

Annual report of the Veterinary Department, Sudan Government.

Contributors

Sudan. Veterinary Department.

Publication/Creation

[Place of publication not identified] : [publisher not identified], [1934]

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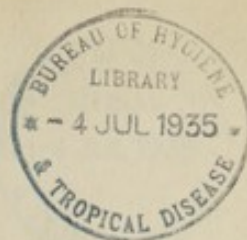
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ANNUAL REPORT

OF THE

SUDAN VETERINARY SERVICE

1934



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S T A F F

The composition and distribution of the Veterinary Staff at the end of 1934 was as follows :-

N A M E	DESIGNATION	STATION
Captain H.B. Williams, O.B.E., M.R.C.V.S., 4N.	Director	Khartoum

Dr. S.C.J. Bennett, D.Sc., M.R.C.V.S.	Veterinary Research Officer	Khartoum
Mr. J.T.R. Evans, F.Sc., M.R.C.V.S.	Asst/ So.	Malakal

Captain R.S. Audas, M.C., M.R.C.V.S., 3N.	Veterinary Inspector	El Fasher
Captain J. Going, M.R.C.V.S., 4N.	"	Kassala
Captain C.F. Fisher, M.R.C.V.S., 4N.	"	Kosti
Major J.R. Ellison, M.R.C.V.S., 4N.	"	Singa
Capt. T. Menzies, D.V.S.M. (Vict.), M.R.C.V.S., 4N.	"	El Obeid
Captain L.E. Frichard, O.B.E., M.R.C.V.S., 4N.	"	Wad Medani
Mr. W.H. Glanville, M.R.C.V.S.	"	Khartoum
Mr. J.E. Furney, M.R.C.V.S.	"	Malakal
Mr. J.A. Gillespie, M.R.C.V.S.	"	El Obeid
Mr. A.W. Chalkers, M.R.C.V.S.	"	Wad Medani

Mr. W. Kennedy, D.S.O., retired in September after ten years' service as Director.

Department of Agriculture
Bureau of Plant Industry
Washington, D. C.

No.	Name	Description
1	Apple	Golden Delicious
2	Apple	Gravenstein
3	Apple	Jonathan
4	Apple	Red Delicious
5	Apple	Winesap
6	Apple	Yellow Delicious
7	Apple	Empire
8	Apple	Macintosh
9	Apple	Orin
10	Apple	Red Rome
11	Apple	Yellow Rome
12	Apple	Granny Smith
13	Apple	Greening
14	Apple	Idared
15	Apple	Liberty
16	Apple	Red Rome
17	Apple	Yellow Rome
18	Apple	Granny Smith
19	Apple	Greening
20	Apple	Idared

U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY
WASHINGTON, D. C.

On his arrival in the Sudan in 1924 from Kenya, where he had held the post of Chief Veterinary Officer, Mr. Kennedy took over a semi-military Department, with a staff of 17 British and 16 Egyptian Veterinary Officers, a classified subordinate staff of 33, and a native police force of about 160 (armed) men. During his tenure of office the Department was reorganized on a purely civil basis. Considerable economies in staff were effected, and later, for financial reasons, still further reductions were made, leaving at the time of his departure a staff of 13 British Veterinary Officers, a subordinate classified staff of 19, and a force of 60 Native Stock Inspectors - the last named being picked men from the abolished veterinary police. As an extension to the Native Stock Inspectors the training of a variable number of "tribal retainers", maintained at tribal expense, was instituted with the view of utilising them as intelligence agents and inoculators. This new Service has, during the three years of its existence, worked very smoothly, and it is only the superimposition of reductions on financial grounds upon those already effected in the interests of interior economy that have made it difficult to provide adequate service for the area which the organisation has to cover.

Captain H.B. Williams, O.F.E., was appointed Director on 18-9-1934 and the vacancy created by this promotion was filled by the engagement of Mr. A.W. Chalmers, M.R.C.V.S., on first appointment.

SECTION I.

DISEASES OF ANIMALS.

I. DISEASES OF CATTLE.

Cattle-Plague.

The total number of deaths recorded this year from cattle plague was 10,050, which is practically the same as the total for 1933.

It was thought that the outbreaks which occurred in Berber Province in November, 1933, had been successfully controlled, but this was not the case, as the disease reappeared in four herds early in January of this year and rapidly spread to other herds totalling over sixteen thousand head of cattle. With the aid of serum and the advent of the rains which allowed of strict quarantine measures being enforced, the outbreaks died down - only to flare up in October. This Province has no British Veterinary Inspector and the small force of Native Veterinary Stock Inspectors was quite unable to cope with the numerous and widespread outbreaks.

The Provincial authorities, however, kindly supplied police to supervise quarantines and inoculators were sent from Khartoum. The year's work on cattle plague in this Province is represented by the following figures :- Number of cattle involved 23,006, deaths 1,498, seruminized 14,376. A mortality rate of only 6.5 per cent. may be taken as proof of efficacy of control by serum plus nasal-swabbing method. In an untreated herd the mortality may be as high as 80 per cent., depending on the time which has elapsed since the last appearance of the disease in the herd.

In the Blue Nile Province the disease appeared in Rufaa District and spread rapidly, eventually involving 16,038 head of cattle. Most of the herds had enjoyed freedom from cattle plague for some years and therefore contained large numbers of susceptible cattle, which accounts for the high rate of mortality that occurred in those herds that were heavily infected before being seruminized. In the cattle raising areas of this Province many grazing grounds are inaccessible to motor transport and there is consequently a delay in moving serum to the outbreaks, which does not occur in the Gezira proper.

In the White Nile Province which is so situated that, although constantly infected, the disease can be kept more or less under control, the incidence of cattle plague was high during the first four months of the year, but gradually declined during the rains, and was exceptionally low at the end of the year. Outbreaks involved 75,494 cattle of which 33,560 were seruminized. The percentage of deaths in controlled herds was 5.6 as compared with 17.4 in untreated herds. The Veterinary Inspector, White Nile Province, reports a growing confidence in serum treatment, and says that it is not uncommon for owners to request permission to bring their cattle in contact with the disease to obtain treatment by serum-nasal-swabbing method.

Small outbreaks which occurred in Abwong, Nasir, Yirrol, Western Muer and Berk Districts of the Upper Nile Province were successfully dealt with by seruminization. A serious outbreak occurred in For District and was still smouldering at the end of the year. Unfortunately the full serum requirements of this Province could not be supplied.

During April and May the herds grazing in Abu Leleig District of Kassala Province became infected by sick cattle from Berber Province. By the end of June the outbreak had been effectively brought under control. The mortality was low.

During 1934 it was found possible to produce sufficient cattle plague anti-serum for the use of the field veterinary staff in their work of controlling outbreaks of disease in the Northern Provinces, but not sufficient for any reserve to be held. If adequate reserves are to be held in order to safeguard against any abnormal incidence of cattle plague, and more particularly if the Southern Provinces are to be served, then the time has arrived when the possibility of increasing our output of serum should be seriously considered.

In the Southern Provinces, despite the small field veterinary staff available to disseminate knowledge of the control of cattle plague, the benefits of the serum-nasal-swabbing method are becoming widely known. Nevertheless, of the 30,000 full 'doses' of serum produced at Malakal only 10 per cent. was available for use in the Provinces of Upper Nile and Bahr El Ghazal, whose herds must total over a million and a half cattle.

The question of preparing vaccine as an additional weapon in our armoury is also fully due for consideration.

