

Annual report of the Sudan Veterinary Service.

Contributors

Sudan. Veterinary Service.

Publication/Creation

[Khartoum] : [publisher not identified], [1944]

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ANNUAL REPORT
OF THE
SUDAN VETERINARY SERVICE
FOR THE YEAR
1944

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ANNUAL REPORT

OF THE

SUDAN VETERINARY SERVICE

FOR THE YEAR

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ANNUAL REPORT

1966

SUDAN VETERINARY SERVICE

FOR THE YEAR

1966

Prepared by the Sudan Veterinary Service
and published by the Sudanese Government

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SECTION I.

STAFF.

The Sudan Veterinary Service suffered an abnormally heavy loss during the year by the retirement of three senior members of the British Staff.

Lt.-Col. C. P. Fisher, Director since 1940, had served for 26 years in the Service. His genius for organisation and administration was displayed during the difficult war years. With a very much reduced field staff to meet all civil and military demands, his able direction won high praise from all concerned.

Dr. S. C. J. Bennett, Senior Research Officer and Assistant Director, had spent 19 years in the service. Besides being a research worker of international repute he was a very able administrator. Some of his most notable research achievements in the Sudan are mentioned in the report of the Senior Research Officer which follows.

Major L. E. Prichard, O.B.E., served for 22 years in the department and was remarkable for his energy and the efficiency with which he carried through any undertaking.

Mr. G. C. Brander, Research Officer (hors cadre) resigned after 2 years service.

Three Veterinary Inspectors returned to the Service on release from the Sudan Defence Force. One Veterinary Inspector remained seconded to the Sudan Defence Force. Two vacancies remained unfilled at the end of the year as it was found impossible to obtain recruits.

The Director was appointed a member of the Rural Water Supplies and Soil Conservation Board and in July assumed the complete functions of Controller of Livestock and Animal Products.

DISTRIBUTION OF BRITISH STAFF AS AT 31st DECEMBER, 1944.

NAME.	DESIGNATION	STATION.
Major W. H. Glanville, 4N., M.R.C.V.S.	Director	Khartoum
Capt. T. Menzies, O.B.E., 4N., M.R.C.V.S., D.V.S.M. (Vi.t.)	Senior Veterinary Inspector	El Obeid
Mr. J. E. Furney, 4N., M.R.C.V.S.	" " "	Wad Medani
Mr. I. A. Gillespie, 4N., M.R.C.V.S.	" " "	Kassala
Mr. A. W. Chalmers, M.R.C.V.S.	Veterinary Inspector and Dean Khartoum Veterinary School	Khartoum
Mr. P. Durran, M.R.C.V.S.	Veterinary Inspector	El Fasher
Mr. J. D. M. Jack, M.R.C.V.S.	" " "	Khartoum
Mr. J. K. Thomson, M.R.C.V.S. D.V.S.M.	" " "	Malakal
Mr. P. Z. Mackenzie, M.B.E. M.R.C.V.S.	" " "	Wad Medani
Mr. H. B. Luxmoore, B.Sc., M.R.C.V.S.	" " "	Released for Military Serv
Vacant	" " "	—
Mr. J. M. Kay	Superintendent	Khartoum
Mr. G. M. Anderson	A Superintendent	Khartoum
RESEARCH.		
Mr. J. T. R. Evans, B.Sc. M.R.C.V.S.	Senior Research Officer.	Khartoum
Vacant	Veterinary Research Officer.	—

ESTABLISHMENT OF NON-BRITISH CLASSIFIED STAFF, 1944

- 6 Veterinary Officers.
- 2 Veterinary Overseers.
- 2 Animal Husbandry Officers.
- 2 Laboratory Assistants.
- 1 Head Clerk.
- 9 Clerks.
- 3 Book-Keepers.
- 1 Store Keeper.
- 13 Head Stockmen.
- 1 Southern Supervisor.
- 5 Southern Stockmen.

UNCLASSIFIED STAFF AS AT 31.12.1944.

- 64 Stockmen.
- 1 Carpenter.
- 2 Storemen.
- 5 Motor Drivers.
- 9 Messengers.
- 71 Veterinary Attendants.
- 20 Temporary Veterinary Attendants.
- 3 Shoeing Smiths.
- 2 Farriers.
- 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.

