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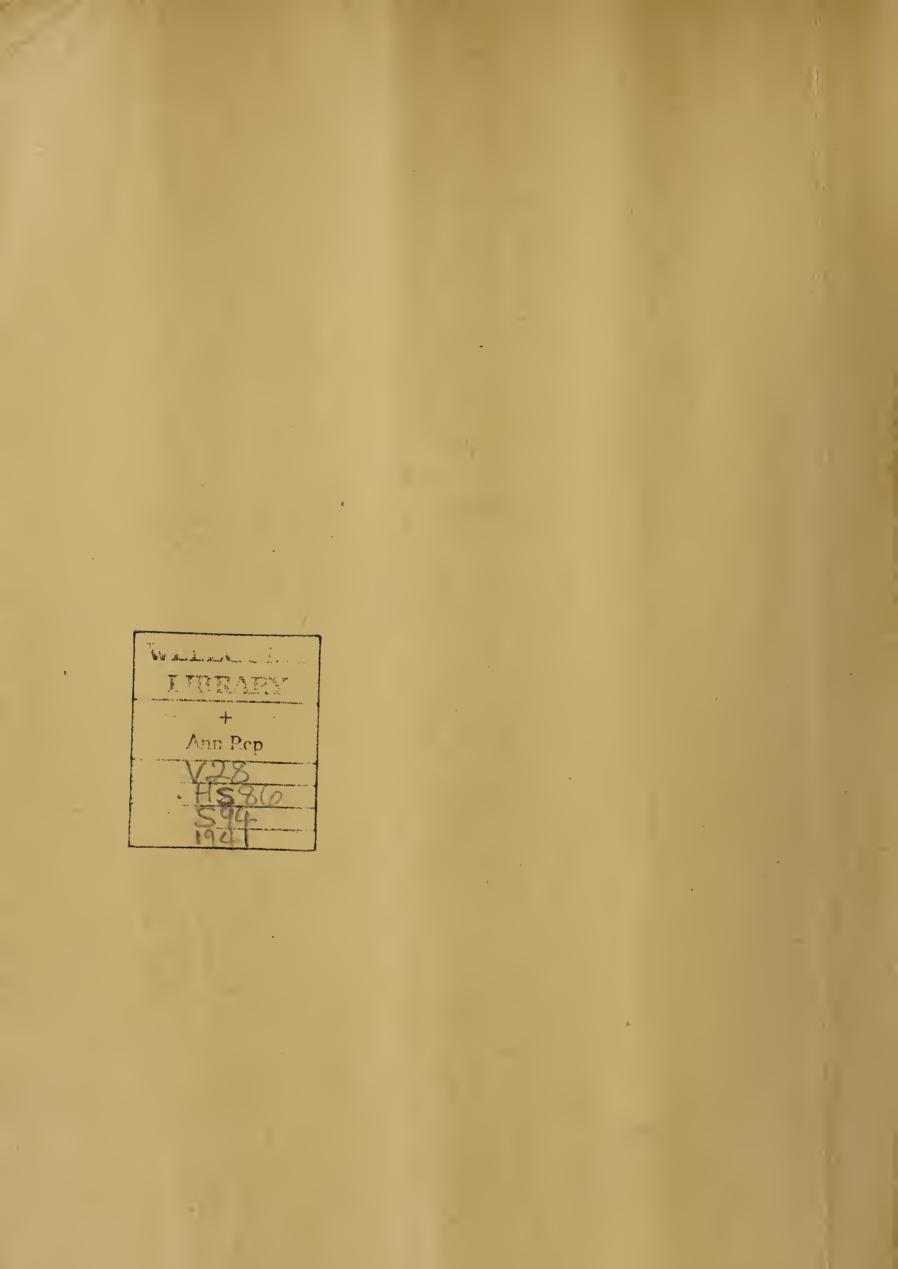
ANNUAL REPORT

OF THE

SUDAN VETERINARY SERVICE

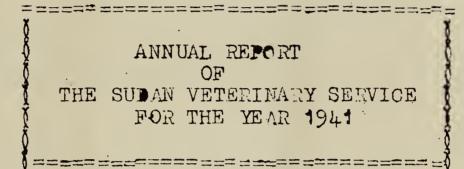
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Report of the Senior Research Officer.	=======================================

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STAFF.

DISTRIBUTION OF BRITISH STAFF AS ON 31ST. DECEMBER, 1941.

		E M A M	:	designation	•	Station
	Lie	ut.Colonel C.P.Fisher M.R.C.V.S.	•	Director	9 •	Khartoum
	Dr.	S.C.J. Bennett, B.Sc. M.R.C.V.S.	6	Asst. Director and Senicr Research Officer	:	Khar toum
	91,	tain T.Menzies, M.R.C.V.S. D.V.S.M.(Vict)		Senior Veterinary Inspector	a J	El Obeld
	⊾aj	or L.E.Prichard, O.F.Z., M.R.C.V.S.	L #	a	\$	Wad Medani
	Mr.	J.T. RLaPvens, B.SEIC. 7. M.R.C.V.S.	ر		•	Malakal
	Mr.•	W.H.Glanville, M.R.C.V.S		Senior Veterinary Inspector, Head- quarters, and Regis- trar Vet. School		Khartoum
	Mr.	J.E. Furney, M.R.C. V.S.	;	Veterinary Inspector	•	Wad Medani
x	Mr.	I.A.Gillespie,M.R.C.V.S.	•	11 11		
	Mr.	A.W. Chalmers, M.R.C.V.S.		11 · · · · · · · · · · · · · · · · · ·	:	Khartoum
x	Mr.	P.Durran, M.R.C.V.S.	•	3 8 H	•	\$
x	Mr.	J.D.M. Jack, M.R.C.V.S.	:	11 (1	:	
X	Mr.	J.K. Thomson, M.R.C.V.S.	:	a ii	•	
	Mr.	P.Z.Mackenzie, M.R.C.V S.	с • •	ти в	6 •	El Fasher
	Mr.	H.A. McLoghry	:	Superintendent	°. ●	Khartoum
	Mr.	P.A.C. Kenny		Laboratory Assistant	•	Khartoum
	Mr.	C.B.Barrett	1	Chief Storekeeper	°*	Khar to um
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- Head Clerk. 1
- · 8 Clerks.
 - Book-Keepers. 2
 - Sarraf. 1
 - Store-Reoper. ŧ
 - 12 Huad Stockaon.
 - Southern Supervisor. 1
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UNCLASSIFI D STAR AS AT 91.12.191:-

- 64 Stockmen.
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- 71 Voterinary Attondants.
 - Shocing Saitas. 4
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In addition to the above there are large numbers of Tribal Voterinery lotainers, chiefly in the Native Administrations, who are supervised by Province Veterinary Inspectors.

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1941 was the war year for the Sudan and military considerations and requirements out-weigher all else. The East African campaign was fought and won, and, although the back of enemy resistance was broken at Keren in the end of March, nothing approaching normal conditions was even in sight at the end of the year.

Five Veterinary Inspectors remain commissioned in the S.D.F. and no new appointments were made.

Early in the year it was decided to organize part of the Service on a military basis so as to utilize local knowledge and experience in a military capacity.

The military veterinary and remount organization is the responsibility of the D.D.V. & R.S., Middle East, who,after a visit to the Sudan, and consultations with the military authorities and the Director, Sudan Civil Veterinary Service, recommended that the veterinary service for the forces in the Sudan should be directed by the existing civil veterinary authority, suitably commissioned for the purpose.

To effect this the Director and Assistant Director were commissioned, both in the British Army and in the S.D.F., and appointed A.D.V. & R.S. and D.A.D.V. & R.S., Troops in the Sudan.

In January, R.A.V.C. reinforcements, which included three Officers, a Veterinary Evacuation Station, and an Advance Base Veterinary Depot, arrived from Egypt. After the fall of Keren and the withdrawal of certain animal units these reinforcements were returned to Middle East.

Towards the end of the year the administration lost a very valued servant in Mr. H.A.MeLoghry. He had held the responsible position of Superintendant for twelve years and, in all, had spont twenty-two years in the service. His work was always of the highest order and he made a valuable contribution to our knowledge of peultry husbandry in a publication which has become an authoritative work of reference for all matters pertaining to the keeping of peultry in the Sudan.

He rotired on pontion, having reached the required age, and was succeeded by Mr. J. McKay.

The three graduates of the Kharteum Veterinary Scheel were absorbed into the service as Veterinary Officers. They are the first fruits of this institution which gives a three years' special course fellowing a two years' science course, all of which is post-secondary education

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Mr. C.B.Barrett retired on pension in November. He had held the post of storekeeper since 1927. The post of Storekeeper has been abolished and a new post of Assistant Superintendant has been created which includes storekeeping. Mr.G.M. Anderson has been selected to fill the new post.

Mr. P.A.C.Kenny, Laboratory Assistant, went on final leave, pending retirement on pension after 18 years service. The Senior Research Officer expresses appreciation of his work in his report.

SECTION I.

DISEASES OF ANIMALS.

1. DISEASES OF CATTLE.

Cattle Plague.

The disease although wides, read was less in incidence than is usual.

