ANNUAL REPORT

OF THE

SUDAN VETERINARY SERVICE

1940

ANNUAL REPORT
OF
THE SUDAN VETERINARY SERVICE
FOR THE YEAR 1940

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C O N T E N T S.

STAFF.

DISTRIBUTION OF BRITISH STAFF AS ON 31st DECEMBER, 1940.

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

* Released for military service.

ESTABLISHMENT OF NON-BRITISH CLASSIFIED STAFF, 1940.

2 Veterinary Overseers.

2 Animal Husbandry Officers.

1 Head Clerk.

8 Clerks.

2 Book-keepers.

1 Sarraf.

1 Store-keeper.

14 Head Stockmen.

1 Southern Supervisor.

4 Southern Stockmen.

UNCLASSIFIED STAFF AS AT 31.12.1940 :-

61 Stockmen.

1 Carpenter.

2 Storemen.

4 Motor Drivers.

9 Messengers.

70 Veterinary Attendants.

4 Shoeing Smiths.

2 Pump Drivers.

1 Ghaffir.

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

ESTABLISHMENT OF NON-PROVINCIAL ORGANIZED TOWNS, 1940.

2 Veterinary Overseers.

2 Animal Husbandry Officers.

7 Road Clerks.

8 Clerks.

2 Pound-keepers.

1 Forest.

1 Town Keeper.

14 Local Bloodhounds.

4 Sanitary Supervisors.

4 Sanitary Inspectors.

UNCLASSIFIED STAFF AS AT 31.12.1940 :-

(1) Storekeeper.

1 Carpenter.

2 Foremen.

4 Motor Drivers.

3 Mechanics.

2 Veterinary Attendants.

4 Sheepdog Raisers.

2 Sheep Drivers.

1 Smelter.

In addition to the above there are large numbers of Tribal Veterinary Assistants, mainly in the Native Administrations, who are supervised by Provincial Veterinary Inspectors.

The most important incident of the year affecting the staff was the retirement of Captain H.B.Williams, C.B.E., from the post of Director. He had held the appointment since 1934 and, in all, spent 20 years in the Service. He was responsible for much real progress, especially concerning veterinary education and the improvement of animal products. During his directorship the Khartoum Veterinary School, a full post-secondary course of veterinary education, lasting five years and ending with a diploma and a licence to practice, opened its first session. The improvement in the production of clarified butter and hides and skins, which has been so marked in the past few years, is, in great measure, directly attributable to his guiding influence. His popularity was remarkable both in and beyond his own Service and at all times he enjoyed the entire loyalty of his staff.

Captain C.P.Fisher was appointed Director to fill the vacancy caused by the retirement of Captain Williams.

During the year there were no additions made to the British staff. On the contrary, four Veterinary Inspectors were surrendered to the Sudan Defence Force and were commissioned as combatant officers in mounted units. This circumstance, and the great amount of extra work incurred on account of the war, has thrown a great strain upon the remnant of the civil veterinary service, a strain only sustained in virtue of the expert local knowledge and adaptability, both in ideas and methods, of its individual members.

The commissioning of Veterinary Inspectors as combatant officers may appear to be a waste of expert material, only to be justified on the grounds of military exigency. Such exigency existed.

Captain Fisher spent five days in Egypt in June conferring with the Egyptian veterinary authorities. Agreement was reached by which Sudan cattle, destined for Palestine, would be permitted to traverse Egypt by rail. The war situation has created a big demand for Sudan cattle in Palestine, and the Government of that country is now prepared to accept them. Unfortunately this demand coincides with other heavy demands leading to an over-taxing of the transport system to such an extent that although the cattle are available they cannot always be delivered in as large numbers as desired.

The year is notable as being that in which the first batch of students graduated from the Khartoum Veterinary School and received its diploma (D.K.V.S.).

SECTION I.

DISEASES OF ANIMALS.

1. DISEASES OF CATTLE :

Cattle Plague :

As usual, the disease was widespread during the year. By the use of prophylactics, used to a large extent by the tribal veterinary staffs, serious losses were avoided and the period may be described as normal.

In the tribal areas "serum alone" and "vaccination" are the methods adopted for exercising at measure of control which is aimed at wherever a semi-nomadic pastoral community has to be dealt with. The habit of life of these people, as well as geographical considerations, makes complete eradication difficult, expensive and, as a policy, disappointing. Rarely can eradication measures be pushed to the point most conductive to success, on account of the hardships they would entail, and sooner or later the inevitable compromise has to be made between what ought to be done, from a disease control point of view, and what can be done relative to the struggle for existence. Starvation is never far away and is, at certain seasons of the year, unpleasantly near.

In the settled and circumscribed areas of the Gezira Province the serum-virus method is adopted with the object of producing and maintaining a permanent immunity in a cattle plague free population.

In the northern cattle-belt of Africa it is always well to remember that food is the all-important problem. Here unfriendly nature has imposed a task so rigorous as to leave little energy over for the refinements of life or the higher types of social organization. Experiments carried out at Khartoum with the ordinary desert grasses show that during the dry season these do not constitute a subsistence diet and that cattle fed exclusively on them starve and die, no matter how generous the ration may be. What it comes to is that cattle in this area must accumulate during the lush season, after the rains sufficient reserve to tide them over a starvation period, when the food will not support life, until resumed by the following rains. Such are the conditions under which the great majority of Arab cattle exist in the northern Sudan and to which disease control measures must conform. Movement there must be if the stock is to survive and, as often as not, segregation, even group segregation, is out of the question.

Biological products constitute, therefore, the only means of dealing with the situation. Fortunately in the case of cattle plague these products are highly efficacious, so much so that the problem resolves itself into an economic or politico-economic one. Wherever and whenever cattle are worth saving from cattle plague they can be saved.

The following summarises the activities of this Service in the control of outbreaks of cattle plague during 1940 :-

PROVINCE	Out-breaks	Infected	Deaths	Serumised	Vaccinated
Kordofan	372	107153	1620	276[illegible]	5774
Darfur	137	68100	771	51869	10023
Gezira	646	134774	3097	12071	10799
Northern	7	215	6	1306	---
Upper Nile	12	1470	15	102[illegible]	68
Khartoum		337	15	254	60
Kassala	6	783	11	319	--
TOTAL	1184	362840	5535	134453	86744

In addition to that used at the actual seat of outbreaks, approximately 40,000 doses of vaccine were used prophylactically for immunising trade cattle for export.

The output of cattle plague anti-serum from the Malakal Veterinary Laboratory fell from 115,000 to 98,436 doses, due principally to the early exhaustion of the grazing areas following two poor rainy seasons.