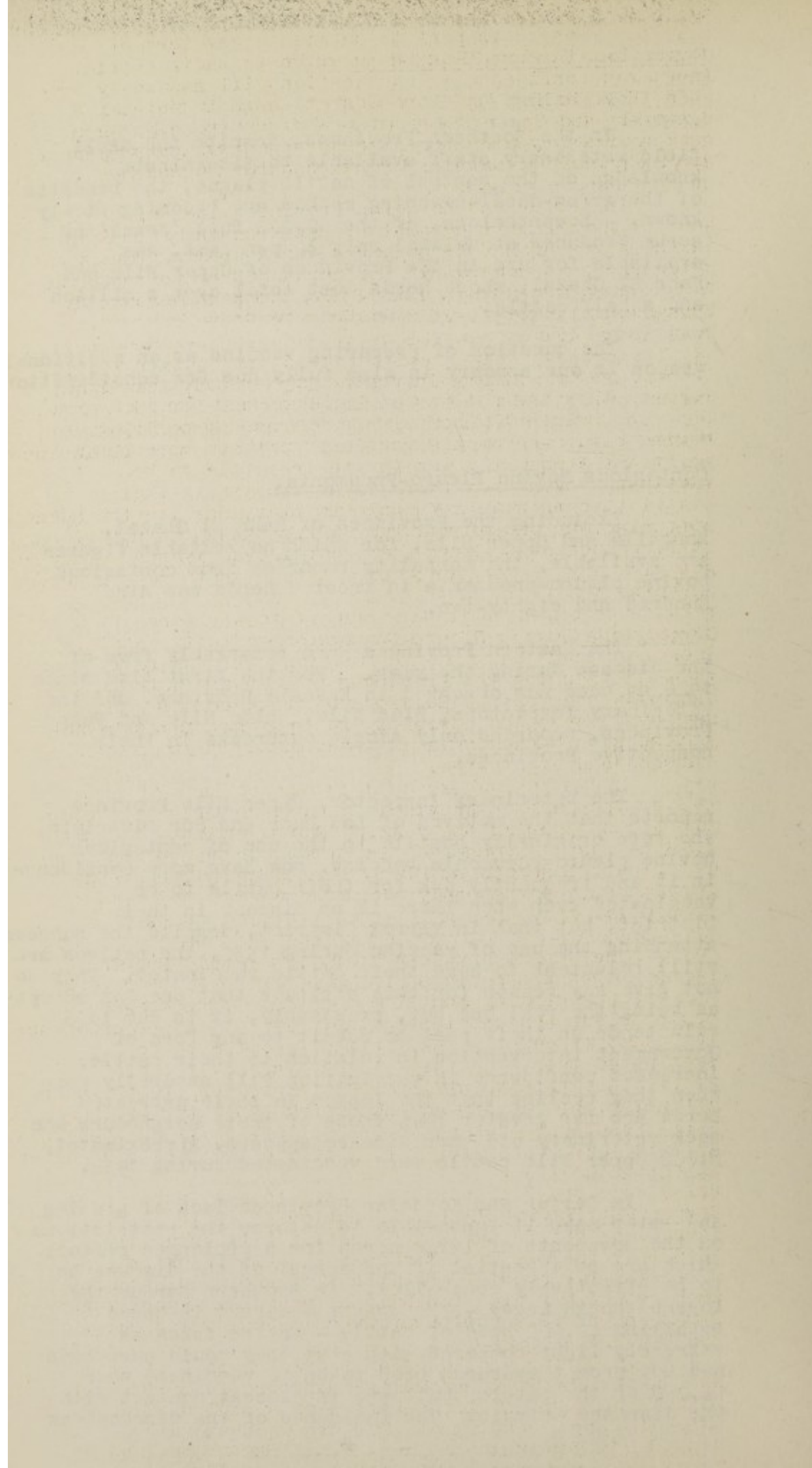
Contagious Bovine Pleuro-Pneumonia.

Excluding the Provinces of Bahr El Ghazal, Mongalla and Upper Nile, for which no reliable figures are available, the mortality recorded from contagious bovine pleuro-pneumonia in treated herds was nine hundred and eighty-two.

The Eastern Provinces were remarkably free of the disease during the year. For the first time since 1926 no case was observed in Kassala Province, and the Veterinary Inspectors, Blue Nile, White Nile and Fung Provinces, recorded only single outbreaks in their respective Provinces.

The Veterinary Inspector, Upper Nile Province, reports that the natives of Lau Muer and Bor Districts, who were originally hostile to the use of contagious bovine pleuro-pneumonia vaccine, now have more confidence in it and frequently ask for their cattle to be vaccinated even when there is no disease in their District, but that in Yirrol District, despite the success attending the use of vaccine during 1933, the natives are still reluctant to have their cattle vaccinated. They do not give any reason for this attitude that one can accept as being the real one but, presumably, it is due to a reluctance on their part to submit to any form of Government intervention in relation to their cattle. Increased confidence in vaccination will assuredly come when they realise that the losses in their untreated herds are far greater than those of their neighbours who seek veterinary aid when disease appears. Approximately 8,000 Upper Nile cattle were vaccinated during 1934.

In Darfur and Kordofan Provinces lack of grazing and water make it impossible to enforce the restrictions on the movements of large herds for a prolonged period, which are so essential if the spread of the disease is to be effectively controlled. In Southern Darfur the losses though heavy - 770 deaths occurred in herds totalling 42,000 head of cattle - may be taken as extremely light compared with what they would have been had not prompt measures been taken to vaccinate some 14,000 of the cattle that were in closest contact with the diseased animals. The incidence of the disease was



slightly heavier than usual in Kordofan. In both Darfur and Kordofan heavy losses occurred in those herds in which, owing to delay in reporting, considerable time has elapsed between the appearance of the disease and the vaccinating of the cattle.

A total of 47,260 doses of vaccine were issued from the Veterinary Laboratory during the year.

Trypanosomiasis.

In those Provinces under veterinary administration in which this disease commonly occurs, its incidence was reported to be high in the Fung and Upper Nile Provinces and low in the Provinces of White Nile, Kordofan and Kassala.

Over 2 per cent. of the cattle belonging to the Rufaa el Hoi, Kenana Kowatil and Ingessena tribes, grazing near Khor Doleib in Fung Province, were found to be infected with trypanosomiasis.

Cases were definitely diagnosed in the Northern, Bor, Western Nuer, Yirrol and Central Districts, Upper Nile Province. One cannot definitely say whether the reported increase in the incidence of trypanosomiasis in cattle in this Province is a real one, due to the suitable climatic conditions prevailing during the year, or an imaginary one based on the increased number of cases brought to the notice of the Veterinary Inspector. With growing confidence in the veterinary staff it is only natural to expect an increase in the number of cases reported.

Foot-and-Mouth Disease.

During November cases of foot-and-mouth disease were observed at Khartoum North Quarantine in a consignment of El Obeid cattle awaiting export to Egypt. A close inspection of the cattle registered for export, grazing in the vicinity of El Obeid brought to light a few cases in most of the herds. On investigation it was found that practically all the infected beasts were of French Equatorial origin, which was to be expected, as the wave of foot-and-mouth disease which swept across Kordofan and Darfur Provinces during the winter of 1932/33 left immune cattle in its wake. The disease was of a mild type and no new cases were being reported at the end of December.

In early December cases occurred in a small herd of trade cattle which had come on hoof from Kordofan to the grazing grounds on the West bank of the Nile near Shendi. The enforcement of strict quarantine measures effectually prevented the spread of the disease to surrounding herds.

With regard to the first of these points, it is to be noted that the Commission has not yet received any information from the Government of the United States regarding the proposed amendment to the Constitution of the United States which would give the President the power to appoint and remove judges of the Supreme Court at will.

A second point is that the Commission has not yet received any information from the Government of the United States regarding the proposed amendment to the Constitution of the United States which would give the President the power to appoint and remove judges of the Supreme Court at will.

THE COMMISSION'S VIEW

The Commission believes that the proposed amendment to the Constitution of the United States which would give the President the power to appoint and remove judges of the Supreme Court at will is a dangerous and unconstitutional proposal. It is a proposal which would destroy the independence of the judiciary and would give the President the power to appoint and remove judges of the Supreme Court at will.

Over the years, the Commission has received many suggestions for amendments to the Constitution of the United States. Some of these suggestions have been very good and have been adopted by the people. Others have been very bad and have been rejected by the people. The Commission believes that the proposed amendment to the Constitution of the United States which would give the President the power to appoint and remove judges of the Supreme Court at will is a very bad suggestion and should be rejected by the people.

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THE COMMISSION'S RECOMMENDATION

The Commission recommends that the proposed amendment to the Constitution of the United States which would give the President the power to appoint and remove judges of the Supreme Court at will be rejected by the people. The Commission believes that the proposed amendment to the Constitution of the United States which would give the President the power to appoint and remove judges of the Supreme Court at will is a dangerous and unconstitutional proposal. It is a proposal which would destroy the independence of the judiciary and would give the President the power to appoint and remove judges of the Supreme Court at will. The Commission believes that the proposed amendment to the Constitution of the United States which would give the President the power to appoint and remove judges of the Supreme Court at will is a very bad suggestion and should be rejected by the people.

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Anthrax.