The war situation has affected even cattle plague. Cattle which formerly were of no economic value and remained beyond the orbit of veterinary activities have now suddenly acquired a new importance. Small traders seek them out for purchase, for trade is good, and sconer or later they come under a trade control which means vaccination and immunity. In this way the increased volume of trade may be considered to have had a salutary sterilizing effect.

Although movements of trade cattle on-the-hoof have been greatly increased in all directions the number of outbreaks of cattle plague has been less, and in the quarantine parks, where about 3,000 head of vaccinated cattle are dealt with each month, not one single ease of this disease appeared.

Cattle Plague can be subjected to a 100%

control wherever the beast becomes of sufficient value to make it worth while. .

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PROVINCL	: Out- : :breaks :		Deaths	: Scruhized:	Vaccinated.
Kerdafan,	: 225 :	45 ,0 25	697	26,737	11,000
Darfur.	74	39,912	992	19,550	3,634
Gozira.	634	149,515	3,0 68	53,395	2,286
Northorn	9	6,753	95		6,590
Upp.Nilc	5	1,508	16	313	856
Khartoun	: 3	277	17	242	55
Kassala.	82	21,669	363	7,108	1,034
Total	• 1,032:	264,659	: 5,248	: 107,345:	25,455

The following is a summary of the cattle plague control work during the year :-

In addition to that used at the actual seat of cutbreaks, approximately fifty thousand 20 c.c. deses of vaccine were used for the protection of trade cattle travelling along the trade routes on their way to Egypt.

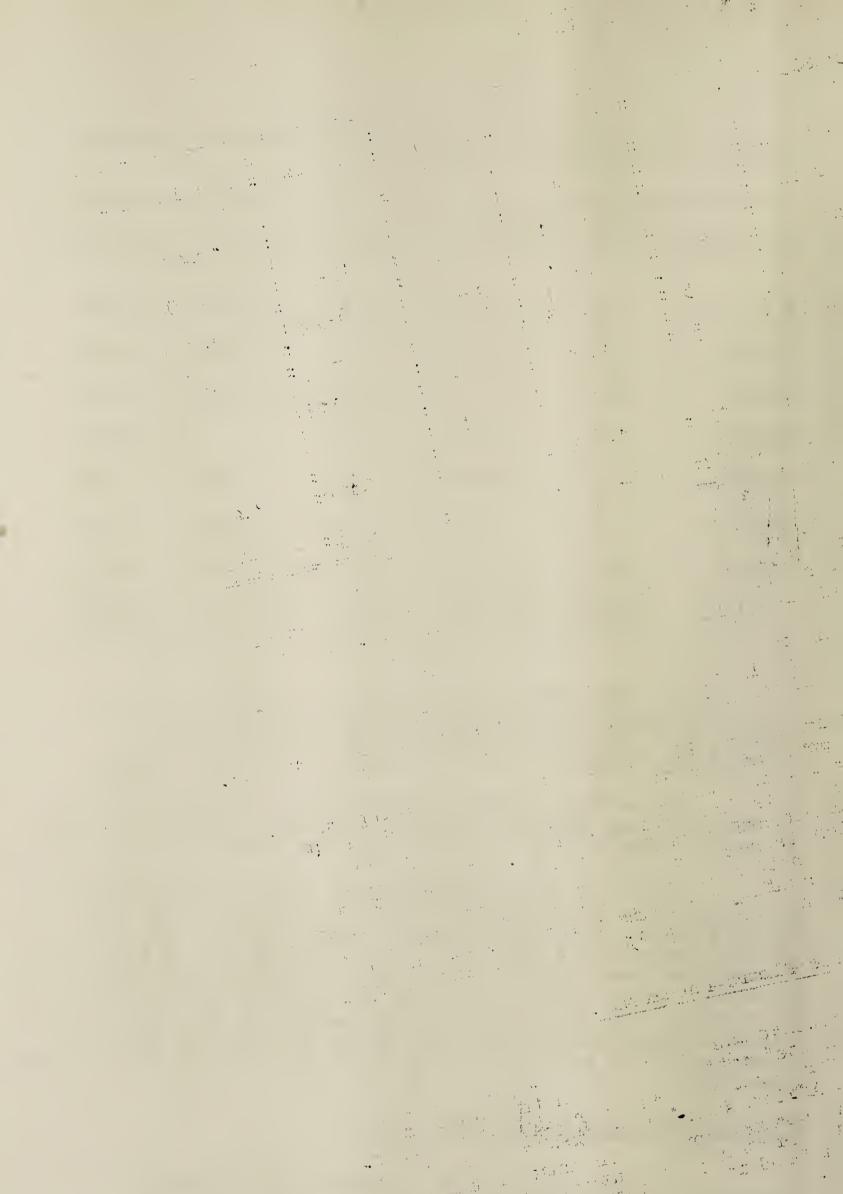
The total cutput of vaccine from the laboratories at Khartoun and Malakal amounted to 201,036 desce of 10 c.c.: a notable achievement and far in excess of any previous effort.

There are still difficulties in precuring sufficient large serum producing cattle from the natives of the Upper Nile Province, where the serum is manufactured, and about 20% of the requirements have still to be imported from Equatoria. Perhaps the penetration of Arab cattle traders into this pagan prevince, which is new permitted for the first time, will in time awaken the native to a consciousness of the need of other things besides cattle; from his point of view one does not know whether to hepe so or not; from our point of view we want his cattle.

Contagicus Bevine Pleuro-Pneusenia.

The incidence was everywhere low and chiefly

confined to merchants' cattle bought in the west and destined either for local slaughter or expert to Egypt. French Equatorial Africa seens to be the source of our infection, for the disease appears in many of the cattle imported from that territory, and outbreaks in the Sudan are very largely confined to the districts traversed by these French cattle.





those amongst trade cattle :-							
PROVINCE	No. of Outbreaks	No. Infected	Deaths	Vaccinated.			
Kordofan	54	7,216	120	6,172			
Darfur.	21	12,603	<u>98</u>	7,746			
Gezira.	6 '''	557	10	: 553			
Northern.	1 	, , , ,	•	с			
Upper Nile.	8	: 1,698	: 18	1,551			
Khartoum.			• •	e • · · · · · · · · · · · · · · · · · · ·			
Kassala:	7	2,12*	: 55	2,055			
Total	96	: 24,195	: 299	: 18,117			
		المسالم المراد فالمريب المتحمد بيبا المرا					

The icllowing table shows outbreaks other than

Including the trade cattle 74,050 doses of vaccine were used during the year as against 39,685 in the previous year.

Foot & Mouth Discase.

Not reported. When next it makes its appearance it is not likely to receive the same amount of consideration as formerly. It is unlikely that this mild and slow spreading African disease will be allowed to interfere with the supply of such an important item of war requirements as meat

In peace time an outbreak of foot-and-mouth and a complete cossation of the trade for expert to Egypt meant a complete cossation of the trade for months. The Egyptian Authorities are being asked to relax their restrictions in view of the urgency of the case and the particular characters of the disease in Africa, and to be satisfied with such safeguards as are already in operation in the case of such diseases as Contrgicus Boyine Pleuro-Pneumonia.

Anthrax.

One shall outbreak involving four cattle occurred

at Khartoum North.

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DISEASES OF CAMELS.

Trypanesoniasis.

Approximately 18,000 deses of antrypol were used during the year, mostly on payment for native-ewned camels at 25 P.T. (5/.) a desc.

Infection is practically certain if canels leave their northern grazing grounds and are made to work in districts where the rainfall gees beyond about 12 inches.

Strongylesis.

Common in the Gezira Province but not important as long as the animal remains in good condition. The nicotine sulphate treatment is effective.

DISEASE OF EQUINES.

Herse Sickness.

Vaccination continues to be a routine practice for any and police horses and mules. The results are very satisfactory and enable operations to be carried out by units mounted on these animals in districts where, previous to the use of vaccine, the mortality hight have been so high as to immobilise the greater part of the force.

3,674 army animals were vaccinated. Seventy deaths from herse-sickness were reported amongst these animals, but it is at least doubtful if in many cases it really was African Herse-Sickness. To the experienced cyc the clinical symptoms and pest mortem appearances were far from typical of the disease as it is usually seen in this part of Africa. Hewever, the deaths decurred from some seeningly virus infection and even if they are all accepted as due to African Herse-Sickness the statement that the vaccine continues to give satisfaction still holds good.

The matter is discussed by the Senier Research Officer in his report which follows.

Epizoctic Lymphangitis.

Fairly widespread, especially in the Eastern Sudan. During the year 43 affected army herses and mules were destroyed.

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It is not regarded as a serious disease, except for the individual concerned for, as a policy, all affected animals are destroyed; from a military point of view it is of minor importance.

DISEASES OF CANINES.

Rabies.

Of the 123 specimens submitted to the Stack Medical Research Laboratories for diagnosis 36 were returned as positive: distribution was as follows :-

	Dogs	:	Camels	:	Donkeys	:	Cats.
:	13	:	1	:	na ana na	:	
	10	:	3	:	1	:	-
	5	:	-	:	-	:	-
	2	:	-	:	-	:	7
	.1	:	-	:	-	:	
	1	•	-	:	-	;	
	32	:	2	:	1	:	1
		10 5 2 1	10 5 2 1	10 9 5 - 2 - 1 - 1 -	10 1 5 - 2 - 1 - 1 -	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

SECTION .II.