On the question of cattle supply for the Malakal Laboratory the Veterinary Research Officer reports :-

"It is a pleasure to be able to report that for the first time in the history of the Laboratory there was no difficulty about the supply of small cattle. The credit for this is entirely due to the energetic co-operation of the District Commissioner, Bor, (Captain Forbes) who was responsible for collecting and sending 510 small cattle in regular consignments to suit the laboratory requirements.

It is unfortunate that a similar situation did not exist regarding the supply of large animals, as nearly half the number required had to be imported from outside the Upper Nile Province.

There is no change in the general policy of attempting to satisfy the whole of the laboratory's cattle requirements from the Upper Nile Province. It is unnecessary to repeat the disadvantages of using imported cattle, as they have been emphasised in most earlier reports, but it is necessary to point out that the District Commissioner, Tonj (the only source of supply outside the Upper Nile Province) is finding it increasingly difficult to collect the number of cattle ordered by the laboratory annually, and it is feared that the quality of these cattle will deteriorate in the future.

The problem of getting those big cattle from the Upper Nile Province still remains difficult and unsolved. The traditional attitude of the people is against any form of commercial exploitation. Their innate conservatism, the limitation of their needs, and their utter inability to realise that wealth can take any other form than cattle, presents to the administrator and to the economist a riddle of extreme complexity. The one will never solve it without the other, and without some pressing need, operating from without, both may fail. A restricted output of serum, associated as it must be with increased losses throughout the whole territory, coupled with the war demands for meat, may supply this need and speed up the tempo of economic development in this area. Necessity sometimes forces a policy which in the long run turns out to be a blessing but which, either from lack of wisdom or courage, would never voluntarily be adopted.

CONTAGIOUS BOVINE PLEURO-PNEUMONIA :

The incidence was everywhere low and in the Northern Sudan chiefly confined to merchants' cattle bought in the west and destined either for local slaughter or export. The disease principally occurs in Kordofan and the Gezira Provinces where there is a constant movement of trade cattle.

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

PROVINCE	OUTBREAKS	INFECTED	DEATHS	VACCINATED
Kordofan	66	8,508	139	7,694
Darfur	3	1,900	19	500
Gezira	21	3,676	65	3,608
Northern	1	64	1	63
Upper Nile	3	351	--	336
Khartoum	-	--	--	-
Kassala	8	1,574	25	1,540
TOTAL	102	16,073	249	13,741

Approximately 24,000 doses of vaccine were used during the year.

FOOT-AND-MOUTH DISEASE :

Routine artificial infection of all cattle destined 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 Quarantine Parks.

The disease in the Sudan is of a mild character and of no economic importance were it not for the fact that the Egyptian Authorities hold up the export trade if it appears in any of the quarantine stations en route to Egypt.

Anthrax

No positive case was observed in the Sudan but the Egyptian authorities frequently report deaths in Sudanese sheep at the quarantine in Alexandria. These sheep are invariably in Egypt longer than the incubation period of the disease. The inference is that they do not bring it with them from the Sudan.

Trypanosomiasis.

Few cases were reported on account of the losses being slight, but there is no doubt that a number of cattle are infected in the Upper Nile Province and in the Kosti District of the Gezira Province.

2. DISEASES OF CAMELS :-

Trypanosomiasis :

Approximately 20,000 doses of Antrypol were given during the year, mostly on payment, to native-owned camels at 25 P. (5/-) a dose. It is interesting to note that amongst the more intelligent Arabs the local expert, who claimed to be able to diagnose trypanosomiasis by the smell of the urine, the condition of the hairs in the tail, and various other signs, has lost a good deal of face since the introduction of the mercuric chloride test. There is no doubt that the herdsman who lives with his camels and has them under constant daily observation does know which are the infected ones, but it is very doubtful if any Arab can do other than guess if confronted with an unknown camel. The semitic Arab is no more prone to stick to an unprofitable tradition than any other man.

M a n g e :

Of low incidence and importance.

Strongylosis :

A frequent complaint amongst camels in the Gezira Province. The Nicotine Sulphate treatment is adopted and found to be effective in those cases where debility is not too far advanced.

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Anthrax

No positive data has been observed in the Sudan but the Egyptian authorities frequently report deaths in Sudanese sheep at the quarantine in Alexandria. These sheep are invariably in Egypt long or than the incubation period of the disease. The inference is that they do not bring it with them from the Sudan.

Tuberculosis.

Few cases are reported on account of the loss a being small, but there is no doubt that a number of cattle are infected in the Upper Nile Province and in the North District of the Darfur Province.

2. DISEASES OF MAN :-

Trypanosomiasis :

Approximately 20,000 doses of Antrypol were given during the year, mostly on pay out, to native-owned cattle at 25 P. (5/-) a dose. It is interesting to note that each of the two principal Arabs is a local export, who claimed to be quite free from trypanosomiasis by the smell of the urine, the condition of the hairs in the tail, and various other signs, but just a good deal of face since the introduction of the prophylactic cultures test. There is no doubt that the Northern who lives with his camels and has their under constant daily observation does know which are the infected ones, and it is very doubtful if any Arab can do other than guess if confronted with an unknown camel. The Sudanese Arab is quick to grope to attack to an improbable credibility when an opportunity.

M a l a r i a :

Of low incidence and importance.

Schistosomiasis :

A frequent complaint among people in the Gezira Province. The Medical Entomologist report is adopted and found to be effective in some cases where mability is not too far advanced.

3. DISEASES OF EQUINES :-

Horse Sickness :

The horse sickness vaccine procured from Kenya continues to be used and to give satisfactory results. All army animals received a dose and there were no losses. One horse privately-owned died at Khartoum a couple of months after vaccination from a disease indistinguishable from horse sickness both in its clinical and post-mortem appearance. In the Gezira Province 247 horses and 178 mules were vaccinated. No losses occurred among these horses but a few mules succumbed to what seemed to be horse sickness. Before the use of vaccine the losses in this Province were considerable and vaccination is now a routine practice with government and valuable privately-owned animals.

Epizootic Lymphangitis.

A number of cases were reported from Kordofan and Gezira Provinces.

4. DISEASES OF CANINES :

R a b i e s :

Of the 99 specimens submitted to the Stack Medical Research Laboratories for diagnosis 30 were from positive cases, distribution as follows :-

PROVINCE	DOGS	DONKEYS	CAMELS	CHEETAH
Kordofan	10	--	--	--
Gezira	6	2	1	--
Equatoria	4	--	--	--
Darfur	3	--	--	1
Northern	1	--	--	--
Kassala	1	--	--	--
Khartoum	1	--	--	--
TOTAL	26	2	1	1

SECTION II.

TRADE IN LIVESTOCK AND LIVESTOCK PRODUCTS.