One hundred and twenty cattle died in the Southern Districts of Kassala Province between the end of September and the beginning of December from a group of symptoms called by the natives "Anata". Owing to delay in reporting the outbreaks it was only possible to obtain blood smears from the carcasses of two beasts which died at Um Dereisa. Both showed anthrax bacilli. The Veterinary Inspector, Kassala Province, is of the opinion that although certain of the clinical symptoms point to anthrax as being the cause of all the deaths, yet he is doubtful if this was actually the case, as no young stock died, no cases occurred amongst the native herdsmen and, also, smears taken from cattle which had died in previous outbreaks from the so-called "Anata" disease showed anaplasmosis and theileriosis but not anthrax bacilli.

Other Diseases.

Cases of psoroptic mange continued to occur amongst plough oxen in the Gezira area, Blue Nile Province. The sale for butchering of all detected cases is considered more economical than their treatment.

II. DISEASES OF CAMELS.

Trypanosomiasis.

The numbers of cases which occurred in the Camel Companies of the Sudan Defence Force stationed in Kassala and Kordofan Provinces were above the average. This may be attributed to the exceptionally heavy rainfall experienced in these Provinces during 1934 being favourable for the propagation of large numbers of "seroot" fly.

Diagnosis by the Mercuric Chloride test and treatment by Naganol injections have made the control of trypanosomiasis in camels so effective that the percentage of losses from trypanosomiasis in the total of deaths has fallen from 42 per cent. in 1925 to 1.8 per cent. in 1934.

That Naganol treatment continues to find favour with the native camel-owners is disabed by the fact that in Kassala, Fung and Blue Nile Provinces, in which treatment of native camels is carried out on payment, 3,234 of their camels were brought up for treatment during the year; the highest number so far recorded in any single year.

THE HISTORY OF THE

The history of the world is a story of the struggle for power and the search for truth. It is a story of the triumph of the few over the many, and of the triumph of the truth over the lies. It is a story of the rise and fall of empires, and of the rise and fall of men. It is a story of the human condition, and of the human mind. It is a story of the human race, and of the human future.

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As it is proposed to make Haganol treatment on payment available to the natives of Kordofan Province, it was thought advisable, in order to gain the confidence of the Northern Kordofan camel-owners, to give a demonstration of the methods employed in detecting and treating camel trypanosomiasis. The Veterinary Inspector, Kordofan, reports as follows :-

"A start was made this year in the treatment of the camels of the Kababish and Kawanla. The Nazir was visited at his camp at Um Gozein, where the District Commissioner had arranged for camels suspected of being infected with trypanosomiasis to be produced. It was obvious that Haganol was on trial for its merit. Sir Ali El Tom produced 14 camels. All were re-actors - The Nazir of Kawanla, who was present also produced 16 reactors for treatment".

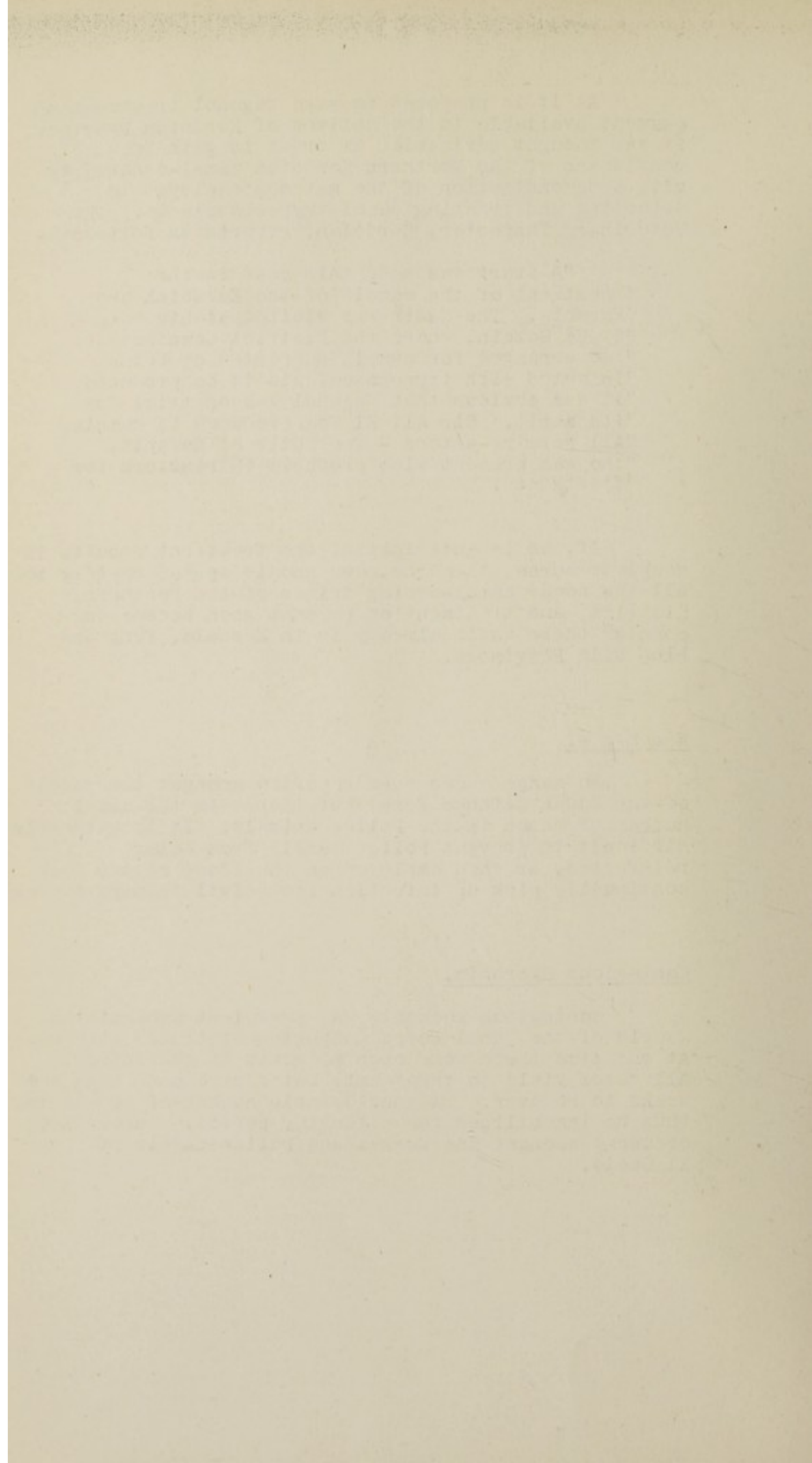
If, as is anticipated, the treatment results in complete cures, then the news should spread rapidly to all the nomad camel-owning tribes of the Northern District, and treatment on payment soon become as popular there as it already is in Kassala, Fung and Blue Nile Provinces.

M a n g e.

No mange cases were reported amongst the camels of the Sudan Defence Force but there was the usual number of cases in the Police animals. It is extremely difficult to prevent Police camels from being reinfected, as when employed on the trade routes they continually pick up infection from civil transport camels.

Contagious Necrosis.

Contagious necrosis was prevalent amongst the camels of the Camel Corps Companies stationed at Bera. At one time there were over 90 cases in quarantine. All cases yield to treatment, but severe ones take some weeks to recover. A considerable number of camels may thus be immobilised for a lengthy period. Cases also occurred amongst the Merkes and Police camels at El Obeld.



III. DISEASES OF EQUINES.

African Horse Sickness.

Although the rainfall in Darfur, Kordofan and the Central Provinces was above normal in 1934, the horse-breeding tribes report their losses from African horse sickness as being exceptionally light, and only nine horses and six mules of the animals in Government service have died of the disease.

The Veterinary Inspector, Blue Nile Province, reports that, of ten horses and five mules that had contracted the disease, seven horses and four mules recovered. The percentage of recoveries is exceptionally high and may be attributed to the fact that it is possible to have an animal under treatment in the Veterinary Hospital a few hours after the appearance of the disease. Telephone facilities and a motor ambulance have made this possible.

Epizootic Lymphangitis.

Forty-four cases were diagnosed at the Veterinary Laboratories as compared with a total of 37 in 1933 and 70 in 1932.

Ulcerative Cellulitis.

Two cases were detected amongst the Police animals at Dilling.

IV. DISEASES OF SHEEP AND GOATS.

Outbreaks of contagious pleuro-pneumonia were reported to have occurred in the Provinces of Kordofan, Blue Nile and Fung, but there was no mention of heavy losses having resulted from the disease.

V. DISEASES OF DOGS.

Table showing number of positive cases of rabies diagnosed at the Wellcome Tropical Research Laboratories during 1934.