1. TRADE IN LIVE STOCK AND LIVE STOCK PRODUCTS.

Cattle.

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The total exports of cattle were 29,131, an increase of 18,086 over the previous year. This increase was expected in view of the extra demands in the Middle East Area. A further increase is expected in the coming year

The increased demand in Egypt acted as a strong stimulant to the Sudan traders and there was a general rush to get hold of cattle at any price; so much so, that prices at the source were forced up to six and seven pounds a head where normally they were two and three.

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A good deal of senseless competitive hidding took place amongst small traders, who thought they saw in the situation an easy way of getting rich quickly on a rising market. To frustrate these activities, and in order to institute a form of price control, the Controller-General of War Supply stepped in and restricted the issue of export licences for cattle and sheep to the larger concerns who had been engaged in the export trade previous to the outbreak of war.

This had a steadying affect on the whole trade and the smaller traders resumed their normal function of collecting cattle and sheep in the outlying districts.

The entry of Japan into the war in early December gave the trade a new importance; for now the Sudan became the sole external source of meat supply for the Midale East Area, Australia and New Sealand for the moment dropping out.

Demands were immediately increased and the Army asked for the output to be stepped-up to 5,000 cattle and 15,000 sheep a month. Furthermore, arrangements were made for the Army to take over the entire output at Shellal at a price per kilo, live weight. The price agreed to was 25 millienes ($b \neq d$), per kilo, for cattle, and 50 millienes ($12\frac{1}{2}$ d) for sheep.

These prices are fixed as ceiling prices and may be lowered at any time. No contractors exist, for the supply is always greaterthan the quantities which can be carried on the railway and river transport systems; in such circumstances, where supply exceeds demand, contracts are to be avoided; the best is rarely supplied under contract and it is difficult to get rid of a bad contractor until his term is finished.

The benefit of having a fixed maximum price at Shellal is reflected right back to the source.

The trade is entirely controlled by this Service, even to the extent of receiving, on behalf of the traders, payment from the Army for the stock delivered.

Another attempt to get cattle from the Southern Sudan was made towards the end of the year

Contrary to previous policy, northern traders were given permits to enter Equatoria and Upper Nile Ptovinces. The trade will take some time to develop, but buyers anticipate, that by using the local merchants as collectors, and provided they are given a free hand in the matter of prices, they will succeed in exporting cattle in fair numbers; the fixed price at Shellal is a safeguard against prices going too high at the source.

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The getting of the cattle to rail-head is the most difficult part of this venture. No river transport is available and it becomes a matter of crossing wide, waterless tracts, on-the-hoof. A survey of possible routes is being made and the boring of some wells may have to be undertaken.

Sheep:-

The total export of sheep, 62,474, shows an increase of 22,879 over the previous year.

Most of sheep come from northern Kordofan, and while the road to Omdurman remains open this district is capable of meeting the demand. During the dry season, from March to June, other sources may have to be drawn upon, particularly Kassala Province.

The resources of the country in sheep are very great and much benefit should accrue from getting rid of the surplus population. Here again, transport to rail-head during the dry season is the difficulty; it is a problem which can best be solved by the traders themselves.

The small, fat, White Nile sheep can walk to rail-head at Kosti at any time of the year, and although, hitherto, they have never been exported, being smaller than the northern sheep, they may now be called upon to play a part in war supply during the dry season when the northern sheep have difficulty getting to rail-head in their accustomed numbers.

The price of 50 millienes $(12\frac{1}{2} d)$ per kilo, live weight, at Shellal is generous and should ensure a continuous supply. The figure may be lowered later on when the habit of selling has become established and the supply assured.

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B. Number of cattle imported during the past three years :-

b	· · · · · · · · · · · · · · · · · · ·	•	
1935	• • • •		2,473
1940		• • • •	3,386
1941	• • • • •	÷ • • •	5,434

<u>Camels</u>:-

It is anticiapted that the export of camels to Egypt will greatly increase during the coming year on account of the shortage of meat in that country.

It is estimated that 100,000 went to Egypt by road in 1941 : precise figures are not evailable.

Clarified Butter.

Clarified butter was again produced in the Bagara district of southern Darfur, but there was a fulling-off as compared with the previous year: 240 Kantars (1 Kuntar = 100 lbs) as against 293; and this in spite of the fact that five creameries were operated instead of four.

The province veterinery inspector reports that "none of the five units were ever working at enything like full pressure" on account of the shortage of milk.

It would seem that when the price of native semm is high, as it is at present, many of the people prefer to make seem with their surplus milk rather than go to the trouble of bringing it to the creamery. A bottle of semm is a much easier thing to carry to market on your badd than its equivalent in fresh milk - about 22 lbs weight.

The retail price of clarified butter rose from 150 P.T. to 206 P.T. a tin (36 1bs).

Somn.

266,109 Kilos of native mode semn, being a total value of CE.15,832, were exported in 1941.

These figures are far below normal; in 1940, 840,673 Kilos, valued at £E.46,795, were exported

Hides and Skins.

Advantage is taken of the facilities offered at the laboratory at Malakal where the country's supply of anti-rinderpest serum is made, for giving instruction to

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tribesmen in flaying nides. It is hoped that in this way, in spite of the bewildering effects on the native of market fluctuations, better hides will eventually be prepared.

Tonj and Aweil districts of Equatoria Province continue to supply well prepared hides. The same can be said for Bor district of the Upper Nile Province. An essential factor in the improvement of these hides is the personal interest which the District Commissioners take in the trade and the results achieved in these three districts are very creditable.

Towards the end of the year there was a sharp rise in the value of hides and skins.

Exports and values for the past two years were as follows :-

	Kil	Vaj	ue	Price per ton				
	1/40	. 1941	1940	1941	: 1940	: 1941		
Hides.	1,265,501	2,870,393	£. 65,264:	£. 206,460	£. 51.5	: 29. : 71.9		
Sheep skins.	665,907	674,301	41.397	43,764	62.1	64.9		
Goat skins.	132,321	97,786:	14,149	7,579	107.0	: 77.5		

The following are the weight and value of the dried hides prepared at the Veterinary Laboratories during 1941 :-

Weight in okes.	Price per oke.					
5,850	104 m/ms.					
$\&E.1 = \pounds.1 - 0 - 6.$	1 Oke = 2.75 lbs.					

INTERNAL TRADE.

The number of animals slaughtered for food as compared with the two previous years is shown below :-

Year	====:	camels	:	Cattle	:	sdeep	=== ;	:====	Go at s.
1939						190,791			E;430

$$1940$$
 $2,350$ $23,986$ $183,439$ $8,853$ 1941 $2,767$ $38,895$ $200,661$ $21,792$

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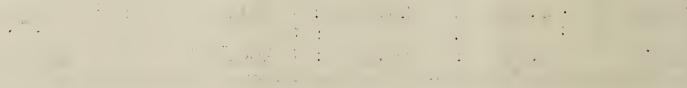
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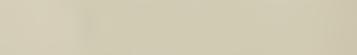
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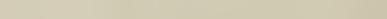
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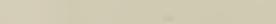
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SECTION III.

- 12 -

IMPROVEMENT OF I IVESTOCK.

GATTLE.

The Sudan is a poor cattle country and the animal husbandry methods taught and practised in Europe cannot, with rare exceptions, be applied to it.

It is a ranching country, and it may be said that, speaking generally, mixed farming is non-existent. White settlers there are none, for the very good reason that the land cannot support a standard of living suitable to their needs.

It is true that in certain cotton growing areas, and on the banks of the Nile, a type of mixed farming exists in which it is possible to develop a higher standard of animal husbandry, but for the country as a whole, nothing short of a miracle can alter in any marked way the character and quality of the stock.

Small improvement may be effected by careful selection of the best indigenous types and by the castration of undesireables, but the substantial and rapid advance associated with mixed farming conditions and the introduction of imported sires, is out of the question; the food supply is not good enough.

The cattle, like their owners, are specialists. In the northern Arab areas they can go for long periods without water; in the south, they and their owners can tolerate a nightly atmosphere so laden with smoke as to be beyond the endurance of most other living things.

No doubt there are times when conditions are good and a better type of animal would thrive, but the carrying capacity of a country must be assessed by its worst periods and not by the best, or even the average; for the bad times, like the good, fall within the range of normal variation and must be expected to recur periodically.

The food problem has not yet been solved in our part of Africa and until it is the stock must remain that hardy, famine-resisting type, which this particular environment has evolved over many centuries; to change it before the food supply is assured is to put the cart before the horse.

Improvement must therefore be limited to selection from the indigenous; and castration. The Burdizzo castrator is entensively used and in the hands of the trained man is an efficient and popular instrument. The method is a great improvement on the brutal native fashion which preceded it.



HORSES.

The purchase of large numbers of remounts towards the end of 1940 practically cleared the horse-breeding districts of serviceable horses.