1. EXPORT AND IMPORT TRADE.

Cattle.

Total exports of cattle were 11,045, an increase of 2,988 over the previous year. This increase was anticipated in view of the extra demands for meat in the Middle East area. A further increase is expected in the coming year. The exports of sheep jumped from 15,375 to 39,595, a rise of 24,220, due entirely to the Army contracts in Egypt.

In spite of these increased demands prices remained fairly normal although every now and then sharp rises and falls, consequent on arrivals at the main marketing centres, occurred. The surplus animal population of the Sudan can usually be relied upon to steady any temporary inflation that may occur in peacetime. When prices start to soar the news soon gets abroad with the result that the markets become glutted and prices return to normal. It is difficult to imagine that there can ever be, except in exceptional circumstances, a real shortage of animals for meat such as would force the price up in any permanent way, although local and seasonal shortages are always likely to occur.

A new feature of the livestock trade is the supply of young beef to the British troops. Young cattle, about 3 years of age, are supplied daily to the Army and are a great improvement on the previous supply which was drawn from the aged animals usually presented for slaughter in Africa.

All cattle in the Sudan are ranched and can only be considered as fat when they are mature and somewhat advanced in age. If slaughtered in this state they are very tough and fall a long way below European standards. The young cattle, on the other hand, although not carrying much fat, are tender and represent a source of comparatively good beef supply. The prejudice of the Arab, who has no sense of meat quality, against selling immature animals instead of keeping them until they get as big as possible, is easy to understand. Not so easy to understand is that of the British soldier against eating mutton, which is adjudged by all other Britishers in the East to be superior to beef. By offering mature prices for immature animals the Arab prejudice is gradually being broken down. The British soldier still stands his ground. The cost of this young beef to the British troops works out at about five pence a pound.

During the year 2,021 cattle were sent to Palestine and demands from that country seem to be on the increase. A trial consignment of 140 cattle, 1,200 sheep and 300 goats was sent to Aden. Owing to delays in transport and freight charges the cost worked out rather high and the order was not repeated.

Sheep.

The total exports of sheep, 39,595 show an increase of 24,220 over the previous year. The cause of this increase was the demand for mutton by troops, other than British, in Egypt.

Large numbers of sheep and goats were also purchased and utilised within the Sudan as a meat supply for Indian troops.

Prices remained at a fairly steady level in spite of these demands, for the supply of sheep is considerable and in normal times is always greatly in excess of the demand.

Towards the end of the year, while there was still plenty of water on the trade routes between Kordofan and Omdurman and travelling was easy, the price actually fell. A seasonal rise must always be expected in the dry weather.

The resources of the country in sheep are very great. Exports for the most part come from Kordofan where the best sheep are bred, but there are also great sources of supply in the Kosti district and in Kassala Province. Sudan mutton is good in comparison with Sudan beef, mainly for the reasons that it is killed younger and carries more fat.

A. Number and values of cattle and sheep exported. during the last three years :-

Year	Cattle	Sheep	Value at port of export
1938	7,256	1,840	£.35,356
1939	8,057	15,377	£.[illegible]7,667
1940	11,045	39,595	£.113,133

B. Number of cattle imported during last three years :-

Year	French Equatorial Africa	Abyssinia	Uganda	Nigeria	Total.
1938	3,024	1	-	-	3,025
1939	2,462	11	-	-	2,473
1940	2,639	-	21	726	3,386

Sheep.

The total exports of sheep, 2,5[illegible]5 show an increase of 2[illegible],200 over the previous year. The cause of this increase was the demand for mutton by troops, other than British, in Egypt.

Large numbers of sheep and goats were also purchased and utilised within the Sudan as a meat supply for Indian troops.

Prices remained at a fairly steady level in spite of these demands, for the supply of sheep is considerable and in normal times is always greatly in excess of the demand.

Towards the end of the year, while there was still plenty of water on the trade routes between Kordofan and Omdurman and travelling was easy, the prices actually fell. A seasonal rise can always be expected in the dry weather.

Since the resources of the country in sheep are very great, Egypt is for the most part cows from Kordofan where the best sheep are bred, but there are also great sources of supply in the Nuba district and in Kassala Province. Sudan mutton is good in comparison with Egyptian, mainly from the reasons that it is killed younger and carries more fat.

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Year	Cattle	Sheep	Value at port of export
1938	7,256	1,000	£ 35,356
1939	8,057	15,377	£ 7,667
1940	11,040	35,355	£ 115,155

B. Number of cattle imported during last three years :-

Year	French Equatorial Africa	Uganda	Nigeria	Total.
1938	3,028	14	-	3,029
1939	2,462	14	-	2,476
1940	2,635	-	24	26	3,386

Camels.

Returns from Egypt show that 20,745 camels were sold for meat in the markets there.

Hides and Skins.

The African is often criticised for his apathetic attitude towards the quality of his hides and skins and his lack of response to propaganda on the subject. But he has good reason for his attitude, for the hide and skin trade is subject to such violent fluctuations that nothing that he can do in the way of better preparation can have any affect comparable to the rise and fall of market prices. In the past ten years hides have ranged in value from 16.3 pounds to 63 pounds a ton and in 1928 reached a figure of 93.5 pounds a ton. The conscientious flayer may on a falling market get less and less for his work, while he who takes no trouble may get more and more on an upward trend. In such circumstances propaganda which tells the African that the better he prepares his hides the more he will get for them is likely to be unconvincing: from his point of view it just is not true.

Not until some method has evolved for stabilising the hide and skin market can any great voluntary response be expected from the African himself. Improvement under other circumstances can only come as the result of some form of pressure on the part of the administrative authority.

Hides that arrive from the Tonj and Aweil districts of Equatoria, from Bor district of the Upper Nile Province and from Nyala district of Darfur Province show a marked improvement compared to those from other districts due to the interest taken by the District Commissioners, in the campaign for improved methods of hide preparation.

The practice of grading hides and skins for export, which in some territories has been developed to a high pitch, was considered by the Standing Veterinary Research Committee for East Africa in 1933. The committee considered that in present circumstances official grading was impracticable on the grounds that it is not possible to guarantee a quality which only becomes accurately measurable after the commodity has passed through the tanner's hands. Nor can the question of compensation by Government be entertained (Annual Report of Imperial Institute, 1939). It would seem that if any form of marking is adopted it should only be of a local nature and designed to assist the local merchants in making their purchases, with the idea that hides from districts with a good reputation are worth more than those from districts where, for various reasons, improvement has not taken place. On account of the difficulty of assessing the exact value of any particular hide the question becomes, in the main, one of general reputation and bona-fide commercial relationship.