PROVINCE	:Mar:	Apr:	May:	Jun:	Jul:	Sept:	Oct:	Nov:	Dec:	Total
Berber	: 1 :		: 1 :							: 2
Blue Nile	: 3 :	: 3 :				: 1 :	: 2 :	: 2 :		: 11
Fung			: 1 :		: 1 :	: 1 :				: 3
Kassala							: 1 :		: 2 :	: 3
Khartoum	: 1 :									: 1
Kordofan	: 1 :			: 1 :	: 1 :	: 3 :				: 6
White Nile	: 1 :	: 1 :						: 1 :	: 1 :	: 4
Total	: 7 :	: 4 :	: 2 :	: 1 :	: 2 :	: 5 :	: 3 :	: 3 :	: 3 :	: 30

The above table shows that rabies has been widespread throughout the Northern and Central Sudan during the year.

The fact that no positive cases have been diagnosed in certain Provinces does not necessarily imply that they are free of the disease, as one has every reason to believe that rabies exists in all Provinces where there are a large number of native-owned dogs. Material for diagnosis can, however, rarely be obtained from the numerous suspected cases which occur in remote districts, owing to the impossibility of obtaining it in a fresh state.

The destruction of stray and ownerless dogs by the Province authorities and the poisoning of jackals and hyenas continues to be carried out as a routine measure, with the result that though isolated cases have occurred in seven Provinces no outbreak has assumed the nature of an epizootic.

Isolation kennels, where suspected animals can be kept under observation, have been fitted out at Omdurman and Khartoum North.

SECTION II

TRADE IN LIVESTOCK AND LIVESTOCK PRODUCTS

I. EXPORT & IMPORT TRADE

Cattle and Sheep.

In February of this year arrangements were concluded between the Sudan Government and the Egyptian Government for a joint investigation of the cattle and sheep trade to be undertaken by one veterinary representative of each Government. Captain H.B. Williams and Ahmed Eff. Mohammed Rashad, the officers delegated by their respective Governments for this work, studied the trade from the grazing areas of Kordofan Province to the Abattoirs of Egypt.

As a result of their investigation and recommendations many points over which there had been misunderstandings in the past were amicably settled; increased transport facilities between Shellal and Cairo were granted, and permission was given to slaughter Sudanese cattle and sheep at Suez and convey the carcasses by rail to towns in the canal zone. The recommendation of the Sudan Government's representative, that export from El Obeid should be limited to the period 1st August to 31st December and that from then onwards cattle should be drawn from Kosti and Shendi, was also approved and brought into force for the 1934-35 export season. This, it is felt, will raise the average standard of condition of the cattle exported during the season, as owing to watering and grazing difficulties the cattle collected at El Obeid rapidly fall away in condition after the end of December.

The fact that no positive results have been obtained in certain investigations may be due to the fact that the first of the diseases on the list is not a bacterial disease. It is a disease of the nervous system and is caused by a virus. It is, however, fairly common in certain districts and is a serious disease. The possibility of obtaining it is a great one.

The description of the disease and the various ways of its transmission are given in the following table. It is a disease of the nervous system and is caused by a virus. It is, however, fairly common in certain districts and is a serious disease. The possibility of obtaining it is a great one.

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TABLE I WAYS OF TRANSMISSION OF THE DISEASE

WAYS OF TRANSMISSION

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In February of this year, the following cases were reported to the Bureau of the Department of Health and the Department of Agriculture. The following table gives the various ways of its transmission and the various ways of its transmission. It is a disease of the nervous system and is caused by a virus. It is, however, fairly common in certain districts and is a serious disease. The possibility of obtaining it is a great one.

As a result of these investigations, it was found that the following points were of importance. The first point was that the disease was not a bacterial disease. It is a disease of the nervous system and is caused by a virus. It is, however, fairly common in certain districts and is a serious disease. The possibility of obtaining it is a great one.

The number of cattle and sheep exported from the Sudan to Egypt is always a true index of the trade conditions prevailing in the latter country. The welcome increase in the number of cattle and sheep exported may be taken as a sure indication that Egypt has experienced a more prosperous time during the period under review. A fillip was also given to the trade by a continuance of the low Sudan Railways freight charges of 1933 and in some cases even a reduction of these. Permission to supply the meat demands of the Egyptian labourers working on the various pumping schemes on the Shellal-Wadi Halfa reach has temporarily opened up new markets to which some thousands of sheep can be exported annually. In addition to an increased demand for cattle and sheep from Egypt, there has also been a slight improvement in the prices obtained at Cairo and Alexandria.

At the end of November an outbreak of foot-and-mouth disease in a consignment of El Obeid cattle, while in quarantine at Khartoum North, necessitated the closing down of El Obeid as an exporting centre more than a month earlier than had originally been intended. Quarantine restrictions imposed on account of the outbreak did not cause any interruption of the trade, as export was switched over to Kosti and Shendi and the old Quarantine Station at Damer was brought into use. By the end of December the consignment of infected cattle at Khartoum North Quarantine was free of disease and was exported to Alexandria without any casualties having occurred.

Further details of the trade in cattle and sheep are given in the following tabulated statements:-

A. Numbers and values of cattle and sheep exported during the last four years.

Year	:	Cattle	:	Sheep	:	Valuation at port of export
	:		:		:	<u>L. E.</u>
1931	.....	5,347	:	919	:	23,245
1932	.....	3,472	:	4,271	:	14,763
1933	.....	5,518	:	4,963	:	24,210
1934	.....	8,963	:	15,642	:	50,311

B. Numbers of cattle imported during the last four years :-

Y e a r	: French : Equatorial : Africa	: Eritrea	: Abyssinia	: Total
1931	: 65	: 16	: 839	: 920
1932	: 113	: 36	: 301	: 450
1933	: 401	: 20	: 782	: 1,203
1934	: 3,437	: -	: 821	: 4,258

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

P r o v i n c e	: 1932	: 1933	: 1934
Darfur and Kordofan	: 3,255	: 4,510	: 6,228
White Nile	: 100	: 700	: 540
Upper Nile	: 20	: 40	: 455
Bahr El Ghazal	: 20	: -	
Khartoum	: 75	: 160	: 426
Berber	: -	: 350	: 1,020
Kassala	: -	: -	: 20

D. Average market prices & total number of cattle sold for export in El Obeid market during the last four years :-

Y e a r	: Number of : cattle sold	: Average price LE. Mms
1931	: 2,126	: 2.210
1932	: 2,435	: 1.405
1933	: 2,355	: 1.376
1934	: 1,789	: 1.810

Camels.

The total number of camels sent from the Sudan to markets in Egypt is estimated at 30,000. This shows that the marked increase in the number recorded as exported in 1933 has been more than maintained. Prior to 1933 the camels for export practically all came from Kassala and Berber Provinces, whereas during the year under review fully 50 per cent. of those sent to Egypt came from Kordofan, Darfur and Blue Nile Provinces, the last named alone contributing 4,500 head.

The Veterinary Inspector, Kassala Province, reports that the Lahawin and Rashaida tribes between them sent over 14,000 camels North and that an Egyptian buyer in the Province purchased 310. Camels of export type sold well all over the Sudan up to the end of November, after which there was a slight fall in prices due to receipt of news that the Egyptian markets were satisfied. At Khashm El Girba during October the average price was LE.6 and exceptionally good nagas fetched up to LE.9.

Prices were good in the Egyptian markets, ranging between LE.3 and LE.15, the latter being the price at which the best quality nagas, in prime condition, were disposed of.

M u l e s .

The Veterinary Inspector, Kassala Province, purchased the Army and Civil requirements of 123 mules at Gallabat in February and reports that there was no difficulty in obtaining animals of a high standard with a minimum of delay.

Hides and Skins.

The condition of the hides and skins market was satisfactory from January to the end of April of this year, the value of the hides and skins exported during the period being SE.48,620 as compared with SE.23,024 for the corresponding period of 1933. In May, owing to a falling off in the demand from Europe, there was a sharp set-back in the prices obtainable for both dry-salted and flint-dry hides. This slump in prices persisted until October when, owing to scarcity of stocks and large demands from Egypt and Syria, prices soared, flint-dry hides rising from 24 to 38 millimes per oke. There was a poor demand from Europe during November and December, but as Egypt and Syria continued to buy heavily, the rise in prices which took place in October was maintained to the end of the year.

Syria, who has become a good customer of Sudan hides, took 517,737 kilos during 1934, whereas in 1927 only 639 kilos were exported to that country.