Sixteen hundred were purchased in the space of a couple of months. These were costrated, posted, and fit for operations before the offensive in Britres started in 1941.

The fall of Gondar in November 1941 marked the end of the campaign. At no time was there any shortage of remounts.

For Army requirements it would seem that the most surviceable animal is one in which there is not more than about 25% imported blood, and that preferably Arabian. Anything butter than this is difficult to keep in condition under campaign conditions, where grass may be very scarce and very coarse; for war in these parts, where there are few roads and no railways, makes exceptional demands on the supply services and animals in the forward areas have often got to live by their wits.

The with policy of my predecessor in discontinuing the use of pure English thorough-breas as sizes has been fully vindicated and it would seem that the time has come to modify the breading scheme still further with the idea of creating a wider distribution of the existing imported blood; for it is only in high dilutions that imported blood is really useful in the tribal horse-breading areas, because, for the first four years of life, the young horse has not to survive native African conditions, and his only chance of doing so is to be richly endowed with that hardiness and resistance to discase which is the special beritage of the indigenous stock.

On the river and in the Gezira province, where food is plentiful, it is possible to produce and maintain a nighter quality horse, out the number of such is limited; they are more the concern of private than of movernment enterprise.

At present there are i government stallions, 6 of these are of pure Arabian descent and the other 2 are by English thorough-breas. In admition there are $\frac{1}{24}$ tribal stallions distributed to reponsible metables of the horsebreeding tribes. A yearly bonus is paid in respect of these tribal stallions if service records are satisfactory and the corse is in good condition. There is also a system of registration for marks, and these also receive an annual bonus if they can show a feal by a government or tribal stallion or evidence that they are in feal to one.

The tribal stallion is the important part of the scheme. He should be an improved horse which has survived native conditions for five years before purchase, so above sil, he should be a norse that has shown times of in the

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tribul races to be superior to his contemporaries; for borses are required to carry loads and it is rational to brees from those which can do it best.

Without racing, selection is difficult, and at best is only the opinion of the incividual in control; granted that de is the best judge in the world his opinion is worth very little compared to the seid test of the race course.

The purchase and castration of so many horses towards the end of 1940 can do nothing but good, and the opportunity should be taken to provide tribel stallions of the right type to replace some of these borses; for there is no would that a good deal of indiscriminate breeding has always gone on; the temptation to use the nearest horse is a strong one to the lazy man.

It was only possible to purchase 600 remounts in Darfur out of the total 1,600, which is disappointing, considering the amount of encouragement that has been bestowed on horse-breading in this province. Allowance of course must be made for the fact that in pracetime Darfur is called upon to supply the 3.D.F. requirements annually; a matter of about 460 horses. But even so, one would have expected at least half the remounts to have come from Darfur.

The question arises whether there are so many mares in Darfur as formerly, and if not, is the depletion due to too many deaths amongst those beying a high percentage of imported bloce. The subject is being studied.

SECTION IV.

EDUCATION.

Three more students enternee the Khartoum Veterinary School from the School of Science and completed their first year of special veterinary studies; this is the second batch and they are due to qualify in December 1,43.

The first sates, which qualified in December 1940, sas now been a year in government employment and is province a useful adjunct to the veterinary staff.

By accepting only three students every second year

there should be no risk of graduates failing to find suitable employment. The value of the stock in the Sudan is so low that veterinary practice is, for the most part, restricted to state service. It is important to regulate the output of graduates in strict relation to state requirements; there is no private practice.



The course provided in the Veterinary School is adapted for the special needs of the territory; prominence is given to such subjects as Epizootology and Animal Industry.

In the present state of the country's development the veterinary problem is more a matter of how best to utilize the existing amimal products, to the thenefit of the native population, rather than the commercial exploitation of any surplus; the standard of living is still very low.

SECTION V.

MISCELLANECUS.

1941 was one of the normally bad years in the Sudan; that is to say, rains above the 20 inch belt were not as good as they might have been; grazing in many of the nortnern districts was very scarce.

The great increase in the export of cattle, sheep, and camels, may have some beneficial effect on the northern districts, for it is from here that most of the animals are drawn. Any decrease in the population should result in more grass being seeded and a future increase in grazing in the normally good years.

VETERINARY HOSPITALS.

Khartoum Veterinary Hospital and Forge.

In-patients Out-patients Attendances Pairs of shoes fitted :- (a) hand made (b) machine made.	253 15,498 1,432 259
Hoof trimming, etc	543
Wad Medani Veterinary Hospital.	

In-patients.		• • • • •		210
out-patients	attendances.	• • • •	* * * * *	19,206

Sugan Defence Force.

The Director and Assistant Director were commissioned as Lt.Colonel and Major respectively in order to carry out the duties of A.D.V. & R.S. and D.A.D.V. & R.S. Troops in the Sudan. Star Barris

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Four Veterinary Inspectors remained commissioned in the S.D.F. and formed the Veterinary Corps for the S.D.F.

The strength of the S.D.F. at the beginning of the year was :-

Horses.		* * * * *	2,467
Mules.			1,138
Camels.	••••••	• • • • •	3,306
		9	

The Sudan is fortunate in that Mange and Glanders, the two most serious scourges of equines in military history, are not included in the catalogue of its diseases; and this is in spite of the fact that, as in all oriental countries, the conditions under which animals are kept are ideal for the existence of these two plagues; of dirt and starvation there is plenty, yet, Glanders has never been seen and Mange, on the very rare occasions it is met with, is mild and tends to regover.

Not so with Epizottic Lymphangitis. Cases of this disease are constantly being diagnosed. It is, however, of relatively minor military importance, for it is slow spreading and could never hold up operations, as either of the other two might, if they get out of band.

Sore backs are by far the most common cause of wastage; they occur in direct inverse ratio to the proficency in animal mangement of the personnel.

It is rare now-a-days to find British Officers with the requisite knowledge of animals to make them good commanders of mounted units; the result is that the function of the Veterinary Officer has widened to embrace many details, (such as saddle fitting; the training of recruits; march discipline etc.,) which formerly were the province of the Company Officer.

In this respect the S.D.F. were especially well served, for the Veterinary Officers were men in the highest degree capable, energetic, and experienced; with special knowledge of the country, its language, its animals, and its peoples. The animal transport of "Rackets", a force involving 14,600 camels, and of the Composite Battalion of over 1,000 mules was the direct responsibility of Veterinary Officers, not only in theier technical capacity, but in all other matters pertaining to the organisation and operation of these units.

The principal remount depot was maintained at Wad Medani and a smaller one at El Obeid. Both were managed **samirbbly** and operated at a very low cost. Demands for remounts were always promptly and efficiently met and the greatest credit is due to the officers in charge; Major Prichard at Wad Medani and Captain Menzies at El Obeid. and the second sec

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ACKNUWI EDGEMENT.

My thanks are due, not all to the member of my own staff for their more than gener us service under increased pressure and trying conditions, but also to those members of other services for the help they have unfailingly given when called upon; it has been much appreciated.



I.

APPENDIX

M. Sail.

The full wing figures show the actual Revenue on Expenditure of the Sulan Veterinary Service for the past three years :-

		1955	: 1940	••••==================================
	•	4	: £.	÷.
4.	REVELUE.	9,552	13,027	21,208
		•	:	
2.	EXPENDITURE :-			
	Chapter IPersonnel and Personnel Allewances	26,891	24,482	22,4 <u>5</u> 2
	Chapter II Services	11,278	11,265	10,036
	Chapter III. Extra rdinary Expendence	. 65	64	
	and the second se	38, 234	: 35,8 1 1	

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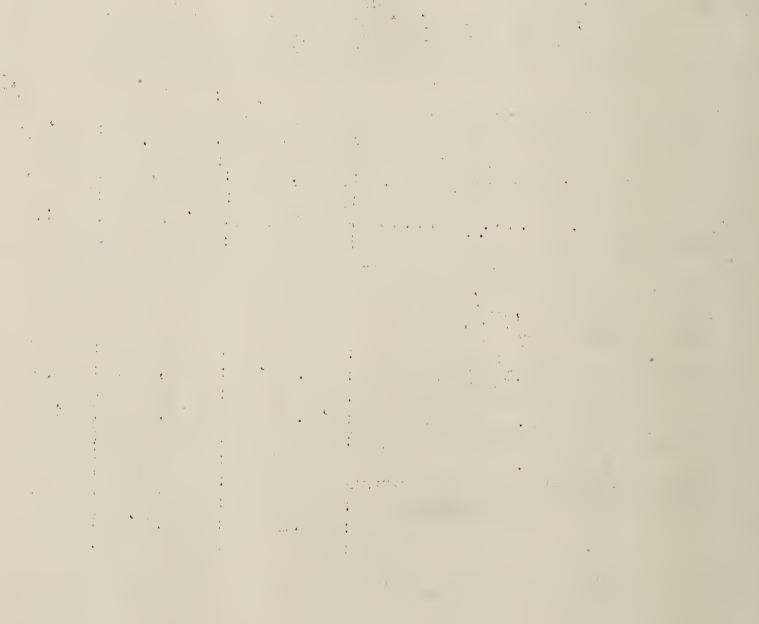