Export of Hides and Skins, untanned, during 1940 with their value as compared with the previous year :-

	Kilos		Value		Price per ton	
	1939	1940	1939	1940	1939	1940
			£.	£.	£.	£.
Hides.	1,160,284	1,265,501	43,273	65,264	37.3	51.5
Sheep skins	882,415	665,907	48,151	41,397	54.5	62.1
Goat skins	185,768	132,321	16,033	14,149	86.3	107.1

The following Table shows the weights and prices obtained for air dried hides prepared at the Veterinary Laboratories during 1940 :-

Number of bundles	Weight Okes	Price per Oke
95	5,479¾	80%s.

1 Oke = 2.75 lbs.
£.1 Egyptian = £.1-0-6d.

Clarified Butter.

After the experience of three seasons the time has come to review the situation regarding clarified butter, as much with the object of recording the early stages of the industry in the Sudan as of providing an authoritative statement in respect of the desideratum to be looked for before opening up new centres.

The term "clarified butter" is here reserved for the clean first-class product produced by the direct method and the use of separators, while "semn" is retained to signify the native-made product produced by boiling butter.

In hot countries milk and butter cannot be stored for any length of time without the use of refrigerators. Also, in semi-arid tropical regions the yield of milk varies according to the season of the year. In such regions it is not always possible to consume the entire fresh products locally during the flood period, nor are there markets sufficiently near to permit of its disposal.

To avoid waste it is necessary, therefore, to turn any surplus milk that may collect during the period of plenty into some product that can be stored without deterioration, and can either be sold in distant markets or used later during the dry season when there is a shortage. This is done by the process known as the clarification of butter, evolved in India many centuries ago. It consists in separating the fat of milk from the water, protein, and salt, by boiling. The native product is known in India as "ghee" and in the Sudan as

Export of Hides and Skins, untanned, during 1.10 with their value as compared with the previous year :-

	Kilos		Values		Prices per kilo	
	1909.	1910.	1909.	1910.	1909.	1910.
Hides.	4,450,208	1,257,904	45,279,664	37.9	54.5	
Sheep skins	886,445	665,907	8,154,[illegible]	54.9	62.4	
Goat skins	185,765	192,341	[illegible]	86.3	107.1	

The following Table shows the weights and prices obtained for air dried hides prepared at the Veterinary Laboratories during 1910 :-

Number of bundles	Weight Okes	Price per Oke
95	2,4[illegible]	80%a.

1 Oke = 2.75 lbs.
2.4 Rupees = 3 4-0-6d.

Clarified Butter.

After this experience of three seasons the time has come to review the situation regarding clarified butter, as much with the object of recording the early stages of the industry in the Indian as of providing an authoritative statement in respect of the conditions to be looked for before opening up new centres.

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To avoid waste it is necessary, therefore, to turn any surplus milk that may collect during the period of plenty into some product that can be stored without deterioration, and can either be sold in distant markets or used later during the dry season when there is a shortage. This is done by the process known as the clarification of butter, evolved in some ancient centuries ago. It consists in separating the fat of milk from the water, protein, and salt, by boiling. The native product is known in India as "ghee" and in the Indian as

"semn". Neither article is of the standard required for European consumption.

The quality of semn varies greatly according to the care with which it is prepared. Keeping the butter too long before boiling and insufficient boiling are the chief faults. The best of it, which comes from the river provinces of the Arab area, is exported to Egypt and finds a ready market there under the name of "Sudan semn". The remainder is consumed locally. All of it
/a has/more or less offensive, rancid, smell, when judged by European standards, and its keeping qualities are in inverse ratio to the "aroma".

In recent years the export of semn has increased, due principally to the increase in cattle population. During the ten years 1920-29 the quantity exported was 1,067 tons as compared with 5,417 tons in the years 1930-39.

Semn is, and should only be, made where there is a definite surplus of milk available which would otherwise go to waste and where there is no market for fresh milk, butter or cream.

In 1937 this Service introduced int Kordofan and Darfur the direct method of making clarified butter, according to the technique already being practised in Tanganiyka Territory. As stated above the product so made is referred to as clarified butter to distinguish it from the native product which is semn. This clarified butter is a first-class product and has been analysed and reported on by the Imperial Institute. It is, in fact, as good as any similar product made anywhere.

The object of introducing the direct method was to transmute a portion, at least, of the inferior product semn into the first-class product clarified butter, and so make it available for European consumption. It was realised at the out-set that it was not so much a case of producing something new as of improving a part of that which already existed. This is a point which should always be kept in view. It tends to be lost sight of by those who, recognising the superior qualities of clarified butter as compared to semn, and being unfamiliar with the background of the question, clamour for the mass production of the superior product. As the originators of the direct method put it :-

> 'It should be pointed out that the production of clarified butter should only be contemplated in such areas and in such seasons where a genuine surplus of milk is available over and above the amount required for domestic consumption and for the feeding of calves. Any attempt at coercion, or any other pressure which may deprive the people, especially the children and young stock, of their necessary requirements of milk and butter-fat should never be allowed. It is infintely better for the milk to be used by the owners themselves in bringing up strong healthy children and well-developed livestock than that they should obtain a few shillings by selling the milk to a factory'.

Production of clarified butter should only be embarked upon after due consideration and in accordance with the best expert advice available.

It was after a careful study of the situation that certain districts of Kordofan and Darfur were selected where there exists an undoubted seasonal surplus of milk and where semn was already being produced in considerable quantities during the rains. It was hoped that once the method of making clarified butter had been demonstrated for a season or two, and the excellence of the product established, private enterprise would take up the production and that the industry would henceforth stand on its own economic feet. So far, these hopes have not been realised, for various reasons.

In the first place, the Sudan native, in common with all people who have little ready money, prefers to pay a slightly lower price for a greatly inferior article, To him a little difference in price is a more considerable item than a big difference in quality, and so, as clarified butter can never compete with semn in the matter of cost of production, (the latter produced by family labour - the cheapest in the world) it follows that the only markets for it are the high-class European trade within the Sudan and the export trade.

Secondly, the export merchants have, so far, shown no interest in it. Their attitude is that they are already exporting a line of Sudan clarified butter to Egypt (i.e. the best quality native-made Sudan Semn) and that an output of five or six tons a year is not enough to warrant them pushing a new line. If the quantity were several hundred tons the matter would be different. And so clarified butter goes to Egypt classified as Sudan semn and fetches the current price for that product. Acually, very little is exported because the merchant prefers to handle semn; it costs him less than clarified butter and realises the same price at the other end.

Thus the demand for clarified butter is restricted to the high-class European trade within the Sudan, and to such elements of the native community as are possessed of a discriminating taste and can afford to indulge it. The great mass of the people prefer semn because it is, as it always must be, cheaper.