Skins from the "hair" sheep of the Sudan, being finely grained and light, make the finest quality ~~gaité~~ ^{gaité} ~~kid~~, and are largely used in the manufacture of high-grade gloves, fine fancy-leather goods and the best class of chamois leather. These skins find an exceptionally good market in America; to which country 970½ tons of our total exports of 1,168 tons of skins were shipped during 1934.

In order to give all Senior Officials of this Service an opportunity for gaining first-hand knowledge of the defects caused by bad flaying and preparation, it was arranged for nine of them to visit, while on leave, the Tannery of Messrs W.R. Ingle & Co. Ltd. at Leeds. The knowledge gained during this visit of the many defects which only come to light during the process of tanning, will enable them to explain to the producers in this country how, by careful methods of flaying and preparation, some of these faults may be eliminated.

Notes on the drying and preparation of hides for export are being compiled for distribution to those Government officials who come in contact with hide merchants, cattle owners and butchers.

With a view to finding a simple and effective method of drying unsalted hides, which can be recommended for general use under the variable conditions prevailing in the Sudan, experimental work is being carried out on the many methods now in use in this and other tropical countries, and also on new ways.

The quantities of hides and skins exported during the last five years and the average values per ton were as follows :-

Y e a r	H i d e s		S k i n s	
	Average value		Average value	
	Tons	per ton	Tons	per ton
		L. E.		L.E.
1930	1,049	38.7	950	103.4
1931	818½	23.8	899½	65.1
1932	712	16.3	862	45.4
1933	1,207	30.0	1,057	48.9
1934	1,115	31.2	1,168	67.6

Samn or Maslee (Clarified Butter).

Approximately 519 tons of samn of a total value of £E.27,300 were exported in 1934 as compared with 534½ tons of a value of £E.24,640 in 1933. Egypt is still our best customer. Steps are being taken to encourage the producers, especially those in the big cattle-owning tribes, to improve the quality of their samn by paying more attention to proper clarification and adopting, as far as is practicable, more cleanly methods of preparation. Over 800 tons of samn were despatched by rail from El Obeid to local markets.

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Year	Total	Average value per ton	Value
1920	1,000	30.7	30,700
1921	800	27.5	22,000
1922	710	25.3	18,000
1923	1,000	30.0	30,000
1924	1,100	31.5	34,650

Mean or Mean (Weighted Average)

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 £2,700 were ... in 1924 as compared with 50 tons
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II. INTERNAL TRADE.

The numbers of animals slaughtered for food in ten of the larger towns during the past three years were as follows :-

	: 1932	: 1933	: 1934
Cattle	: 15,775	: 16,812	: 21,325
Sheep	: 155,483	: 155,234	: 169,153
Goats	: 3,609	: 4,410	: 6,243
Camels	: 2,725	: 2,013	: 1,277

The above figures show that there was a marked increase in the numbers of cattle, sheep and goats slaughtered in these towns compared with those of the two preceding years, but a large decrease in the number of camels. A good demand from Egypt kept the price of fat slaughter camels high and accounted for the decrease in the number slaughtered locally.

There was only a very slight improvement in the prices obtainable for local slaughter cattle, of which there were a plentiful supply.

SECTION III.

IMPROVEMENT OF LIVESTOCK.

Cattle.

During the year all attempts to effect improvement in the local breeds of cattle by crossing native cows with bulls of imported breeds have been discontinued, and the efforts of the veterinary staff concentrated on educating the native cattle owners to breed from carefully selected stock of the best native type and on encouraging them to castrate all unsuitable bulls at an early age. A more simple form of instrument for carrying out the sterilization of young bulls than that previously employed has been introduced, and all tribal veterinary retainers are being trained in its use.

The Veterinary Inspector Upper Nile Province, reports that the last of the ten bulls (mostly half-bred Friesians), imported into that Province during the period 1928-33, died during 1934 and that very few of their progeny have survived them. Despite the fact that they were better fed and looked after than the local cattle,

it was found impossible to keep them in anything approaching good condition; flies and other pests, which only slightly worried the native cattle, gave them no rest and were undoubtedly in large part responsible for their failure.

Horses.

Since the first attempts were made to control and improve horse-breeding in Darfur, some years prior to the inauguration of the official scheme in 1930, innumerable difficulties, both economical and climatic, have been successfully weathered. In addition, native antipathy to the introduction of new methods has been overcome. The success which has attended the scheme has been in a large measure due to the whole-hearted assistance given to Captain Audas by many officers and Government officials in Darfur in spreading the knowledge of the improved methods of horse-breeding and raising introduced by him.

A number of horses of the stamp required as remounts for the police were purchased in Kordofan Province at the Homr Horse Show held at Muglad, but no outstanding horses of the improved half-bred type were noticed. In future, improvement of existing stocks in this tribe will, as far as possible, be confined to the introduction of selected country-bred stallions from neighbouring tribes. The Messeria Horse Fair at Sinut produced a limited number of good half-bred horses. This tribe has lost its old enthusiasm for horse-breeding and is, perhaps wisely in these days of mechanisation, turning its attention to the growing of cotton.

At the end of the year there were thirty-one Government-owned stallions at stud, of which 12 Arabs, 2 Egyptian country-bred and 4 country-breds were stationed in Darfur : 4 Arabs and 3 country-breds in Kordofan Province : 1 Arab and 2 Thorough-breds in Khartoum Province : and 2 Arabs and a Thorough-bred in Berber Province.

Two Arabs died during 1934 and three were destroyed on account of age. These losses, and those which occurred at the end of 1933, were made good by the purchase of 2 Arabs and 2 country-breds and the generous gift of a sire by each of the following :- Mr. J.W. Gibson, Mr. W.P.D. Clarke and Mohamed Eff. Sultan.

"Charlie", the only riding donkey stallion now at stud, has had a successful year; his services totalled 72.

The following is extracted from a report submitted by Captain R.S. Audas, M.C., on the progress of the horse-breeding scheme in Darfur Province :-

"The scheme, adopted with the object of
 "maintaining and improving the standard of the
 "native horse, has now functioned over a period
 "of nine years; each year progress has been
 "observed and noted. The two drought years,
 "1930-1931, with their shortage of grazing and
 "absence of grain, were a very great strain on the
 "scheme, despite which the saleable stock of 1934-
 "1935 is amazingly good.

"At the present time it is safe to state
 "that not only have a large number of half and
 "three-quarter bred horses been produced, but the
 "whole standard of the native horse of the tribes
 "concerned has definitely risen. This is
 "particularly noticeable in the Beni Helba, Tergam,
 "Fellata, Rizeigat and Habbania. The resulting
 "native horse is larger, and has better riding
 "qualities, and common faults such as brushing
 "have to a great extent been eliminated. This is
 "entirely due to the use of approved sires and to
 "the native owner having come to realize that the
 "mis-shapen, injured and deformed animal is
 "relatively unsaleable. The tribes possessing
 "trading instincts e.g. Fellata and Rizeigat,
 "immediately dispose of horses that are unsaleable
 "for Government purposes. It is satisfactory to
 "observe that those who have successfully sold
 "their horses avail themselves of the Veterinary
 "Officer's opinion with regard to the purchase of
 "new stock.

"Opportunity only arises at the Annual Shows
 "(where all horses, mares and foals are produced)
 "of appreciating the actual progress made. It is
 "satisfactory to note the increasing annual demand
 "for private purchases from this Province. The
 "interested observer visiting the polo and racing
 "centres of the North cannot fail to be struck by
 "the type, numbers, quality and capabilities of
 "the horses produced under this scheme. The
 "writer is convinced that the standard of remount
 "supplied to the Army in recent years is a great
 "improvement on that of nine years ago; this will
 "be borne out by those in a position to judge.
 "This is not due to more care being given to
 "purchasing, but to the greater number of good
 "horses available.

"It must be borne in mind that very large
 "numbers of horses have been bought from the
 "tribes in recent years, amongst them many
 "horses that would have been used as sires.
 "Were it not for the fact that the Government
 "has in some measure maintained and encouraged
 "the keeping of horses solely used for breeding
 "purposes, there would have been no question of
 "improvement, and the standard of the horses would
 "have definitely deteriorated.

"Much has been done, and it is encouraging
 "to be able to state that the private demands of
 "this year are more than double those of any
 "previous year. We can look forward in the very
 "near future to producing horses, in numbers,
 "which will compete favourably with imported
 "animals costing two or three times as much.

"As regards imported horses, our
 "experience has confirmed our original ideas,
 "viz, the English thorough-bred horse can only
 "be used with success where artificial conditions
 "are available; the offspring cannot withstand
 "the unavoidable hardships met with in this
 "country; they can only be grown under pampered
 "conditions; and can be looked on as luxury
 "animals.