SECTION II.

DISEASES OF ANIMALS

DISEASES OF CATTLE.

Cattle Plague.

Although the disease was fairly wide-spread it was of low virulence in most areas. The mortality in reported outbreaks was 1.3% compared with 1.7% in 1943.

The following table summarises cattle plague control of reported outbreaks.

Province	Outbreaks	Cattle involved	Deaths	Serumized	Vaccinated
Blue Nile	333	82,984	949	28,745	—
Darfur	135	59,295	842	31,607	1,020
Kassala	34	6,859	112	2,759	—
Khartoum	19	2,288	128	1,193	—
Kordofan	147	30,505	328	16,630	12,113
TOTAL	668	181,931	2,359	80,934	13,133

In addition to the serum used for the control of the above outbreaks some 17,500 doses were issued to Upper Nile and Equatoria Provinces. No accurate returns of disease in these two provinces were made available.

Some further 250,000 doses of vaccine were issued, either for the protection of trade cattle, or as a long range disease control measure in non-trade cattle, or as barter for virus producers.

The following table gives the comparative incidence and control of cattle plague during the past five years:

YEAR.	Outbreaks	Cattle Involved	Deaths	Serumized	Vaccinated
1940	1,184	362,840	5,535	134,453	86,744
1941	1,032	264,659	5,248	107,345	25,455
1942	1,112	279,484	4,872	126,211	36,374
1943	760	199,212	3,391	130,980	57,073
1944	668	181,931	2,359	80,934	13,133

Contagious Bovine Pleuro Pneumonia.

As in previous years the disease was most prevalent along the trade routes. Constant watch was kept for the disease among cattle destined for export. 527 cases were observed at El Obeid, 22 at Khartoum North quarantine and 157 at Wadi Halfa quarantine. All infected animals were slaughtered as soon as detected.

The following is a summary of control of reported outbreaks other than those among trade cattle.

Summary for 1944.

Province	Outbreaks	Cattle involved	Died or slaughtered	Vaccinated
Blue Nile	10	1,318	21	1,297
Darfur	10	5,299	245	4,862
Khartoum	1	19	—	18
Kordofan	35	5,610	101	5,515
Upper Nile	7	1,520	17	946
TOTAL	63	13,766	384	12,138

Comparative table for last five years.

Year	No. of Outbreaks	Cattle involved	Died or slaughtered	Vaccinated
1940	102	16,073	249	13,741
1941	96	24,195	299	18,117
1942	77	12,066	240	10,932
1943	53	10,538	192	9,033
1944	63	13,766	384	12,138

Foot and Mouth Disease.

As a result of the widespread infection in Darfur and Kordofan towards the end of 1943, cases of foot and mouth appeared among cattle in Khartoum North and Wadi Halfa quarantines early in the year. The Egyptian Government placed an embargo on all in-contacts with the result that there was a complete cessation for about seven weeks of the export of cattle and sheep to Shellal.

Routine artificial infection of all cattle destined for export to Egypt was started in the early rains and continued during the remainder of the year. In consequence there was no further interruption of the export trade.

An outbreak occurred in the Belgravia Dairy herd of high grade Friesians. Milk production was reported to have been reduced by 40 per cent.

Anthrax.

A few isolated outbreaks occurred in Kordofan and Blue Nile Provinces but were quickly suppressed.

22 cases occurred in cattle at Khartoum North quarantine and 7 cases at Wadi Halfa quarantine.

In addition 9 cases occurred in sheep at Wadi Halfa quarantine.

Black Leg.

No outbreaks were reported. 1,200 doses of vaccine were issued against payment in Kordofan Province in areas infected last year.

Trypanosomiasis.

This disease was mainly responsible for the output of serum from the Malakal laboratory being approximately 800 litres less than the maximum estimated output (see report of Senior Research Officer which follows).

Senior Veterinary Inspector, Kassala reported two small outbreaks in the Rahad river area of the southern district of Kassala Province. The herds involved belonged to sedentary people who do not move to the upper reaches of the Rahad river along the Abyssinian border where tsetse fly might be expected to exist. The disease may have been introduced by nomads and subsequently transmitted mechanically by tabanidae. Trypanosomiasis has not been reported in this area since 1928.