It should be stated in relation to the cost of production that native authorities are not yet capable of producing clarified butter and maintaining its high standard of quality without a good deal of help and supervision. It requires an intelligent trader, skilled in the technique of manufacture, controlling his own labour and risking his own capital, before a commodity of consistently high quality can be produced independant of Government interference. Such a trader must be able to purchase a minimum of 72 gallons of milk daily for a considerable season at a cost of less than 1 milliemesa rotl (say, a farthing a pint) before the venture becomes worth while.

Production of clarified butter should only be embarked upon after due consideration and in accordance with the best expert advice available.

It was after a careful study of the situation that certain districts of Kordofan and Darfur were selected where there exists an undeclared seasonal surplus of milk and where such was already being produced in considerable quantities during the rains. It was hoped that once the method of making clarified butter had been documented for a season or two, and the excellence of the product established, private enterprise would take up the production and that the industry would honourably stand on its own economic feet. So far, these hopes have not been realised, for various reasons.

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Secondly, the export merchants have, so far, shown no interest in it. Their attitude is that they are already exporting a kind of Sudan clarified butter to Egypt (i.e. the best quality native-made Sudan Samn) and that an output of five or six tons a year is not enough to warrant their pushing a new line. If this quantity were several times that the matter would be different. And so clarified butter goes to Egypt classified as Sudan samn and fetches the current price for that product. Actually, very little is exported because the merchant prefers to handle samn, it costs him less than clarified butter and realises the same price as the other end.

Thus the demand for clarified butter is restricted to the relatively few European types within the Sudan, and to such elements of the native community as are possessed of a discriminating taste and can afford to indulge it. The great mass of the people prefer samn because it is, as it always must be, cheaper.

It should be stated in relation to the cost of production that native authorities are not yet capable of producing clarified butter and maintaining its high standard of quality without a good deal of help and supervision. It requires an intelligent, trained, skilled in the technique of manufacture, controlling his own labour and taking his own output. Before a commodity of consistently high quality can be produced undoubtedly of government interference. Such a trader must be able to purchase a minimum of 20 gallons of milk daily for a considerable season at a cost of some [illegible] (i.e. a farthing a pint) before the venture becomes worth while.

As indicated above, no traders, so far, have been found willing to go into the business, in spite of offers of help and advice tendered by this Service, and the only clarified butter so far produced is that made by the native authorities in the Baggara tribal areas of the west under the direct supervision of the Veterinary Service using government equipment. Care is taken to keep the price paid for milk rigidly within what is considered economic limits, to represent as nearly as possible genuine trading conditions and so prepare the ground for ultimate private enterprise. In Darfur the price paid is 10 milliemes for 12 rotls.

Such is the background of the clarified butter industry as it appears today. To forecast future developments would be unwise. The war has created such a demand for fats that a temporary boom may at any time occur, to be followed later by the inevitable slump. But leaving war influences out of the calculations it would seem that before any headway can be made in the export trade much larger quantities will have to be produced, so that it becomes worth while for the exporter to run the product as a separate line in the knowledge that, having created a regular demand, he is in a position to supply it.

The limiting factor in production is the sparsity of cattle population. I will quote again from the originators of the direct method (French and Lowe) relative to this point :-

> 'The area to be served by a factory will be a radius of approximately five miles. That is to say not more than one and a half hours' walk from the kraal to the factory. Within this area there should be about 5,000 head of cattle, of which at least 20% should be cows in milk. If each of these cows yields a little more than half a pint of milk per diem, in addition to feeding its calf and supplying the milk requirements of its owner, this area will give enough milk to produce at least one "debe" or four-gallon petrol tin (36 lbs) of clarified butter daily. Anything less than this is hardly worth producing owing to expenditure involved in keeping the factory working. An ultimate production of 300 tins a season must be aimed at'.

These are exacting conditions and even when found do not persist for long in our scattered pastoral areas. A factory must be prepared to make frequent moves in order to keep within the prescribed radius of the milk supply It may well be that the volume of clarified butter cannot be greatly increased until some change in the way of life of the people, leading towards more settled conditions and the semblance of mixed farming, has come about.

There is no justification, therefore, for the anticipation of any great permanent expansion in the clarified butter industry in any discernible future.

Even if an established export trade, commanding a price double the present figure, should call for an increased production, a point may soon be reached beyond which to increase the out-put of clarified butter would be to deprive the native community of its essential semn.

No doubt, in theory, all the surplus semn at present exported should be raised to the standard of clarified butter, and with its value doubled, traded under a special mark. In practice this is not possible. Under existing pastoral, semi-nomadic conditions, a large surplus must still remain semn, made in the family, by family labour, and by family methods.

During the year six government owned creameries were operated in Darfur and Kordofan provinces by native administration authorities under the supervision and management of the Senior Veterinary Inspectors and their staffs, and, in the case of Darfur, assisted by the loan of a wholetime Sudanese Animal Husbandry Officer. In Darfur approximately 300 kantars (100 lbs.= 1 kantar) were produced and in Kordofan 50 kantars. In Kordofan where the government supervision was to a considerable extent relaxed the quality of the product fell at once, so much so that the greater part of it could not be recommended for sale to Europeans. The standard in Darfur was maintained and a wholesale price of £.3.500%s a kantar, delivered any station in the Sudan was obtained.

S e m n.

The following Table shows exports and value of semn :-

Countries exported to	Kilos	Value LE.
Egypt.	785,547	43,811
Cyprus.....	343	21
Aden.	34	2
Palestine.....	34,869	1,859
Greece.....	37	2
Arabia.....	9,595	497
Italian East Africa.....	5,523	353
Belgian Congo.....	4,325	250
	840,673	46,795

2. INTERNAL TRADE.

The numbers of animals slaughtered for food in the larger towns during 1940 and the totals for this and two previous years are given below:-

Year	Camels	Cattle	Sheep	Goats
1940	2,350	23,586	183,435	8,853
1939	1,556	20,521	190,791	8,430
1938	2,654	19,222	160,366	11,657

SECTION III.

IMPROVEMENT OF LIVESTOCK.

CATTLE.

