhlocyba, foot-and-mouth disease, and horse-sickness respectively.

One scientific paper was published.

(Sgt.) B.O.V. Research

SENIOR RESEARCH OFFICER,  
SUDAN VETERINARY SERVICE.