Milk Fever.

Up to date milk fever had not been recorded in the Sudan. A case which was successfully treated occurred in the dairy herd of the School of Agriculture, Shambat. It is surprising that further cases have not occurred among the 500-600 gallon cows of indigenous breeds in the numerous dairies developed during the war years.

DISEASES OF CAMELS.

Trypanosomiasis.

The disease was reported to have been very prevalent in Blue Nile, Kassala and Kordofan Provinces.

Demands for Antrypol were the highest on record. The following table shows issues during the year:—

Province	Free	On Payment	Total
Blue Nile	301	13,413	13,714
Darfur	50	2,154½	2,204½
Kassala	177	6,166	6,343
Khartoum	6	168	174
Kordofan	56	14,137½	14,193½
Sudan Defence Force Units	—	313	313
TOTAL	590	36,352	36,942

Mange.

Cases were reported among Government camels in Kassala, Blue Nile, Kordofan and Darfur Provinces. The incidence of the disease in native herds appeared to be low compared with 1943 except in Kassala Province where it was reported to be widespread in the northern area and along the Eritrean frontier.

DISEASES OF EQUINES.

African Horse Sickness.

Four deaths were reported. 1,561 doses of vaccine were issued for the protection of Army, Government and privately owned animals.

Cryptococcus Infections.

33 horses and 35 mules were destroyed. Losses among police animals in the Upper Nile Province were only 7 horses and 3 mules compared with 49 horses and 3 mules in 1943. The Province Veterinary Inspector considered the following measures were responsible for the large reduction of destructions:—

“The Commandant of Police has got all his police “Sarraga minded”; slides are sent in for examination from the slightest swelling, open or closed; if positive, the animal is despatched immediately to Malakal, no matter how distant the animal is from Headquarters; on arrival the animal is isolated and surgically treated by excision or line firing.”

DISEASES OF OVINES.

Sheep Pox.

50 sheep died or were slaughtered at the quarantine at Wadi Halfa.

DISEASES OF DOGS.

Rabies.

The following table shows the distribution of rabies as confirmed by the Stack Medical Research Laboratories.

Province	Dogs	Donkeys	Camels	Total
Kassala	8	1	1	10
Blue Nile	16	1	—	17
Kordofan	13	—	—	13
Darfur	2	2	—	4
Khartoum	—	1	—	1
TOTAL ...	39	5	1	45

Unconfirmed cases were reported from several districts in the Upper Nile Province. 4,056 stray dogs were destroyed in the Blue Nile Province, 955 in Kordofan Province and 418 in Kassala Province. 588 cats were destroyed in Khartoum Province.

SECTION III

TRADE IN LIVESTOCK AND LIVESTOCK PRODUCTS

Cattle.

Export continued to be limited to the Military Authorities in the Middle East. Exports decreased from 40,517 in 1943 to 34,611 in 1944. The decrease was due mainly to the embargo mentioned under Foot and Mouth disease. The low river between Wadi Halfa and Shellal also caused a complete cessation of export for over 3 weeks during July.

The average price per live kilo paid at Shellal by the Army was 27.26 m/ms. (7d.) compared with 24.88 m/ms. (6d.) in 1943. The average weight at Shellal was 344.94 kilos compared with 356.47 kilos in 1943.

The condition of export cattle was above normal but owing to the heavy demands of the last few years there has been a small but steady decrease each year since 1942 of the average weight of cattle delivered at Shellal. Darfur and Kordofan provinces continued to supply the vast majority of cattle for export. Some 1100 were exported from Equatoria. Their average weight was 305.8 kilos.

Sheep.

Exports to the Army at Shellal increased from 93,094 in 1943 to 104,500 in 1944.

Average weights and prices at Shellal were 44.56 kilos and £E. 2.269 m/ms. compared with 44.60 kilos and £E. 2.113 m/ms. in 1943.

120 desert sheep from Kordofan Province were exported via Juba to the Kenya Government for experimental breeding purposes.

Camels.