Propaganda for the elimination of the scrub bull continues and many castrations are carried out by the tribal authorities in the cattle-raising districts. The more one comes to know the Arab cattle belt of the Northern Sudan the more fully one realizes that in this area regular food is the all-important question, and not the improvement of stock by any of the recognised genetic principles in vogue in other more fortunate parts of the world. The Arab herdsman, like the Dinka and the Nuer, has by the ordinary process of evolution become very expert at dealing with the animal situation as he finds it. To change him would be to exterminate him, for no other type of man could wring from this land the bare existence for himself and his cattle which at certain periods of the year is all it has to give. The first step in any plan for the improvement of animal husbandry must be an improvement in the food supply. To do this economically is very difficult, if not impossible, in a land where water is at a premium and the value of the stock so low that any spending on its behalf cannot be justified. When adequately fed the Sudan Arab cattle improve to a surprising degree. Any attempt to improve them by the introduction of high-quality bulls would simply be to widen the gap between what the animal requires and what the country has to give. Selection of the indignous stock is the only rational line of advance and this method is practised by the stock-owners so far as circumstances permit. But to select the best animals to breed from is not an easy thing to do; opinions vary and in any case are arbitrary; the best lookers are not always those with the highest survival value, and to survive is the first duty of an Arab animal. Speaking generally any intereference with a long established custom of these hard-living Arab people is a mistake and should only be contemplated if supported by the results of practical experiment.

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1940	2,390	23,466	168,435	6,895
1939	1,976	20,521	190,751	6,420
1938	2,604	15,222	160,356	11,617

SECTION VII.

IMPROVEMENT OF LIVESTOCK.

CATTLE.

Propaganda for the elimination of the scrub bull continues and many questions are carried out by the tribal rulers (?) in the cattle-raising districts. The more one seems to know the hardy little bull of the Northern Sudan the more fully one realizes that in this area regular stock is the all-in-a-trunk question, and not the improvement of stock by any of the recognized genetic principles in vogue in other more fortunate parts of the world. The Arab herdsman, like the Dinka and the Nuer, has by the ordinary process of evolution become very expert at dealing with the animal situation as he finds it. To change his ways would be to exterminate him, for no other type of man would wring from this land the hard existence for himself and his cattle which at certain periods of the year is all it has to give. The first step in any plan for the improvement of animal husbandry must be an keen interest in the food supply. To do this economically is very difficult, if not impossible, in a land where water is at a premium and the value of the stock so low that any spending on its behalf cannot be justified. When acquainted by the Sudan Arab cattle improve to a surprising degree. Any attempt to improve them by the introduction of high-quality India would simply be to widen the gap between what the animal requires and what the country has to give. Selection of the indigenous stock is the only rational line of advance and this method is practised by the stock-owners as far as circumstances permit. But to select the best animals to breed from is not an easy thing to do, opinions vary and in any herd are many different; the best looking are not always those with the highest survival value, and to survive is the first duty of an Arab animal. Spending generally day in-and-out-from with a long established custom of these hard-living Arab people is a statute and should only be contemplated if supported by the results of practical experiment.

HORSES.

The Sudan is not a horse country. Horses were introduced about the eighth century by the Mohammedan Arabs and since then have penetrated as far as the Niger basin and beyond. In a southerly direction penetration ceased at about the 12th parallel. The Sudan horse is small, frequently misshapen, and an inferior equine judged by the usually accepted standards. He has, however, become highly specialised by his environment and can live on the country under native conditions, a thing which no imported horse can do. He is hardly and requires little training or management and, as a remount for native troops and police, serves admirably.

The war taxed the resources of the country to the full and in the last four months of the year approximately 1,600 remounts were purchased for military service.

Fifty-seven government-owned stallions are in service in the horse-breeding districts of Darfur and Kordofan. These horses are bred originally from Arabian stock, and are doing much to improve the shape of the country-bred without sacrificing those essential qualities of hardiness, immunity to disease, and ability to survive low-living conditions which are the special heritage of these useful little indigenous horses. A consignment of 200 Sudan country-bred horses which were sent to Palestine was much appreciated for these qualities and proved a better proposition under war-time conditions than some of their more aristocratic relatives imported from England.

All remounts purchased were castrated and vaccinated against African Horse Sickness. All the castrations were done by the Burdizzo method which is considered far superior to any other. The view is held that the instrument, contrary to often expressed opinion, requires considerable skill in its use. In the hands of a capable operator the results are surprisingly good. The important points about the operation seem to be : the use of chloroform : the crushing of each cord twice above the epididymus, an assistant closing the instrument : the prevention of any form of exercise, even walking to water, for a week.

The Senior Veterinary Inspector, Darfur Province, reports:-

> 'Some 340 horses were castrated by the bloodless castrator. For the unsexing of horses in large numbers there is no doubt that this method claims first place. It is economic, efficient, and humane under chloroform. Animals do not lose condition and as a rule are ready for work in ten days. Occasionally the testicles do not atrophy, necessitating another operation. This has been found in about 3% of cases. Also I have found that in approximately 8% of cases the scrotum, usually on one side, becomes septic. When this is

boldly opened and the dead tissue removed the wound heals quickly. Even if sepsis sets in I have found that the horse does not loose condition to the extent that he does with a septic cord after the ordinary operation of removing the resticles.

It should be noted that these horses were aged between 5 and 10 years.

Similar results were obtained at Khartoum where the Veterinary Inspector reports :-

'Of the 170 horses castrated only 19 developed complications consisting of large swellings and abscess formation. About 50 developed fairly large swellings without abscess formation, but no treatment was adopted and all recovered uneventfully. The remaining 100 showed no reaction beyond, in some cases, a slight transient swelling on the third or fourth day after castration.

All horses except those which developed abscesses continued to feed well and lost no condition (in fact horses in poor condition usually improved steadily) and most of them were fit for normal exercise in 10-20 days. The 19 horses (11.2%) which developed abscesses were among the first hundred castrated and consisted of horses bought locally, most of which were more than 8 years old, and a batch of police horses from Kordofan, mostly aged. No fatalities occurred in the 170 horses.'

At El Obeid, where a less scientific technique was adopted in order to save time, results were not so good. Out of 654 remounts castrated there were four fatalities and the recovery period was recorded as three weeks. The deaths were due to peritonitis which is an extremely rare sequal if the operation is carried out by the ordinary technique.

SECTION IV.

EDUCATION.

The year 1940 will be notable in the history of education in the Sudan as that in which the first Sudanese students qualified as Veterinary Surgeons at the Khartoum Veterinary School.

Three students were successful and received the Diploma of the Khartoum Veterinary School (D.K.V.S.). The present course for veterinary students extends over five years and is entirely post-secondary education. Two of these years are spent in the School of Science in company with Medical, Engineering, and Agricultural students, and the remaining three at the Khartoum Veterinary School.

The subjects in the final year are:-

Epizootology.
Animal Industry
Medicine.
Surgery.
Administrative Routine.

The "King Farouk Prize", a prize presented by Ali Maher Pasha, sometime Prime Minister of Egypt, for the best student in the final year was awarded to Ibrahim Mohammed Khalil.

SECTION V.

MISCELLANEOUS.