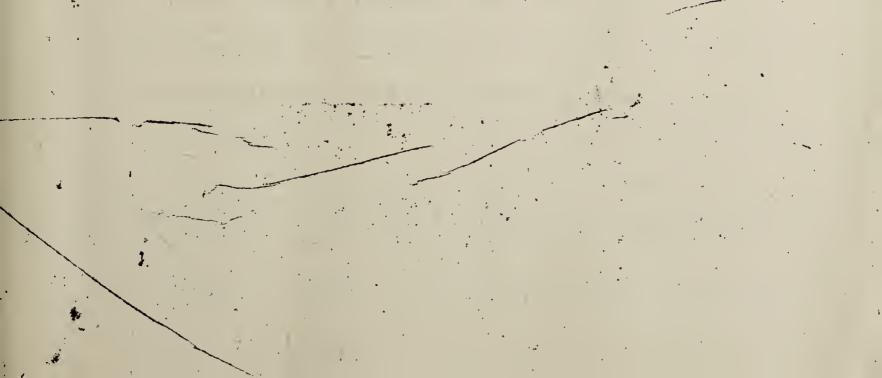






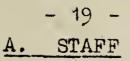


ANNUAL PEPORT OF THE SENIOR RESEARCH OFFICER SUDAN VETERINARY SERVICE FOR THE YEAR ENDING 31ST. DECEMBER, 1944.



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A number of changes have occurred among the classified staff during the year.

The most important has been the departure on final leave, pending retirement to pension, of Ar. P.A.".Kenny, British Laboratory Assistant, after approximately eighteen years' cervice: Ar. Kenny's responsibilities have been greater than the title of his post would indicate, since he has, in most years, had to assume full charge of the Khartoum laboratory for some months during my absence. I wish, therefore, to acknowledge his great dependability and zeal, from which the Service has benefited for so many years.

Mr. Kenny has been replaced by Mohd. Eff. Ali rebemid, who received his dipl ma (D.K.V.S.) at the Khartoum Veterinar. School at the end of 1940. This official was posted to the Research Section in January 1941 in the grade of Veterinary Officer, and when Mr. Kenny is finally struck off the strength the post of British Laboratory Assistant will lapse.

A second Veterinary Officer, El Amin Eff. Abdalla. DiK.Vi3. has been simultaneously posted to the Malakal Veterinary Laboratory. This is the first step in a projected change whereby it is intended not to have a Veterinary Research Officer permanently posted at kalakal, but to transfer the existing one, Mri J.T.R. Evans, to Khartoum; where the need for a second senior official bas been making itself increasingly felt during the past few years. The technical work at the salakal laboratory has now settled down to a fairly rigidly standardized routine, and it is thought that, with the Veterimary Inspector, upper kile Province, to act as a link with the Province staff and ensure a regular supply of cattle, a Sudanese Veterinary Officer should be able to do all the purely laboratory work. This reorganization may, with reasonable luck, be completed in 1,42, but throughout the past year the boot mas been very much on the other fo t, since, owing to the release of a number of Veterimery Inspectors for military service, the Veterinar, Research Pricer at Falakal has had to carry out the dities of the Province Veterinary inspector.

In addition to the foregoing changes, two specially selected men, nitperto graded as dead Stockmen in Scale F, have been re-classified as reboratory Assistants in Scale J, and will act as senior technical assistants at the Khartoum and Lalakal laboratories respectively.

L. ROUTLAS WORK.

The main items of routino w rk have, as usual, been as follows:-

- I. Preparation and issue of cattle plague antiserum (...alakal)
- 11. Preparation and issue of cattle plague vaccine (Fhartoum and Lalakal)
- iii. issue of cattle plague virus for "serum-simultaneous"
 i monization (Keartoum)
 - IV. Preparation and issue of contagious bovine pleuropneumonia vaccine (Voartoum)
 - V. Issue of foot-and- mouto disease virus (Whartoum)

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- VI. Issue of diagnostic materials and of antrypol (naganol) for the control of camel trypanosomiasis (Khartoum)
- VII. Distribution of horse-sickness vaccine purchased from Kenya (Khartoum)
- VIII. Examination of patnological specimens (Khartoum and Malakal)

The following are short notes on each of the above

I. CATTLE PLAGUE SERUM

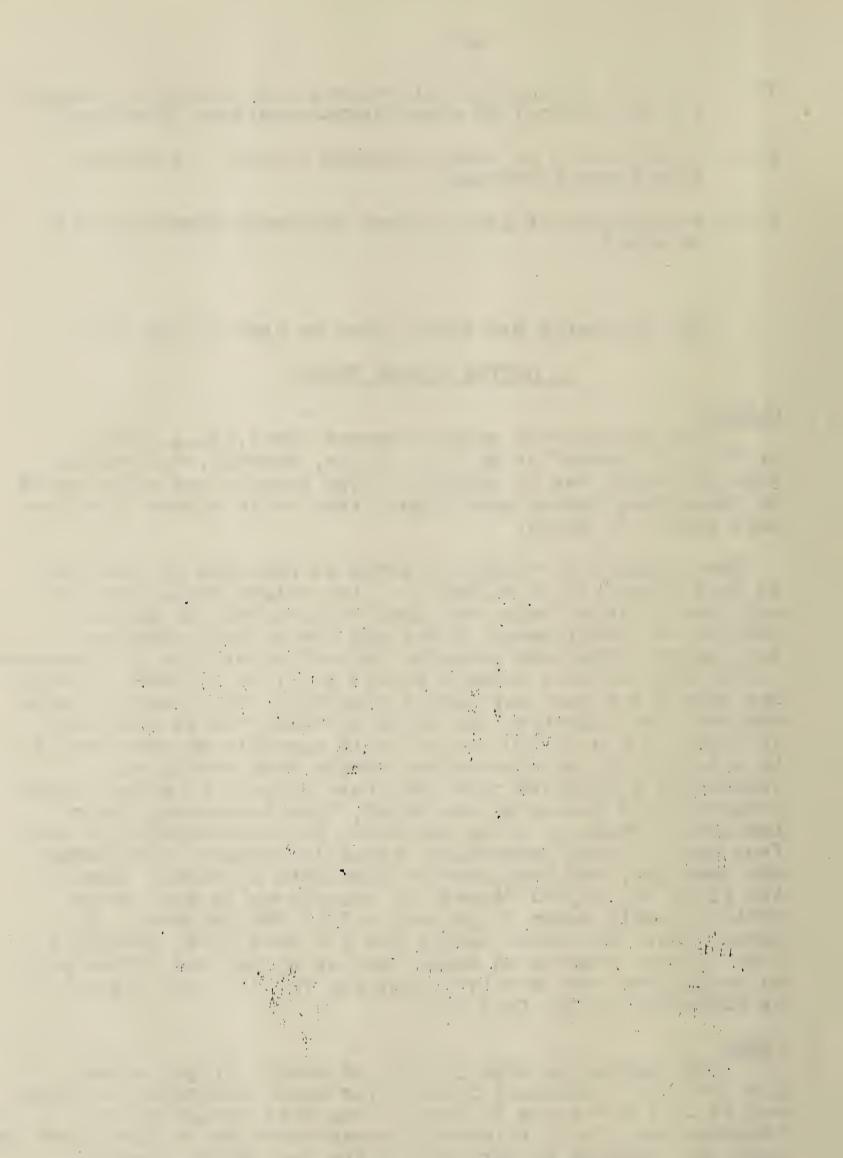
Output

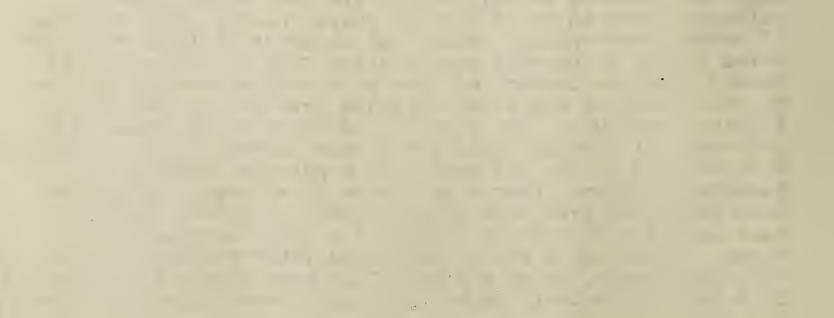
The quantity of serum prepared was 5,576.4 litres, or 111,520 "doses" of 50 c.c. It is, however, noteworthy that the serum was of unusually high potency and represented an immunizing factor much higher that would appear from the nett number of doses.