The control measures instituted in 1943 to limit export remained in force. Some 40,000 animals were exported to Egypt. The average price per head in Egypt increased from approximately £E. 16 in 1943 to £E. 20 in 1944.

Goats.

2,962 goats were exported via Wadi Halfa to the Egyptian Government for the feeding of poor people in Upper Egypt. Their average weight and prices delivered at Shellal was 29.37 kilos and £E. 1.762 m/ms.

Horses and Mules.

The quarantine restrictions prohibiting the export of equines to Egypt on account of African Horse Sickness remained in force but were waived by military exigencies. 50 Sudan country bred horses and 300 Abyssinian mules vaccinated against African Horse

Sickness were delivered to the Middle East Forces. Many of the mules were sent to the 8th Army in Italy where it was reported they were particularly useful.

Hides and Skins.

Six established hide exporters were appointed authorised sellers and given the sole right to sell to the United Kingdom Commercial Corporation (Sudan) Ltd., which handled all exports. Prices fixed for hides delivered to the U.K.C.C. at Port Sudan covered four categories of air dried and three categories of drysalted hides. Prices for air dried hides ranged from 60 to 120 m/ms., per oke (1s 2.8d. to 2s. 5.5d. per 2.75 lbs.) and from 50 to 100 m/ms. (1s. 0.3d. to 2s.0.6d.) for dry salted hides.

Classified purchases from the authorised sellers were as follows :

	M. Tons.
First Class air dried	261.30
Second Class air dried	216.00
Third Class air dried... ..	255.28
First Class dry salted	1005.13
Second Class dry salted	216.55
Air dried Rejects	58.82
Dry salted Rejects	198.38
	<hr/>
TOTAL	2211.46
	<hr/>

Arrangements were made to compensate merchants who had purchased hides at prices related to inflationary Middle East markets and who were forced to sell to the U. K. C. C. at controlled world market prices. Those who had long held consignments at ports were allowed to export as it was necessary to clear the ports preparatory to the U. K. C. C. becoming the sole exporter.

The institution of controlled, graduated prices which makes the preparation of good hides worth while is gradually raising the standard of export hides.

The total exports for the year were 1,371,599 kilos, valued at £E. 129,154 compared with 1,697,996 kilos valued at £E. 188,047 in 1943.

Sheep and Goat Skins.

Exports increased from 439,685 kilos valued at £E. 43,388 in 1943 to 717,160 valued at £E. 81,962.

Quantity and Value of livestock and livestock products exported during the last five years.

	Unit	1940		1941		1942		1943		1944		TOTAL	
		No.	Value £E.	No.	Value £E.	No.	Value £E.	No.	Value £E.	No.	Value £E.	No.	Value £E.
Cattle	... head	11,045	63,728	29,131	228,439	50,089	462,961	40,517	347,738	34,611	309,270	165,393	1,349,136
Sheep	... head	39,595	49,405	62,474	94,122	151,782	264,072	93,094	185,535	104,620	227,694	451,565	820,828
Goats	... head	669	282	3	1	24	14	750	375	3,226	4,123	4,672	4,795
Horses	... head	245	3,745	228	2,500	669	7,105	1	20	—	—	1,143	13,370
Mules	... head	1	4	2	20	—	—	—	—	—	—	3	24
*Camels	... head	20,745	165,960	100,000	800,000	150,000	2,400,000	50,000	800,000	40,000	800,000	377,932	4,965,960
Hides	... Tons	1,265	65,264	2,870	206,460	2,792	581,743	1,698	188,047	1,371	129,154	9,996	870,668
Sheep and goat skins	No.	582,008	55,546	575,882	51,343	627,830	60,469	419,095	43,388	717,160	81,962	2,921,975	292,708
Other skins	... —	—	372	—	267	—	1,680	—	36,334	—	77,908	—	116,561
Semn ...	... Tons	840	46,795	226	15,832	—	52	1	118	—	15	1,067½	62,812
TOTAL			451,101		1,398,984		3,418,096		1,601,555		1,627,126		8,496,862

* The number and value of camels exported are conservative estimates.

Internal Trade.