"The horse of Arab type of doubtful
 "origin - until recently often classified in
 "Egypt as a true Arab - is unreliable and may
 "produce many mondescript animals.

"The most successful imported horse is
 "the pedigree Arab, whether of the 'Khiolawi'
 "'Saklawi' or 'Muniki' strains, which can be
 "relied upon to throw true to type. Of these
 "three strains, the 'Khiolan', with his
 "strength, muscular build, and endurance, is
 "the one to be sought after and has proved
 "himself to be best suited for cross-breeding.
 "The 'Saklawi', of which we have one true
 "representative, is a horse of great beauty;
 "although vigorous and a prolific sire, his
 "offspring seem to lack stamina to survive
 "Sudan native conditions. Of the third, the
 "Muniki, the lean race horse of Arabia, has
 "produced offspring of great speed though
 "lacking in size and substance".

SECTION IV

MISCELLANEOUS.

Grazing and Water.

Except in the case of the Northern districts of
 Serber Province and parts of Dongola Province, the rains
 of 1934 were uniformly heavy and well distributed. The
 reported excellence of the grazing in the pastoral areas
 is reflected in the prime condition of the cattle and
 sheep arriving at Khartoum for export and local slaughter.

2.

The failure of the rains in certain districts of Dongola and Berber Provinces was compensated for by the abundance of good grazing which became available on the low-lying lands near the river as a result of the flooding and seepage which occurred when the Nile flood reached an abnormally high level.

Reports from the Upper Nile Province state that grazing was good throughout the year.

During a tour of the Blue Nile Province it was noticed the cultivators on the lands of the Kassala Cotton Company had been successfully encouraged by Company's staff to conserve bulk forage for feeding to their working bulls and other stock during the dry summer months when green grazing is non-existent and grazing of any kind scanty, whereas in many other areas it was observed that the cultivators had left their gassab standing to be eaten either by animals brought in by cotton pickers or by passing flocks and herds, and had made no attempt to harvest even a small part of it to carry their animals over the dry months preceding the rains. If the working bulls are to be kept in good condition for cultivating during the summer, it is essential that their owners should store sufficient of their crops to hand-feed them when grazing is not available.

Purchase of Remounts.

In addition to purchasing the horse, mule and camel requirements of the officials and police of the Sudan Government, 219 horses, 60 mules and 140 camels were purchased for the Sudan Defence Force.

Veterinary Hospitals.

The numbers of cases treated at the Khartoum and Wad Medani Veterinary Hospitals were as follows :-

Khartoum	6,502
Wad Medani	6,168
	<u>12,670</u>

At the Khartoum Veterinary Hospital forge 1,591 pairs of shoes were fitted and many hundreds of horses and mules had their feet rasped and trimmed.

(Signed) H.B. Williams

Badik

DEFECTION, SUDAN VETERINARY SERVICE

A N N U A L R E P O R T

OF THE

VETERINARY RESEARCH OFFICER,

SUDAN GOVERNMENT

1934.

ANNUAL REPORT

OF THE

VIETNAM RESEARCH OFFICE

U.S. GOVERNMENT

1964

A. STAFF.

The classified staff throughout the year has consisted of myself, one Assistant Veterinary Research Officer, one European Laboratory Assistant and one Sudanese Clerk.

The permanent section of the unclassified staff, viz: seven Sudanese Laboratory Attendants, has continued to give good service. By posting them alternately to Malakal and Khartoum, all have now become proficient in all classes of routine duties.

B. ROUTINE WORK

The main routine work of the Research Section has, as usual, consisted of the preparation of cattle plague antiserum, the preparation of bovine pleuropneumonia vaccine, the issue of diagnostic materials and of naganol for the control of camel trypanosomiasis, the examination of material submitted for diagnosis, and maintenance of the Veterinary Service library.

I. CATTLE PLAGUE ANTISERUM.

In spite of favourable working conditions generally, it was not possible to produce the 5,000 litres of antiserum which are the annual objective of the Malakal laboratory. Actually, 4,767 litres (95,340 nominal "doses") were prepared. Furthermore, although the serum prepared in the first half of the season was of high potency, that from the later bleedings fell slightly below the required standard. In order to compensate for this, the dosage for field use had to be increased, with the ultimate effect that the year's output in terms of "doses" did not amount to more than 80,000 instead of the attempted 100,000.

There is no doubt that trypanosomiasis was entirely accountable for the diminution in serum potency, since grazing was plentiful and other conditions were favourable, including a plentiful supply of highly susceptible virus producers. Out of 300 serum producers, trypanosomes (*T. congolense* in every case) were actually seen in the blood of 52, while 30 others showed fairly unmistakable clinical symptoms. These cattle had to be retained because at that time of the year it would have been extremely difficult if not impossible to replace them. No trypanosomiasis was detected in the virus producers, which come from a special district.

A small series of experiments (see section on Research) showed that treatment with Antimosan (Bayer) would serve to reduce the losses; fairly intensive treatment would probably be necessary. It was found that too many accidents occurred when tartar emetic was given.

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The problem of trypanosomiasis calls for further consideration, but it must be remembered that its incidence is very variable, and while the past year at Malakal has been a bad one it may be in no way representative.

Anxiety continued for the health of the subordinate staff. Their quarters were mosquito-proofed, but nevertheless every laboratory attendant was sick at some time or other with malaria. This year again, as in 1933, they were, however, conveniently sick one at a time and the continuously threatened breakdown in work did not occur.

This section may be closed by repeating last year's observation that it is not at present advisable - in Malakal at any rate - to attempt a larger output of serum.

II. CONTAGIOUS BOVINE PLEURO-PNEUMONIA.

The demands for pleuro-pneumonia vaccine have been greater than in any earlier year. A total of 47,260 doses was issued as compared with 26,420 in 1933 and 31,200 in 1932 (hitherto the "record" year).

III. CONTROL OF CAMEL TRYPANOSOMIASIS.

The issue of materials for the diagnosis and treatment of camel trypanosomiasis has progressively increased from year to year since the mercuric chloride test for diagnosis and treatment by naganol have been adopted as routine procedures. In the years 1931-34 inclusive the issues of naganol have been 578, 990, 2,901 and 4,219 doses respectively, and issues of all associated materials have risen in proportion.

Most of the increased demand has come from non-official camel owners, whose camels are tested for infection and treated on the payment of a fee covering the cost of materials. In addition, however, 1934 has been characterised by an abnormally high incidence of camel trypanosomiasis in consequence of heavy and extensive rains in the camel areas. Officially owned camels have therefore been to some extent responsible for increased demands.

It has been the policy in 1934, as in the two immediately preceding years, to keep the treatment of infected camels entirely in the hands of European Veterinary Inspectors. From the research standpoint this policy has been retained in order to obtain large scale information on the efficiency of the single intravenous dose of four grammes of naganol which now constitutes the routine treatment.

This policy has been abundantly justified by the amount of reliable information obtained, not only as to the efficiency of the treatment in primary infections but also in regard to the duration of "immunity" following a cure. The period of "immunity" had already been shown by laboratory experiment to be of variable duration, but in any case relatively short. The occurrence of a "bad"

The problem of transportation is a very serious one, but it must be remembered that the railroad is very valuable and the government should not neglect it. It has been a long time since it was properly maintained.

Another question is the matter of the railroad. There are many things that are being done, but it is not enough. The government should do more to improve the railroad and make it more efficient. It is a very important part of the country's infrastructure.

This section may be closed by repeating the same question and it is not at present available. It is a matter of fact that the railroad is not at present available. It is a matter of fact that the railroad is not at present available.

II. CONTAGIOUS DISEASE PREVENTION

The danger for contagious diseases is a very serious one. It is a matter of fact that the disease is not at present available. It is a matter of fact that the disease is not at present available. It is a matter of fact that the disease is not at present available.

III. CONTROL OF CANAL TRAFFIC

The issue of control of canal traffic is a very serious one. It is a matter of fact that the canal is not at present available. It is a matter of fact that the canal is not at present available. It is a matter of fact that the canal is not at present available.

Most of the increased demand has been for the canal. It is a matter of fact that the canal is not at present available. It is a matter of fact that the canal is not at present available. It is a matter of fact that the canal is not at present available.

It has been the policy of the government to keep the canal open. It is a matter of fact that the canal is not at present available. It is a matter of fact that the canal is not at present available. It is a matter of fact that the canal is not at present available.