The standard to which our serum is expected to conform is that doses of 5 c.c./100 lb. live weight should provect most cattle from death, and that 10 c.c./100 lb. should prevent the development of any but the mildest symptoms say, slight fever and catarrh, but not stomatitis or diarrhoea - and that the test animals should continue to feed normally and should not lose any bodily condition. This year two bulk samples were titrated, the first of which was as effective in doses of 5 c.c./100 lb. as would normally be expected of 10 c.c./100 lb, and the second sample very nearly so. Veterinary Inspectors mere therefore advised to reduce their routine field dosage by one third, thus increasing their immunizing range by fifty per cent. In consideration of the fact that a large proportion of acattle injected with serum are immature, and thus receive less than a nominal "dose", the yield of 111,000 "doses" of exceptionally good serum "ould probably serve to protect a full 500,000 head. In actual fact, the whole output has not been used, leaving a very welcome reserve in hand, but, up to the end of the year, no complaints were received that the reduced dose was not as effective as the full dose.

Titre

The unusually high potency of cattle plague serum hus now been a constant feature for three successive goesons, and it is intcresting to inquire "hy this should be so. Examinations of all relevant circumstances shows that there is only one constant feuture during the gast three seas as differing from those of earlier years, namely, the technique of serum preservation. Since the disaster of 1938, when the serun became so heavily contaminated with bacteria that it caused numerous deaths and thea mole season's output hearto be destroyed, it has been a regular prachice to add acraflavine 1-50,000 to the serum in addition to the usual 0.5 per cent. of curbolic acid (see this Report, 1938, pp.38-41). Bulk' samples so treated have been regularly examined for bacterial content after some months of storage, and it has been usual for less than half a dozen colonies to grow in agar plates sown with one tenth of a cubic centimetre of Since the serum is dispensed Thitheer bottles seuled serum. "ith crom caps, thuse collines "ill most likely have developed from the few bacteria that Would almost certainly gain access





during the opening of such a package. In fact, the serum has contlantly been, not only for all practical purposes, but probably also in absolute terms, bacteriologically sterile. Experiments in 1938 showed that bacterial contamination not only rendered serum dangerous but also reduced its potency, so that, pending submission of the opinion to a critical test, it is reasonable to resume that prevention of bacteral contamination has been responsible for the high titres recently recorded in stored bulk samples.

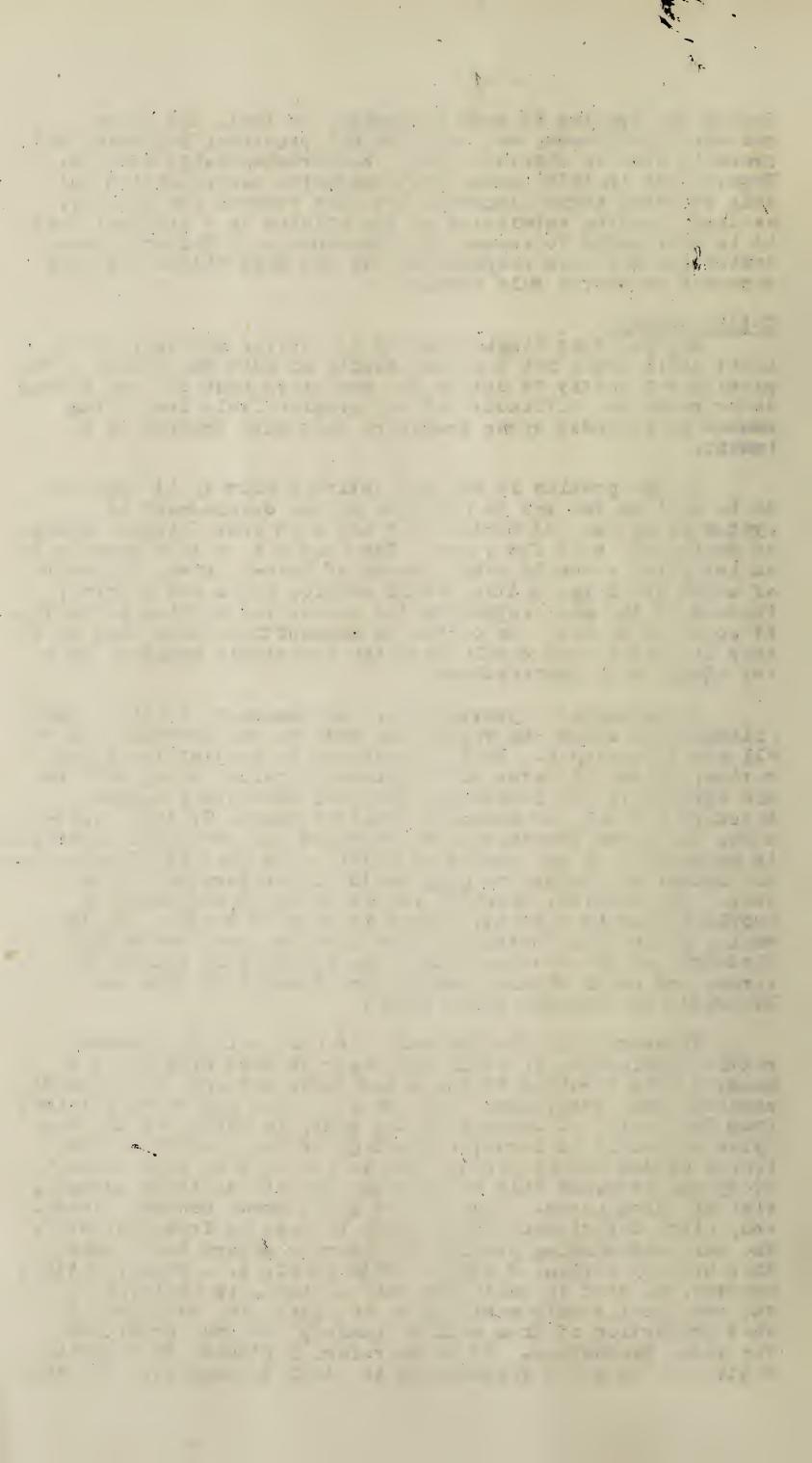
Crttle supply.

The greatest single anxiety in carlier sersons, or at least until 1940, has been the supply of suitable cattle. The problem was partly to obtain the necessary numbers, and partly to overcome the difficulty of the progressively increasing number of intended virus producers that were proving to be immune.

If the problem is not yet entirely solved, it repears to be well on the way to solution by the development of a system of option and barter that has been increasingly employed during the past few years. The system is rather complicated enteiling a considerable amount of book-keeping, the units of which are large castle, and locattle, serum and v coine, instead of the more sophistics ted pounds and milliones. However, it seems to be more acceptable to communities among whom onership is tribal, and cattle bargains invertably complex, then any simple each transaction.

In principle s provisional, and somewhat thatio, annual clictment of serum and vaccine is made to the Province, as to all other Provinces. This is made and is subject to <u>ad hoc</u> review, by the Director of Veterinary bervice, being what in his opinion is its reasonable share of the annual cutput, based, in general, on economic considerations. Of this allotment, the sarum fraction is distributed and stored in Districts, in propertien to the number of cattle cash District Commissioner expects his people to sell to the labor tory during the year. The vaccine, which is stored at the laboratory, is supplied only on payment, either in cash or cattle. On the whole, it is large cattle, coming from the more northerly Districts of the Province, that are supplied in return for serum, and small cattle, coming almost entirely from Ber Districts, in exchange for vaccine.

Unfortunately the Province, in spite of its enormous cettle population, is still not esger to part with the f.w hundred herd required by the lebore tory, but Lome improvement occurred this year, since only 28 per cent. had to be obtained from Equatoria, at against 47 per cent, in 1940. Of the two types of cettle at issue, a shortage of large of the is the lesser of two evils, because one is at any rate cortain that every one obtained will be subtable for its destined purpose, viz: yielding corum. Thus one rt least knows how one stands, and, tince deficiencies can always be made up from Equatoria, the only outstanding problem is river transport (now a more then usually serious fector). With small, i.e. young, cattle, however, the case is guite otherwise, since, in addition to the numerical requirement, ther is slways the question of what proportion of them will be immune, and thus unsuitable for virus production. It is therefore fortunate that small cettle are at least forthcoming in adequate numbers. For this



one's thanks are abmost entirely due to Capt. W.A.H. Forbes and his Dinkas in Bor District.

Many of the cattle prove to be immune, but, since they can be replaced in the same way as the original ones were obtained, the technical routine of the laboratory is not hindered. In fact, until the proportion of immune beasts is determined, it is both desirable and possible to infect a somewhat excessive number of them in preparation for the hyperimmunization of each group of serum producers. A plentiful supply of virus is thus ensured for the maximal hyperimmunization policy employed, and ray susceptible cattle thet may be infected additional to strict requirements are not wreted, but their lymphoid tissue is converted into veccine (see also the following Section on Cattle Plague Vaccine). The immune cattle, being too small to be worth the trouble of using se serum producers, sre either bertered for fresh ones with notives living firly close to the laborstory, or sold by suction for what they will fetch.

It will be replized that the foregoing system takes no account of the financially authorized sale price for leborstory products in relation to the true market value of the cattle. Except in the onse of the small minority of cettle sctually bought and sold for cash, the process is one of true brrter, and not even a hypothetical book value is entered in respect of the transactions. The system is, in fact, highly irregular, but, of all those hitherto tried. it is the only one that has worked ressonably well.