The number of animals slaughtered for food in the ten principal towns as compared with the four previous years is shown below :

Year	Camels	Cattle	Sheep	Goats
1940	2,350	23,986	138,439	8,853
1941	2,767	38,899	200,611	21,792
1942	2,203	43,653	182,408	18,225
1943	1,753	40,989	159,971	19,376
1944	1,884	*40,644	*201,932	18,569

* includes 2,632 cattle and 5,665 sheep slaughtered by the Army in Khartoum.

Table showing the number and average prices of cattle sold in El Obeid Market during the past five years.

	Number sold	Average price per head.
1940	3,015	£s. m/ms. 1.602
1941	10,432	2.282
1942	24,523	2.844
1943	15,183	4.231
1944	21,433	4.160

Clarified Butter.

The production of improved clarified butter at Government creameries under Government supervision was considered no longer justifiable for the reasons stated in my 1943 Annual Report.

Native Semn.

A scheme for improving native semn was introduced in Darfur Province. Veterinary Staff supervised the selection and reboiling of good quality semn during the rains. About 300 kantars (13,608 kilos) were produced but not marketed in 1944. If it comes up to expectations and commands a higher market price than the average Darfur product, further assistance and instruction will be given in 1945.

SECTION IV.

IMPROVEMENT OF LIVESTOCK.

Cattle.

In general, improvement measures remain confined to selection from indigenous breeds and castration of scrub animals.

A scheme whereby all stock bulls are to be approved by a licensing board and branded and all other bulls castrated has been adopted by the local administration in the Eastern Jebels area of Kordofan Province.

Horses.

The abnormal offtake from Darfur during the war years has resulted in a deterioration in the standard of horses available for purchase. 127 remounts were required but it was possible to purchase only 102.

Veterinary Inspector Darfur has commented as follows on the Darfur horse breeding scheme :—

“ Great strides have been made since interest in horse-breeding in the Sudan was first aroused 40 years ago. Early workers complained of the lack of co-operation due to suspicion and prejudice on the part of the natives but it is a different story now. Baggara will sit and discuss the percentage and breeding of their horses for hours on end and there is great pride in possession of a good looking animal : but there is little change in their methods of management, and little or none can be possible under Baggara conditions of life. The horse must be tough and hardy like his owner and content with little other food than what nature provides, so we must beware not to attempt to evolve a breed which is not hardy enough for its habitat. It cannot be denied that the general improvement in quality of horse-flesh seen some years ago raised hopes unduly high, and a slight reverse has been experienced. Observation has shown this to be due in the first place to too great an increase in foreign blood which has resulted in somewhat high mortality in young stock. Secondly, remount demands have been so great that the tribes have been annually stripped of their best horses. This was anticipated when the scheme for tribal stallions was brought into force, but valuable as these may be, the free and unrestricted life of the native mare makes indiscriminate mating unavoidable. Systematic removal of all the best horses thus increases the scope of undesirable remainders to reproduce their type.”

It is proposed to reduce temporarily for a period of five years the high standard hitherto observed for army and police remounts and to increase greatly the present establishment of tribal stallions.

Section V.

EDUCATION.

In spite of the acute shortage of British Staff it was possible to keep the Khartoum Veterinary School open. The two students under tutition passed their professional examinations in Bacteriology Pathology, Parasitology, Materia Medica and Animal Husbandry II. Very good marks were obtained in the first three subjects but the external examiner of Animal Husbandry reported on the students' lack of animal background which was responsible for the comparatively low marks obtained in this practical subject.

During the summer vacation the students spent six weeks in Darfur Province under the supervision of the Veterinary Inspector.

SECTION VI.

MISCELLANEOUS.

It was an excellent year for stockowners in most areas. Grazing was above normal during the early part of the year. The rains were good, resulting in plentiful grazing during the latter part of the year except in some areas where damage by locusts occurred. Losses from disease were slight. Stock-owners continued to obtain good prices for their animals and animal products.

The general health and condition of government and army animals was very satisfactory throughout the year.

Great difficulty was experienced in purchasing camel remounts for the police owing to the heavy sales to Egypt. The tribes with good riding camels have very few for sale. Moreover strong trotting camels are in demand for smuggling commodities across the frontiers. Owners willing to sell were demanding up to £E. 25 each for riding camels in Kassala Province.