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season, in the sense that camels under field conditions were exposed to infection over unusually long periods, has facilitated the collection of a large amount of additional information. This cannot at present be assessed with great precision, since conditions have made it necessary to continue observations into the early months of 1935. It can, however, be provisionally concluded that while the single four gramme dose is undoubtedly of very high efficacy in the treatment of primary infections, the period of "immunity" following the use of so small a dose is in general so short that in "bad" years - in the above mentioned sense - the re-infection rate may be unpleasantly high.

The general conclusion at present is that the single four gramme injection is sufficient as a standard routine dose; there appears to be no need to increase it but, as rare relapses almost certainly occur, there is, conversely, no indication that attempts should be made to investigate the possibility of reducing it.

A second objective in retaining the treatment in the hands of Veterinary Inspectors has been to obtain the confidence of native camel owners, especially in areas in which little treatment on payment has been practised. This matter does not directly concern the Laboratory, and does not call for discussion in this Report.

IV. EXAMINATION OF SPECIMENS.

There has been a slight increase in the number of specimens submitted for diagnosis, 452 having been received as compared with 423 in 1932 and 447 in 1933. These numbers are of spontaneously submitted specimens, and are exclusive both of special material sent by field officers working in cooperation with the Laboratory and of material originating in the Laboratory in connection with research. The Malakal laboratory examines specimens for the Upper Nile, and these are also not included in the foregoing total.

As usual, most of these specimens have been of no particular interest; a few, however, are worthy of mention.

1. Cryptococcus infections.

The year has produced its crop of unusual cases, the most interesting being as follows :-

- (a) A horse recorded in last year's report as being still under observation (case d, p.24). The horse showed intermittent watery and purulent nasal discharge, in both types of which cryptococci were occasionally to be found. The horse was kept under observation, and apart from the foregoing symptom remained normal and in good conditions for three and a half months before being finally destroyed. On post mortem examination (at the Malakal laboratory, carried out by Messrs Evans and Glanville) no lesion of any kind was discovered.

Smears for microscopic examination were made from all the head cavities, the nostrils, trachea, lungs, and associated lymph glands. No cryptococci were detected except in smears from the mucous membrane of the posterior (ventral) meatus. This case is remarkable for at least four features, namely (i) the intermittent nature of the discharge, (ii) the fact that the discharge was sometimes watery and sometimes purulent, (iii) the occasional presence of cryptococci in both types of discharge, and (iv) the fact that no lesion could be detected on post mortem examination, although destruction was delayed for three and a half months.

- (b)-(h) Seven cases at various times during the year in which infection was limited to the lachrymal gland or associated tissues.
- (j) A case of primary cryptococcus pneumonia.

Apart from the foregoing, only 35 cases of epizootic lymphangitis were detected.

2. Trypanosomiasis

The year's specimens differed in no material way from the average. T. congolense was found in horses and cattle in Southern Kordofan, Upper Nile, Fung, and White Nile, while T. vivax in cattle was found in Kordofan and Kassala.

A few more blood films than usual were sent in for examination, and a few more cases of trypanosomiasis than usual were detected. It is, however, doubtful whether the year was one of abnormally heavy infection with tse-tse borne trypanosomes.

3. Anthrax

A single outbreak of bovine anthrax, in which two positive diagnoses were made, occurred at Um Dereisa on the Kassala side of the River Rahad. As has been noted in earlier reports, occasional cases of Anthrax come to notice in various parts of the Sudan, but the disease appears not to be common.

4. Undulant Fever.

It is known that undulant fever exists in the Sudan, and Br. melitensis has been isolated from human patients. Until this year no evidence of goat infection has been found. In 1934 one sample of goat serum of high agglutinating titre was received, and in being the first of its kind is at least worthy of placing on record.

General for microscopic examination were made from all the head cavities, the middle ear, the nasal cavity, and associated lymph glands. No cryptococci were detected except in material from the mucous membrane of the posterior (ventral) nostril. This cavity is sometimes the site of local lesions. (i) The latter nature of the discharge, (ii) the fact that discharge was sometimes watery and sometimes purulent, (iii) the occasional presence of cryptococci in both types of discharge, and (iv) the fact that no lesion could be detected on post mortem examination, although the infection was detected for three and a half months.

(b)-(2) Seven cases at various times during the year in which infection was limited to the lacrimal gland or associated tissues.

(1) A case of primary cryptococcal pneumonia.

Apart from the foregoing, only 15 cases of cryptococcal lymphangitis were detected.

3. Cryptococcal pneumonia

The year's specimens, divided in no special way from the average. *Cryptococcus* was found in horses and cattle in Northern Rhodesia, Upper Nile, Tanganyika, and other parts of Africa and India.

A few more blood films than usual were made for examination, and a few more cases of cryptococcal pneumonia were detected. It is, however, doubtful whether the year was one of abnormally heavy infection with the *Cryptococcus*.

4. Antibody

A single outbreak of positive antibody, in which two positive diagnoses were made, occurred at the B. V. S. on the Kaimosi side of the River Tana. As has been noted in earlier reports, occasional cases of antibody come to notice in various parts of the Union, but the disease appears not to be common.

5. Unilateral fever

It is known that unilateral fever exists in the Sudan, and in the Sudan has been isolated from human patients. Until this year no evidence of such infection has been found. In 1935 one sample of goat serum of high agglutinating value was received, and in being the first of the kind since 1925 worthy of placing on record.

5. Actinomyces pneumonia.

A species of actinomyces in pure culture was found in smears from the lung of a mule which died of pneumonia in Gedaref. Since only smears and preserved tissue were available, the species could not be identified.

6. Bacterial necrosis.

This is another world-wide infection which has not hitherto been recorded in the Sudan. In 1934 smears of pus from a liver abscess in a bull was sent from the Upper Nile Province. Actinomyces necrophorus was present in a state of purity. It is probable that such infections are not really rare in the Sudan but this case is the first one to be recorded.

7. Sporotrichosis.

A case was diagnosed in a septic condition of the skin of a camel. This constitutes another first record in the Sudan of a not infrequent and almost ubiquitous infection. Hitherto in this country sporotrichosis has not been recorded either in camels or in other animals. The present case was diagnosed from pus smears, and the species of sporotrichon has not been culturally identified.

8. Lingatula serrata.

A case of infection of a bull's liver with larvae of this parasite was received from El Obeid. This again is a first case in the Sudan.

9. Cysticercus bovis.

Although Taenia saginata is of world-wide distribution, and occurs in the Sudan, it is noteworthy that not a single case of Cysticercus bovis infestation has previously been recorded in this country. In 1934 the first case was detected, and this had the merit of being found in a very unusual position. It occurred in an ox slaughtered for meat. Numerous cysticerci were present in the liver, but the head muscles - and in fact all other muscles and organs - were entirely free from parasites.

10. Miscellaneous.

In addition to the foregoing, the following diagnoses have been made :-

Horses : Ulcerative lymphangitis, piroplasmosis (*B. caballi*), ringworm and various septic infections.

Mules : Various septic infections, including streptococcic septicaemia.

Spontaneous abortion

A species of abortion is quite common in the early stages of pregnancy. It is usually due to the loss of the embryo or to the loss of the placenta. It is usually accompanied by pain and bleeding. It is usually followed by a period of rest and recovery.

Spontaneous abortion

This is another form of abortion. It is usually due to the loss of the embryo or to the loss of the placenta. It is usually accompanied by pain and bleeding. It is usually followed by a period of rest and recovery.

Spontaneous abortion

A case was diagnosed in a patient who had a history of a miscarriage. The patient was found to have a miscarriage. The patient was found to have a miscarriage. The patient was found to have a miscarriage.

Spontaneous abortion

A case of infection of a child's liver was reported. The patient was found to have a liver infection. The patient was found to have a liver infection. The patient was found to have a liver infection.

Spontaneous abortion

Although the patient was found to have a liver infection, it is not clear whether the infection was the cause of the abortion. The patient was found to have a liver infection. The patient was found to have a liver infection. The patient was found to have a liver infection.

Spontaneous abortion

In addition to the foregoing, the following cases have been reported:

- 1. A case of spontaneous abortion in a patient who had a history of a miscarriage.
- 2. A case of spontaneous abortion in a patient who had a history of a miscarriage.
- 3. A case of spontaneous abortion in a patient who had a history of a miscarriage.

Donkeys	:	Blood filariasis and septic infections.
Cattle	:	Anaplasmosis, piroplasmosis, theileriosis.
Camels	:	Trypanosomiasis (<u>T.evansi</u> type), septic pneumonia due to <u>Corynebacteria</u> .
Jackal	:	Multiple sarcoma of lung.
Bustard	:	Haemoproteus infection (fatal).
Domestic Fowls	}}	Spirochaetosis.