Grazing and Watering.

1940 is likely to be remembered in many districts as one of the worst years on record from a grazing point of view. In the Northern Province conditions were particularly hard, it being the second year in succession that the river was exceptionally low. Even in the West rains were bad and grazing around the important cattle centres of El Obeid and Nahud was poor. In the East the war aggravated the situation. The war zone included considerable grazing areas and the inhabitants of these were pushed into other areas to the accompaniment of the usual Cain and Abel squabbles.

When considering over-stocking problems, and grazing problems generally, it is always well to remember that these bad years, like the good ones, fall within the normal range of climatic variation. Good and bad years offset each other pretty evenly over a period of time and should not be regarded as fortuitous.

VETERINARY HOSPITALS.

Khartoum Veterinary Hospital and Forge.

Out-patients	7,648	
In-patients	4,329	
Pairs of shoes fitted	I,600	(of which 700 pairs were hand made)
Rasping of feet	500	

Wad Medani Veterinary Hospital.

Out-patients	I7,326
In-patients	422

Sudan Defence Force.

The veterinary service and remounting of this Force towards the end of the year became a very important activity. Apart from about 4,000 camels, I,600 remount horses were purchased, vaccinated against African Horse Sickness, and castrated.

In the early part of the year in view of the smallness of the Force it was considered that the most economical way of providing a veterinary service was to commission a number of Veterinary Inspectors as combatant officers and to post them to mounted units. This was done, but later it was found that the increase in animal units, all requiring some measures of veterinary service,

SECTION V.

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Grazing and Transport.

1940 is likely to be remembered in many districts as one of the worst years on record from a grazing point of view. In the Northern Districts conditions were particularly hard. It being the second year in succession that the rainfall was exceptionally low. Even in the West rains were bad and grazing around the important outlying centres of Ti Obold and Kabud was poor. In the East the war aggravated the situation. The war zone including considerable grazing areas and the inhabitants of these were pushed into other areas to the accompaniment of the usual fear and Abdi squabbles.

Then again during over-stocking problems and grazing crops generally, it is always well to remember such years as these bad years, like the good ones, fill with the notable range of climatic variation. Good and bad years offset each other pretty evenly over a period of time, and should not be regarded as fluctuations.

VETERINARY HOSPITALS.

Eastern Veterinary Hospital, and Ferung.

Out-patients 7,648

In-patients 4,529

Pairs of shoes fitted 1,600 (of which 700 pairs were hand made)

Hooping of feet 100

Wad Madani Veterinary Hospital.

Out-patients 17,394

In-patients 482

Sudan Defence Force.

The veterinary service and remounting of this Force towards the end of the year became a very important activity. Apart from about 4,000 camels 1,800 remount horses were purchased, vaccinated against African Horse sickness, and cared for.

In the early part of the year in view of the uncertainty of the future it was considered that the most economical way of providing a veterinary service was to complete a number of Veterinary Inspectors as combatant officers and to send them to mounted units. This was done, but later it was found that the increase in animal work, it requiring some measure of veterinary service,

made the system impossible, and it became apparent that to continue to use Veterinary Officers as combatant officers, and so to restrict their veterinary activities to their own particular units, was wasteful and unsatisfactory. Accordingly towards the end of the year an Army Veterinary organisation was in the process of formation under the control of the Director, Sudan Veterinary Service, who was to be suitably commissioned in the Sudan Defence Force for the purpose of exercising such control.

Acknowledgement.

It should be recorded that the field staff of Veterinary Inspectors was reduced by 50% when certain members were surrendered to the Sudan Defence Force and that the war greatly increased the work of those who remained. The purchase and management of large numbers of remounts and a great expansion of the meat trade and export animal trade constituted a considerable extra demand which was generously and admirably met by those who still constitute the Civil Veterinary Service.

My thanks are due to Political staffs and all other Departments and Services for the help given to to this Service when called upon. It has been much appreciated.

Sd. C.P. Fisher
DIRECTOR,
SUDAN VETERINARY SERVICE.

VS/I2.A.2/40.

Khartoum,
10/3/1941.

APPENDIX I.

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

	1938	1939	1940
	£.	£.	£.
I. REVENUE	8,378	9,552	13,027
2. EXPENDITURE:-			
Chapter I - Personnel and Personnel Allowances ...	27,493	26,891	24,482
Chapter II - Services	10,157	11,278	11,265
Chapter III. Extraordinary Expenditure	158	65	64
TOTAL	37,808	38,234	35,811

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Chapter III. - Stores Veterinary Expenditure	128	65	64
TOTAL	37,808	38,234	36,811

Sd. C. F. Fisher.
DIRECTOR,
SUDAN VETERINARY SERVICE.

ANNUAL REPORT

OF

THE SENIOR RESEARCH OFFICER, 1940.

A. STAFF AND GENERAL.

Under this section there is nothing new to report, since the constitution of the staff and the duties thereof have continued as in earlier years.

B. ROUTINE WORK.

The main items of the 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 on each of these.

I. CATTLE PLAGUE SERUM.

The maximum output of which the Malakal Veterinary Laboratory is capable, if all circumstances are favourable, is 125,000 full "doses" of 50 c.c. (6,250 litres). Although this total has constantly been aimed at, some limiting factor has always intervened to cause a shortfall. The past season has only differed from earlier ones in that it was early realised that there was no chance of even approaching the maximum, and efforts were confined to attempting an output of from 100,000 to 110,000 "doses". Finally 98,436 doses (4921.8 litres) only were prepared.

The cause of the shortfall was not the usual one of difficulty in obtaining sufficient suitable cattle, since, for the first time for many years, adequate numbers of both virus producers and serum producers were available - although nearly half of the latter had still to obtained from outside the Upper Nile Province. The limiting factor on this occasion was early exhaustion of grazing in following a second season of different rains, aggravated by the appearance of contagious bovine pleuro-pneumonia among the serum producers.

As a fortunate offset to the unhappy features, all the serum produced proved to be of unusually high potency, protecting susceptible animals against anything beyond the very mildest symptoms in doses of 5 c.c. per 100 lb. live weight, i.e. half the standard dosage. Thus, although the total output of serum was below normal, field officers were advised to use it in smaller doses and the general prophylactic range was substantially greater than usual. The season's work can therefore be regarded as having achieved, on the whole, very satisfactory results.

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VIII. Examination of pathological specimens (Khartoum and Malakal).

Short notes will be given on each of these.