A violent storm of wind and rain at night during early July caused widespread havoc in Rufaa District of Blue Nile Province. It is believed that some 15,000 sheep as well as many cattle died during the night. The animals were in very poor condition due to scarcity of grazing and were therefore unable to resist the intense cold.

About 200 sheep were poisoned by eating locust bait in Blue Nile Province.

Veterinary Hospitals.

Khartoum Veterinary Hospital and Forge.

In Patients	...	...	...	...	...	321
Out-patient attendances	...	...	...	...	...	5,154
Pairs of shoes fitted :						
(a) Hand Made	...	...	...	...	...	2,524½
(b) Machine made	...	...	...	...	...	314
Hoof trimming etc.	...	...	...	...	...	541

Wad Medani Veterinary Hospital.

In patients	146
Out-patient attendances	5,460

Acknowledgement.

At the end of another trying year, grateful thanks are due to all members of my staff for their very generous service. An apology is due to members of other services for the inadequate help and assistance rendered. Lack of staff and in many instances inadequate transport were responsible for this state of affairs.

(Sgd.) W. H. GLANVILLE,

*Director,
Sudan Veterinary Service.*

APPENDIX I.

FINANCIAL STATEMENT.

The following figures show the actual revenue and expenditure of the Sudan Veterinary Service for the past 3 years.

	1942	1943	1944
1. Revenue £E	35,207	29,674	38,658
<hr/>			
2. Expenditure			
(i) Personnel and Personal Allowances £E	23,615	26,530	26,224
(ii) Services £E	14,533	15,794	18,357
(iii) Capital £E	248	—	—
	<hr/>		
TOTAL £E	38,396	42,324	44,581

APPENDIX II
ANNUAL REPORT
OF THE
SENIOR RESEARCH OFFICER
A. STAFF.

The hors cadre research officer, Mr. G. C. Brander, who was appointed in 1942, resigned after completing his preliminary contract, and left the Sudan in January.

Dr. S. C. J. Bennett, D.Sc., M.R.C.V.S., Senior Research Officer, left on final leave in May, after nineteen years service in the Sudan.

Dr. Bennett carried out most valuable investigatory work, and achieved results that have made it possible to control all the more serious livestock diseases in the country. Prior to his appointment no biological or chemotherapeutic measures of control had been adopted, and cattle plague, contagious bovine pleuro-pneumonia and camel trypanosomiasis took a heavy toll of the country's livestock every year. His glycerinised spleen pulp vaccine against cattle plague has been used on several hundred thousand export cattle whose subsequent history has been followed and, although frequently exposed to infection, not a single beast has developed the disease. The mercuric chloride test for *T.soudanense* infection in camels and the routine treatment with antrypol have become so popular that it is sometimes impossible to satisfy all the demands of the native owners. His vaccine against contagious bovine pleuro-pneumonia, although naturally less spectacular in its effect, has by its proved efficacy steadily gained the confidence of the nomadic cattle owners and has considerably reduced the incidence of the disease.

Dr. Bennett's published works on these, and other animal diseases whose etiology had previously been obscure, are a record of the great service he rendered to the Sudan.

Mr. J. T. R. Evans, Veterinary Research Officer, was appointed Senior Research Officer in September. The post vacated by him has not yet been filled.

The remainder of the professional staff of the laboratory consisted of Veterinary Officers Mohammed Eff. Ali Mihemied and El Amin Eff. Abdalla, diplomates of the Khartoum Veterinary School. The former was in sole charge of the technical work involved in the preparation of cattle plague antiserum and vaccine at Malakal and the latter was responsible for equally important work at the Khartoum laboratory. Owing to the temporary reduction in the senior staff and higher demands for laboratory products both these officials have had to accept greater responsibility than would normally have been the case. This opportunity is taken to record that they have responded excellently and have carried out their duties most satisfactorily in every respect.