The following two trbles, plthough they show no direct enttle-for-cettle transactions, will give some iden of the extent to which the barter system is employed: -

1. Smell cettle

On charge 1.1.41 Purcht sed for cash Bartared for veccine Bortered for serum 1,005

Bled for virue 516 Sold by suction 275 On oherge 31.12.41 214 1,005

2. Large cattle

On charge 1.1.41	355	Blod out for serum	609
•	715 x	Died	28
Bertered for vecoine	114	Sold by suction	8
-		On cherge 31.12.41	539
1,	184	/	1,184

x Including 232 from Eqguatoria

368

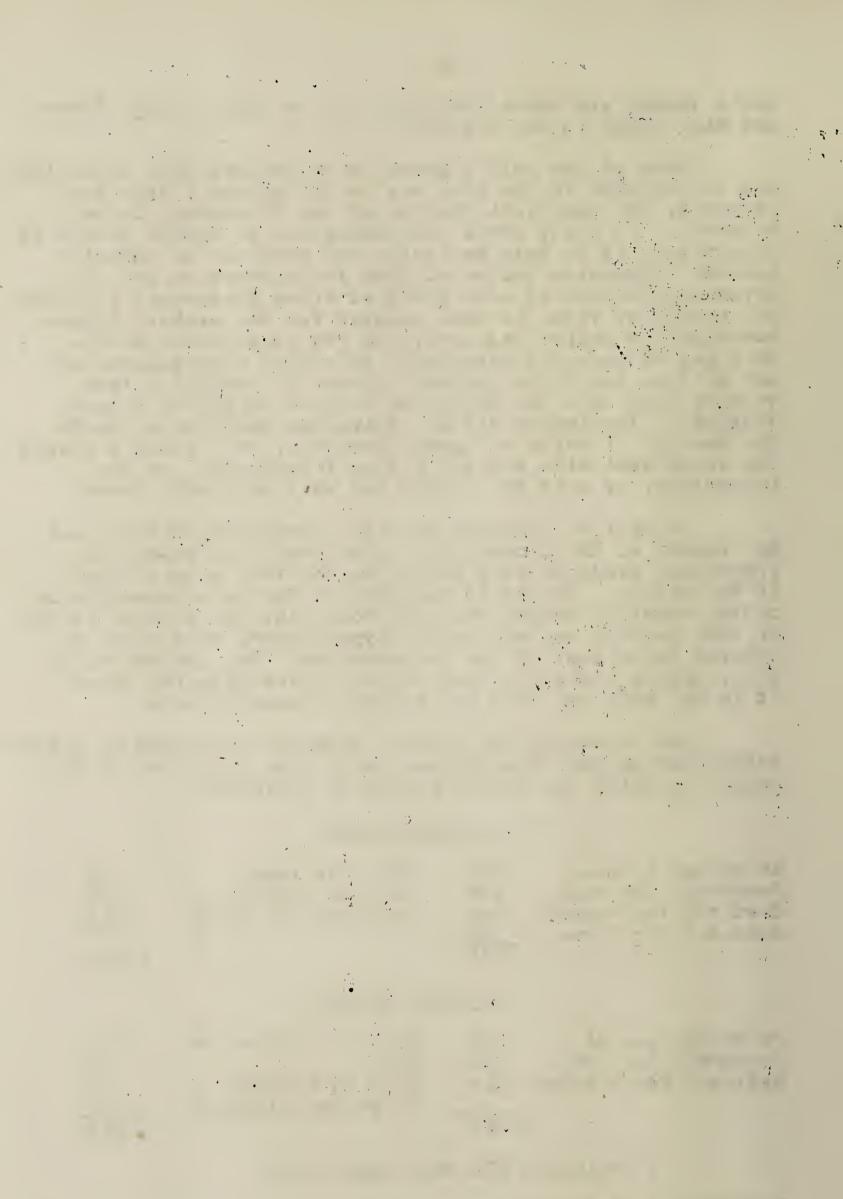
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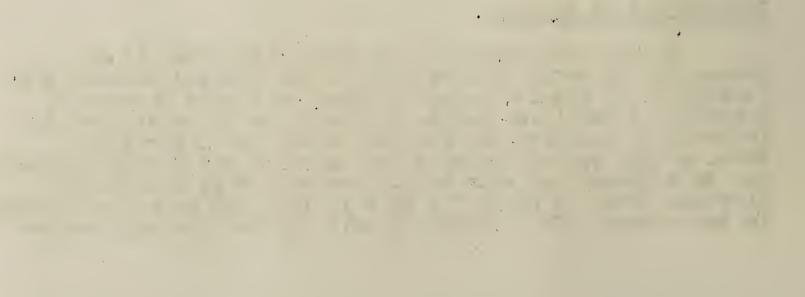
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Frrming cut of eattle.

As has been indicated in cerlier Reports, it is necessary, in order to lose none of the limited working time Evailable, to obtain during the current scason as many as possible of the large cattle required for the next senson. In order to conserve the grazing ground the laboratory, these cottle are not brought into Malikal but merely veccins ted and then firmed out with cattle owners living some little distance rway. A small fee is paid for each beast on delivery in the sutumn. The earning of this fee has recently become





very popular smong the shilluk who, during the working sesson, are employed as casual labourers at the laboratory. Their desire to give satisfaction is shown by the fact that this year they ran 400 large, and 00 cmall cattle with their own mords from June to October, and delivered all but 10 in excellent condition.

Miscelleneous .

The health of the walakal staff remained "good". That is to say, although every one of the technical essistants developed malaria at one time or another, the spacing-out was such that work was not materially hindered.

The Scilluk labourers worked well and behaved well; they did not consider their usual holiday without pay - a strike - necessary.

Grazing, as usual, began to give out before climatic conditions made it necessary to suspend operations, although the preceding rainy season had been fairly good. There is, imaged, no doubt that the salakal laboratory is now, and has been for some years, working to its maximum capacity unless one resorts to the costly expedient of supplementary fording of leboratory en mals.

II. CATTLE IT AGUE VACCINE.

There has been no modification in the trobnique of prepering this product as compared with corlier seasons.

" ost of the material for making this vaccine is secured as by-product of serum preparation (lymphoid tissue from bled-out virus producers) and from similar material becoming incidentally available in Chartoum. Usually, however, additional cattle have to be specially used in Khartoum to supply domands arising towards the end of the Salakal offscason. This year, it was known in advance that domanda would appreciably exceed those of normal years, and arrangements were made to prepare additional quantities of crude material at walkel. The object of this arrangement was economy, since the barter system described in the preceding section enables one to obtain cattle virtually cost-free. The additional output at Helakal, the volume of which was limited by the smount of extra work that could be done, was not sufficient to cover the whole of the extra demand, but it went a useful way towards doing so, and effected a considerable teconomy.

The total output of crude material from Mulakol was roughly 1/400 litres, sufficient for the final preparation of about 140,000 nominal "doses". This is rather more than the equivalent of a normal year's requirement. Of this total, 1,1,2 litres were sent to Aburtoum for further treatment and the remainder "finished" and issued in the southern Provinces.

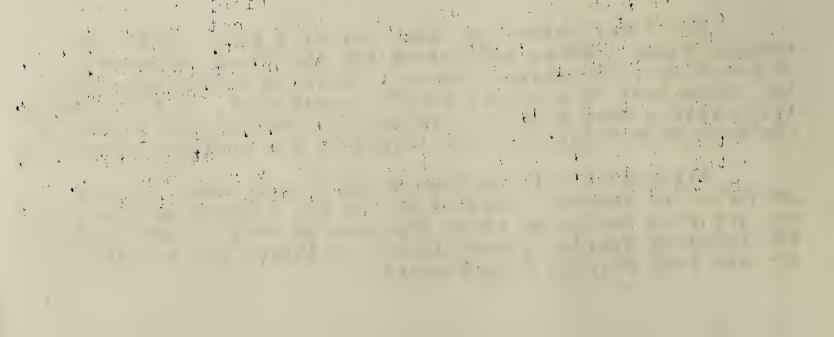
Altogether 201,090 "doses" of 1 c.c. were finally prepared and issued. This is by far the Jargest quantity that nab yet been used, and is an increase of over 60 per cent. on the total of 124,170 issued last year (which was itself a year of more than average requirements).

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larger number of merchants' cattle exported to Egypt, and moved about within the Sudan to provide rations for troops and prisoners of war. Not only were all these cattle vaccinated, but vaccine was used with unusual - in peace time one would say uneconomic - liberality in areas from which trade cattle are mainly purchased. So far as is known, no beest vaccine ted during the year subsequently contracted cattle plague.

III. CATTLE PLAGUE VIRUS

This is a product for which there is no great demand in the Sudan, since conditions generally are unfavourable to its widespread use for conferring permanent immunity by the serum-virus method. A roughly average total of 3,070 doses were issued, as against 2,800 and 4,540 in the two preceding years. Nearly all of this was issued to Gezira Province for the immunization of working oxen.