I. - CATTLE PLAGUE SERUM.

The maximum output of which the Malakal Veterinary Laboratory is capable, if all arrangements are favourable, is 1,400,000 full "doses" of 50 c.c. (1,250 litres). Although this total has constantly been aimed at, some limiting factor has always intervened to cause a shortfall. The past season has differed from earlier ones in that it was early realised that there was no chance of even approaching the maximum, and efforts were confined to attempting an output of from 100,000 to 150,000 doses, finally produced about (1281.8 litres) only were prepared.

The cause of the shortfall was not the usual one of difficulty in obtaining sufficient suitable cattle, since, for the first time for many years adequate numbers of both virus producers and serum producers were available - although merely half of the latter had still to be obtained from outside the Upper Nile Province. The limiting factor on this occasion was early exhaustion of grazing following a second season of deficient rains, aggravated by the presence of contagious bovine pleuro-pneumonia among the serum producers.

As a fortunate offset to the unhappy features, all the serum produced proved to be of unusually high potency, protecting susceptible animals against anything beyond the very slightest reactions in doses of 5 c.c. per 100 lb. live weight - half the standard dosage. Thus, although the total output of serum was below normal, fluid effects were adjusted to use it in smaller doses and the general prophylactic range was actually greater than usual. The season's work on therefore compared as having achieved, on the whole, very satisfactory results.

II. CATTLE PLAGUE VACCINE.

There has been no modification in the technique of preparing this product, which still consists of plain glycerinised lymphoidal tissue.

About 900 litres of crude material (sufficient for roughly 90,000 doses) became available at Malakal. Of this about 800 litres were sent to Khartoum for further treatment, the remainder being retained and treated locally for issue in the two Southern Provinces. Including further quantities prepared in Khartoum, a total of 124,170 doses was issued to field officers. This quantity is slightly more than the average annual output in normal times.

The vaccine has again proved entirely satisfactory. Accurate reports cannot be obtained from the nomad cattle owners, but, since no cases of cattle plague appeared in any of the many thousands of vaccinated cattle being held in infected areas pending export to Egypt and elsewhere, there is no doubt as to its high prophylactic value.

III. CATTLE PLAGUE VIRUS.

A rather larger quantity than usual was issued, viz: 4,540 doses as against 2,880 in 1939. This product, which consists of glycerinised lymphoidal tissue maintained in cold storage, is only used for the immunisation of certain working oxen by the serum-virus method. No question as to either its safety or its efficacy has yet been raised.

IV. CONTAGIOUS BOVINE PLEURO-PNEUMONIA VACCINE.

The number of doses issued was 39,285 as against 36,450 last year. Both these totals may be considered within the normal range and no further remarks are indicated.

V. FOOT-AND-MOUTH DISEASE VIRUS.

Owing to a slight increase in the number of cattle exported, 12,700 doses of this product were issued as against 10,000 last year. Following its use, no case of foot-and-mouth disease occurred among cattle awaiting export, thus still leaving one with the hope that only one type of virus is at issue in the country.

VI. CAMEL TRYPANOSOMIASIS CONTROL.

Although more camels than ever before were treated for trypanosomiasis, viz: 18,120, issues of antrypol (naganol) and associated items from the laboratory fell from 17,783 to 17,154. The treatment in excess of issues were effected by using up stocks held in outstations at the beginning of the year. Issues, and treatments, would have been much more numerous had not the delivery of a consignment of antrypol been slightly delayed by circumstances referable to the war. Actually demands by private owners for treatment on payment were at least as numerous as before, but, owing to the necessity for giving prior consideration to officially-owned camels, the number of doses sold fell from 17,815 to 15,499. (It may be added that the delayed consignment arrived early in 1941, so that losses among privately-owned camels cannot have risen very seriously).

VII. HORSE-SICKNESS VACCINE.

This continues to be purchased from Kenya and merely distributed by this Laboratory. The number of doses issued rose from 983 to 2,874, but the number of treatments carried out on payment fell from 452 to 464. So far as can be ascertained, its use continued to give as good results as can be expected from any biological product. Although about a dozen vaccinated animals subsequently died of some condition which at least resembled horse-sickness very closely, no steps were taken, in consideration of existing circumstances, to confirm the diagnosis. Even if all the deaths were indeed due to horse-sickness - which is very doubtful - the losses could still be regarded as negligible compared to what they probably would have been if vaccination had not been carried out.

VIII. SPECIMENS EXAMINED.

The number of specimens examined from sources outside the laboratories fell from 538 to 392, the fall being doubtless due to the fact that some Veterinary Inspectors have been released for military services in non-veterinary formations. Most of the positive specimens were, as usual, of conditions that occur quite commonly in the Sudan, and call for no particular comment.

The only specimen of special interest was a mass of Onchocerca cervicalis, recovered from an abscess on the withers of a horse in Kordofan. Although "fistulous withers" due to the presence of this worm has been reported from numerous other countries, this is the first occasion on which the affection has been recorded in the Sudan.

Other less interesting diagnoses included :-

HORSES : Cryptococcus pneumonia (3 cases), epizootic lymphangitis, ulcerative cellulitis (C. ovis), trypanosomiasis (T. brucei), piroplasmosis (B. caballi), cutaneous habronemiasis, ringworm, "osteoporosis", and miscellaneous septic and helminthic infections.

MULES : Epizootic lymphangitis, ulcerative cellulitis, microfilaria in blood, and various septic and helminthic infections.

DONKEYS: Epizootic lymphangitis, ringworm, and common septic and helminthic infections.

CATTLE : Babesia bigemina, Theileria annulata, Tryp. congolense Actinomyces farcinicus, and various septic and helminthic infections.

CAMELS : Tryp. evansi and various septic and helminthic infections.

FOWLS : Spirochaetosis.

RABBITS : Cysticercus pisiformis (The adult worm has not yet been seen in the laboratory, but must evidently exist in the country), coccidiosis.

C. RESEARCH.

Deliberate research remained in abeyance. The only item of investigation carried out was the completion of observations on the efficacy of the British-made "antrypol", which is said to be chemically identical with the German-made "naganol" that has hitherto been used with such complete success in the treatment of camel trypanosomiasis. At the end of last year eleven camels, infected with three strains of T. evansi and treated with a single dose of five grammes of antrypol, were apparently well on the way to recovery as judged by improvement in bodily condition, absence of visible trypanosomes in wet blood films, and disappearance of reaction to the mercuric chloride tests. This year cure was confirmed by injecting samples of fresh blood from the camels into other susceptible animals (gerbils), none of which became infected. in addition to this laboratory observation, over 11,000 treatments under field conditions have now been carried out, the results of which have been equally as good as those carried out in the past with the original naganol.

D. PUBLICATIONS

For the first time for many years no papers have been published in scientific journals.

E. SUMMARY.

The volume of routine work, which reached its highest recorded point last year, has shown no signs of diminishing. No research has been possible.

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