B. ROUTINE WORK.

The main items of routine work have been, as usual, as follows :-

- 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 (Khartoum).
- IV. Preparation and issue of contagious bovine pleuro-pneumonia vaccine (Khartoum).
- V. Issue of diagnostic materials (for the mercuric chloride test) and of antrypol for the control of camel trypanosomiasis (Khartoum).
- VI. Distribution of horse-sickness vaccine — purchased from Kenya (Khartoum).
- VII. Preparation and issue of blackleg vaccine (Khartoum).
- VIII. Issue of foot and mouth disease virus (Khartoum).
- IX. Preparation and issue of contagious bovine abortion vaccine (Khartoum).
- X. Examination of specimens (Khartoum and Malakal).

I. Cattle Plague Antiserum.

The output of serum totalled 5,196 litres or 173,200 "doses" of 30 c.c. This was 500 litres less than was produced in the previous year and roughly 800 litres less than the maximum estimated output.

The chief cause of the shortfall was the unusually large number of serum producers infected with trypanosomiasis, mainly *T. congolense*. Altogether trypanosomes were found in 325 bulls, almost half the number used, and although most of them were successfully treated with tartar-emetic or stibophen, their yield of serum was appreciably reduced.

The supply of large cattle (serum producers) was satisfactory and for the first time in the history of the Malakal laboratory they were all obtained from the Upper Nile Province. Six hundred were purchased by contract from local merchants and the remaining hundred odd bought through District Commissioners.

Most of the merchants' bulls came from the Eastern Nuer District, the home of the biggest cattle in the Sudan. This area possesses excellent grazing but it also borders on an undefined tsetse belt in the Abyssinian foothills. All the cattle arrived in the laboratory in very good condition but after they had been subjected to one or two hyperimmunisations and bleedings clinical features of trypanosomiasis became apparent in those infected.

Most of the sick ones were given a course of five weekly injections of stibophen and in every case no trypanosomes could be found by microscopic examination of the blood following the second or third injection. As small animal inoculation was not practicable and the bulls were ultimately bled out for serum, this fact, together with general improvement in bodily condition, was interpreted as evidence of cures.

The supply of small cattle (virus producers) was also adequate. Slightly more than three quarters of the sixteen hundred odd used were obtained by barter for cattle plague vaccine. The others were

purchased for cash. Approximately a third of them proved to be immune against cattle plague.

II. Cattle Plague Vaccine.

As usual, the bulk of the vaccine was prepared as a by-product of serum production. About 70,000 doses had to be specially prepared to satisfy the increased demands from the cattle exporting centres in the Western Sudan. Altogether 297,000 doses of 10 cc. were produced and all but 1600 doses, supplied to Aden, were issued to meet the internal requirements. This figure is an increase of 75,000 doses over the previous highest issue (in 1942.)

Twenty five thousand doses were bartered for virus producers, and most of the remainder sold producing a revenue of nearly £E. 12,000.

III. Cattle Plague Virus.

Virus in the form of glycerinised lymphoid tissue pulp was issued for serum-simultaneous immunisation of working oxen in the Blue Nile Province and a few dairy cattle near Khartoum. The issue of 3,682 doses was slightly higher than that for 1943.

This method of immunisation did not give entirely satisfactory results among the high-grade Friesian cattle of the Belgravia Dairy and an occasional heifer died from cattle plague. Its use in this herd has since been suspended in favour of an injection of vaccine followed by virus a fortnight later. The herd is fairly well isolated and it is hoped that eventually it will be possible to determine the duration of immunity produced in this way.

IV. Contagious Bovine Pleuro-Pneumonia Vaccine.

The issues of this product fell from 50, 529 doses in 1943 to 37,075. No "accidents" following its use were reported.

V. Camel Trypanosomiasis Control.

The demand for antrypol (naganol, suramin B.P.) continued to increase and 36,362 doses were issued as compared with the previous highest total of 30,646 doses in 1943. They were almost all distributed for treatment, on payment, of privately owned camels and produced a revenue of over £E. 9,000.

VI. Horse Sickness Vaccine.

This product was purchased, as in the past, from the Kenya Veterinary Service, stored in the laboratory refrigerators and distributed when required. The demands rose slightly from 1,163 doses in 1943 to 1,561 doses. 419 doses were administered to privately owned horses, on payment, and the remainder was used on Government and Army animals.