C. RESEARCH.

Such research as has been possible has been almost entirely confined to the most important disease in this country, namely cattle plague, although small scale experiments have also been carried out on trypanosomiasis, i.e. other than camel trypanosomiasis which has already been discussed.

I. CATTLE PLAGUE

Owing to the splitting up of the Laboratory into two parts, which has been necessary in order to produce cattle plague antiserum, research is also split up. In so far as cattle plague research is concerned, the Malakal laboratory, which produces cattle plague antiserum, carries out such research as is possible on the technique of serum preparation; other features (at present vaccine preparation) are studied in Khartoum. This procedure is not ideal, but is rendered inevitable by local conditions. Work carried out in 1934 has been as follows :-

Cattle Plague Antiserum.

It has been mentioned in earlier Reports that cattle plague antiserum for routine use is at present prepared by intramuscular hyperimmunisation at the highest rate that local cattle will withstand. The problem under consideration is to ascertain whether this maximal rate of hyperimmunisation can be reduced, and if so to what degree.

In 1932 attempts were made to reduce the intensity of hyperimmunisation by retaining the maximum tolerated dose and prolonging the interval between doses. It was recorded in this Report for that year that no great success attended the efforts. In 1934 the alternative way of reducing the intensity has been studied, i.e. reduction of the size of hyperimmunising doses of virus while retaining the minimum practicable interval. The results were approximately the same as those in the first series of experiments, in that by this method also no great reduction in intensity of hyperimmunisation seems practicable. It is, however, possible that some slight reduction may ultimately be found possible.

II. TRYPANOSOMIASIS

Bovine T. congolense.

If there is any form of animal trypanosomiasis that can still be regarded seriously in the Sudan it is T. congolense infection in cattle. During 1934 several cases occurred among the serum producing cattle at Malakal and the opportunity was taken to make a preliminary study of the value of "Antimosan" (Bayer) as a therapeutic agent. As these experiments were of a preliminary nature, every precision was not aimed at in carrying them out.

The main objective was not so much to consider the possibility of complete cure as to ascertain whether, by Antimosan treatment, it would be an economic procedure to treat infected serum producers. It is recommended by the manufacturers that Antimosan be given as a course of five injections of the solution at the rate of 10 c.c. per hundredweight at weekly intervals. The minimum recommended dose is 40 c.c.

At Malakal 27 cattle, diagnosed by microscopic examination of the blood as infected with T. congolense were treated with Antimosan, and several others left as controls. Of the 27 treated beasts 20 were given a "full course" of five injections and seven were given three doses only, the dose in all cases being the minimum recommended (40 c.c.) although the weight of the cattle averaged 700-800 lb.

As it was not practicable to check apparent cures by injecting blood into experimental animals, blood examination was largely disregarded, and the criterion of benefit from the treatment was the manner in which the cattle withstood routine hyperimmunisation and bleeding.

The results were as definite as could be expected in such a roughly designed experiment. All cattle receiving five injections improved in condition and half of them maintained the improvement; the other half, however, gradually relapsed. None of the beasts receiving three injections showed any improvement whatsoever.

It is intended to study this drug with more precision when opportunity arises.

Equine T. congolense.

One natural case of this disease has been available for treatment and was treated with the Bayer preparation "Surfen C". The makers suggest that this drug (which is supplied in a 2.5 per cent. solution) be injected intramuscularly. It was, however, thought advisable to confirm this. A naturally infected horse, with T. congolense visible in the blood and transmissible to small animals, was treated, the proposed dose being 100 c.c. of the solution. After slow intravenous injection of half this volume the horse collapsed, but recovered after a short time; the full dose was not given. A few days later a full 100 c.c. was given in the form of two subcutaneous injections of 50 c.c. each on either side

Experimental Typhoid Fever

It is well known that typhoid fever is caused by the bacterium *Salmonella typhi*. The disease is characterized by a prolonged fever, headache, and a characteristic rash. The incubation period is usually 1-2 weeks. The disease is most common in warm climates and is often spread by contaminated food and water.

The aim of this experiment was to determine the effect of typhoid fever on the body's temperature. The experiment was conducted on a group of 10 healthy subjects. Each subject was given a known quantity of *Salmonella typhi* bacteria. The temperature of the subjects was recorded at regular intervals over a period of 14 days.

At the end of the experiment, it was found that the subjects who had been infected with typhoid fever showed a significant increase in their body temperature. The average temperature of the infected subjects was 101.5°F, while the average temperature of the control group was 98.6°F. This result is in agreement with the findings of other experiments on typhoid fever.

As it was not possible to check the temperature of the subjects at regular intervals, the results of this experiment are not as accurate as those of other experiments. However, the results do show that typhoid fever causes a significant increase in body temperature.

The results of this experiment are in agreement with the findings of other experiments on typhoid fever. The results show that typhoid fever causes a significant increase in body temperature. This is due to the fact that the bacteria cause the body to produce more heat.

It is intended to study this fever with more precision when opportunity arises.

Saline T. Congestion

One natural cause of this disease has been attributed to the bacteria *Salmonella typhi*. The bacteria are spread by contaminated food and water. The disease is most common in warm climates and is often spread by contaminated food and water. The incubation period is usually 1-2 weeks. The disease is characterized by a prolonged fever, headache, and a characteristic rash. The aim of this experiment was to determine the effect of typhoid fever on the body's temperature. The experiment was conducted on a group of 10 healthy subjects. Each subject was given a known quantity of *Salmonella typhi* bacteria. The temperature of the subjects was recorded at regular intervals over a period of 14 days. At the end of the experiment, it was found that the subjects who had been infected with typhoid fever showed a significant increase in their body temperature. The average temperature of the infected subjects was 101.5°F, while the average temperature of the control group was 98.6°F. This result is in agreement with the findings of other experiments on typhoid fever.

of the neck. Large swellings developed, which were ultimately opened in my absence although they would probably have resolved spontaneously. The trypanosome infection was completely cleared up; the horse recovered condition, no trypanosomes were thereafter seen in the blood, and small animal sub-inoculations after intervals of one, two and three months were negative in result.

While admitting the danger of drawing anything in the nature of general conclusions from a single case, the foregoing observations permit of at least two tentative ones, namely, that the intravenous and sub-cutaneous routes of injection are unsuitable, and that for the treatment of T. congolense in the horse Surfen C should be given a serious and extended trial.

D. PUBLICATIONS

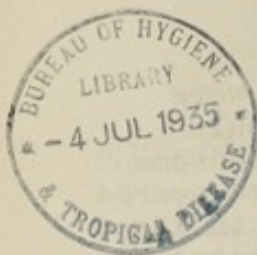
Two papers were published during the year :-

1. BENNETT, S.C.J. and EVANS, J.T.R. - Cattle Plague Antiserum prepared by Intraruminal Hyperimmunisation. Jour. Comp. Path. & Therap., 1934, Vol.47, pp.87-93.
2. BENNETT, S.C.J. - "Immune" and "Hyperimmune" Cattle Plague Antiserum. Jour. Comp. Path. & Therap., 1934, Vol.47, pp.163-180.

Khartoum,
30-1-1935

SAM.

(Signed) S.C.J. Bennett
VETERINARY RESEARCH OFFICER



of the neck. Large swellings developed, which
ultimately opened in my abdomen although they
probably have resolved spontaneously. The
infection was completely cleared up. The
condition, no symptoms were characterized as
blood, and small animal and insect bites
of one, two and three months were negative in results.

While admitting the danger of drawing conclusions
the nature of general conclusions from a single case,
the foregoing observations permit of at least two
tentative ones, namely, that the incubation and
outbreaks of infection are unusual, and that
for the treatment of *T. conjunctum* in the human subject
should be given a serious and extended trial.

D. PUBLICATIONS

Two papers were published during the past year:

1. BARNETT, S. C. J. and SWAIN, D. T. J. - *Coccidia*
Plasmodium and *Leishmania* prepared by International
Hypodermatidiosis. Jour. Comp. Path.,
Thames, 1934, Vol. 47, pp. 5-7.
2. BARNETT, S. C. J. - "Tumors" and "Hypodermatidiosis"
Gallus Gallus and *Leishmania*. Jour. Comp. Path.,
Thames, 1934, Vol. 47, pp. 10-12.

INTERNATIONAL
10-1-1935
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