VII. Blackleg Vaccine.

Blackleg vaccine was prepared from virulent strain of *C. chauvoei* isolated locally. 2,400 doses of "anaculture" were issued for use in known foci of infection in Kordofan Province. No outbreaks of blackleg were reported.

VIII. Foot and Mouth Virus.

After a lapse of three years foot and mouth disease again appeared in the Western Sudan. It became so widespread that it was decided to infect artificially, by intralingual injection of virus, all cattle destined for export to Egypt so that their movement north should not be interrupted by appearance of this disease on the journey. Fortunately there is still no evidence to suggest that more than one type of the virus exists in the Sudan.

Altogether 46,400 doses were issued as compared with 12,700 in 1940.

IX. Contagious Bovine Abortion.

Vaccination was continued in the Belgravia Dairy herd where contagious abortion was first diagnosed in 1943 (vide Annual Report 1943 p. 26). Thirty six negatively-reacting, empty cows and heifers were vaccinated with McEwen's strain of *Br. abortus* 45 (20) and 15 others were left as controls. About one third of both groups were grade-Friesans and the remaining two thirds were indigenous breeds. By the end of the year one cow only, a control, had developed a positive agglutination reaction.

Of the 46 cows vaccinated in 1943 which gave negative agglutination reactions throughout the year, one developed a positive reaction in 1944 and aborted. The 13 controls which had given negative agglutination reactions in 1943 continued negative throughout 1944.

Although no conclusions can be drawn from these results, it is proposed to continue vaccinating small batches of negatively reacting cows and heifers every month, shortly before service, and keep about half the number as controls.

X. Specimens Examined

The examination of pathological specimens is one of the minor activities of the laboratory. The vast majority of the 1,807 examined were of no particular interest but the following are worthy of short comments :-

1. Tuberculosis.

This disease has previously been observed in cattle only and, on an average, not oftener than once every two years.

The only case diagnosed this year was in a bull terrier bitch which showed lesions of the mesenteric glands. It would have been interesting to determine whether the infection was of bovine or human origin, but unfortunately there was no fresh material available for cultural work or animal inoculation. On purely *a priori* grounds one would say that it was probably due to human infection because human tuberculosis is so very much commoner in the Sudan than the bovine type.

2. Caseous lymphadenitis in sheep.

Caseous lymphadenitis has never previously been reported in

the Sudan, although the same causal organism, *Corynebacterium ovis*, producing ulcerative lymphangitis in horses, has been detected regularly for many years. A northern sheep from Kosti sent to the laboratory, showed typical lesions affecting the prescapular and inguinal lymphatic glands, lungs and one kidney. Subsequent closer inspection of sheep in that area has shown the presence of several cases.

3. Echinococcus granulosus cysts in sheep.

The only excuse for mentioning this condition is that previously the few occasions on which echinococcus cysts have been seen in the Sudan have all been in camels. A northern sheep from the White Nile area showed nine large cysts situated intermuscularly and subcutaneously. There were no cysts in the internal organs.

Other less interesting diagnoses included :-

- Cattle : *Tryp. congolense*, *Tryp. vivax*, *Theileria annulata*,
Brucella abortus, *Actinomyces farcinicus*, *Schistosoma bovis*.
- Sheep : Sarcoptic mange.
- Camels : *Tryp. evansi*
- Equidae : Cryptococcus infections, ringworm, ulcerative cellulitis, *Onchocerca cervicalis*, and various septic and helminthic infections.
- Foultry : Spirochaetosis (including one case in a duck), fowl typhoid and various worms.

C. RESEARCH.

No deliberate research has been attempted on account of the continued increase in routine work, shortage of staff and lack of adequate space. A few minor problems were attended to but no developments are worthy of report.

D. PUBLICATIONS.

Two papers were published in scientific journals :

BENNETT, S.C.J., HORGAN, E.S., and, MANSUR, A.H.

"The Pox Diseases of Sheep and Goats". Journal Comparative Pathology and Therapeutics, 1944, Vol. 54 pp. 131-160.

BENNETT, S.C.J., "Cryptococcus Infection in Equidae". Journal of the Royal Army Veterinary Corps, 1944 Vol. 16 pp. 108-118

J.F.R. Evans

Khartoum, 27/2/1945.

Senior Research Officer.