IV. CONTAGIOUS BOVINE PLEURO -PNEUMONIA VACCINE

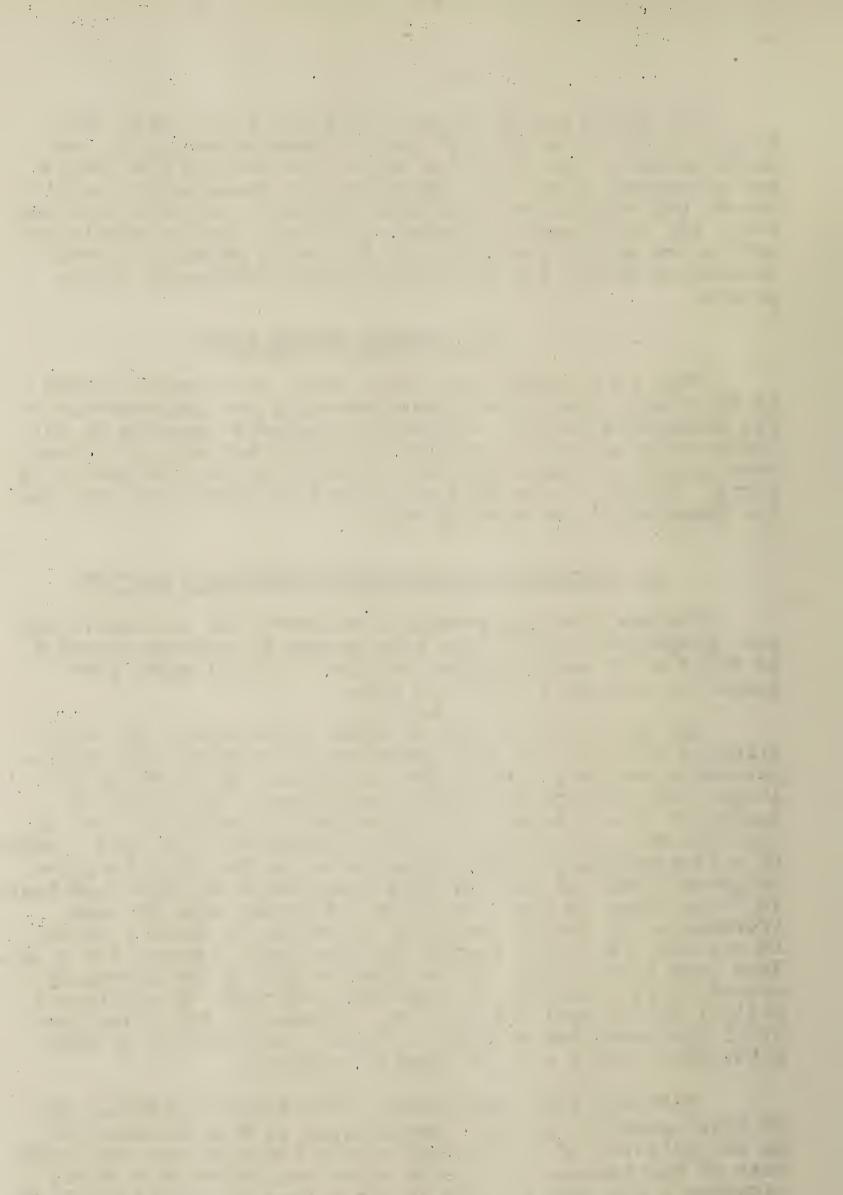
Demands for this product have increased in roughly the same proportion and for the same reason as already recorded in the case of cattle plague vaccine. 71,050 doses were issued as against 32,685 last year.

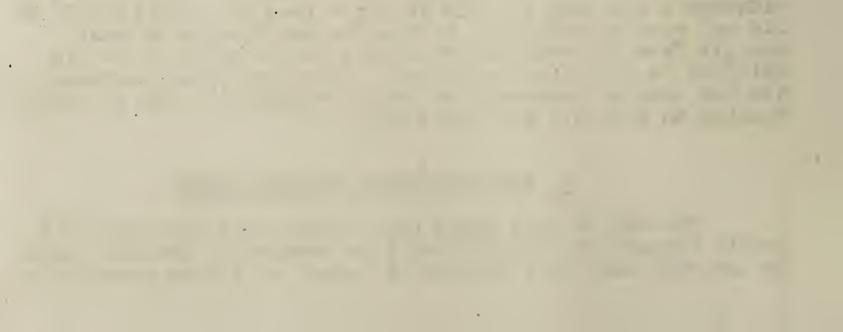
One has to record one of those regrettable and inexplicable accidents so well known to all workers with pleuropneumonia vaccine, namely, the occurrence in the field of large, and occasionally fatel, swellings at the point of injection of a vaccine that laboratory tests had led one to conclude was non-virulent. The circumstances are that a strain of culture-virus had been subcultured in the inboratory for 22 generations and that it then appeared to be safe when tested in large doses on four cattle in the laboratory. By some (fortunate) oversight, probably referable to staff changes, it was not taken into routine use for for a further ten weeks. When used in the field ot the 32nd to 34th generations, it caused large swellings in about ten per cent. of vaccinated cattle, and several cattle died. Retests in the laboratory still confirmed the voccine as "safe", but the use of this particular strain was, of course, suspended.

Although most regrettable, the economic significance. of this accident, taking a broad view, is best illustrated by the attitude of a prominent cattle exporter who sustained most of the losses. He called on me and informed me that, although I had just let him in for a loss of about LE.120, he did not wish to complain, because he had derived so much benefit from the vaccination of his cattle in the past, in spite of an occasional accident. This particular merchant has had tens of thousands of cattle vaccinated, and is continuing to have all his stock done.

V. FOOT-AND-MOUTH DISEASE VIRUS

The use of this egent for deliberately infecting all cattle destined for export has been suspended, because, with the greatly increased numbers of issue, it is not possible to





The rationale of deliberate infection, as proctised in 1939 and 1940, is that Arab cattle develop such mild symptoms of this disease that they will continue feeding if soft green grees is available; consequently they lose hardly any condition. The main reason for deciding on infection was that if the disease appears in a guarantine it causes great delay and economic loss, even though its pathological phenomena are so mild. In the first place it spreads very slowly, no matter how one may try to accelerate its spread by thorough mixing. Unfortunately, also, it spreads very persistently, in spite of efforts to limit its range by segregation into small groups. Short of deliberate infection by artificial means, several weeks or even months may elapse before an infected trainload of cattle can be declared free. It is not, however, economically practicable to practise deliberate infection during the dry season, because the cattle will not eat dry grass while their mouths are sore, and fall away very badly in condition.

Fortunately the areas from which export cattle are mainly drawn have been free from foot-and-mouth disease for over a year, and there is a good chance that they may remain so. If, however, the disease reappears, measures other than either deliberate infection or ordinary quarantine practice will have to be adopted if delays and loss are not to be incurred. Recommendations in this connection have been made, and are at present under consideration.

VI. CAMEL TRYPANOSOMIASIS CONTROL

Although the number of doses of antrypol (naganol) and associated diagnostic items issued was larger than ever before, the total would have been greater still had it not been for the difficulty of securing delivery of supplies of the drug. The actual total was 17,953 as against 17,154 last year. The few hundred additional doses roughly represent a few kilogrammes of German-made naganol captured in Eritrea.

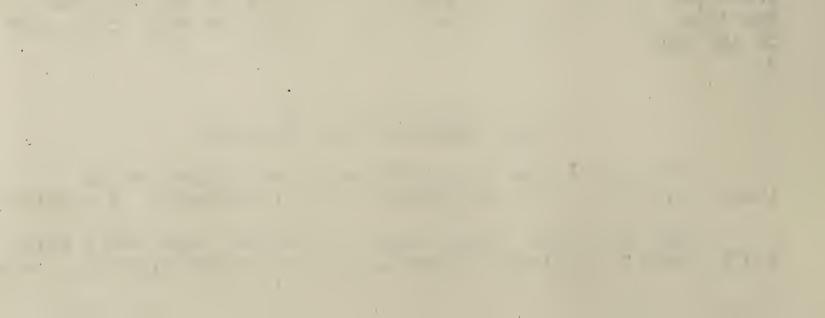
As in 1/40 it has been necessary, in virtue of limited supplies, to allot adequate stocks for the treatment of military and police camels, so that any unsatisfied demands will have been those made by private owners. The number of private owners actually turned away has been small, but the news of the shortage of antrypol will have spread, and will have decided many other owners not to make fruitless journeys to treatment centres. Consequently, in spite of the relative shortage, all stations showed small stocks in hand at the env

VII. HORSE SICKNESS VACCINE

This continues to be purchased from Kenya, being stored in Poblatory refrigerations and distributed as required.

Much more was issued than ever before, the total being 3,977 doses as against 983 and 2,874 in the two previous years.





of this total 2,6/4 doses were issued for the vaccination of army horses and mules, 248 used on privately-owned horses (on payment), and the remainder used on Government animals.

It may be assumed that all vaccinated animals were exposed to horse-sickness infection and, so far as can be ascertained, about 70 of them subsequently died of the disease-sey about two per cent. This figure, taken at its bare face value, is very satisfactory, but some veterinary officers have expressed doubts whether all fatalities were really due to horse-sickness. Further discussion of this point, and records of a failemalk experiments, will be found under the section dealing with research.

VIII. SPECIMENS EXAMINED

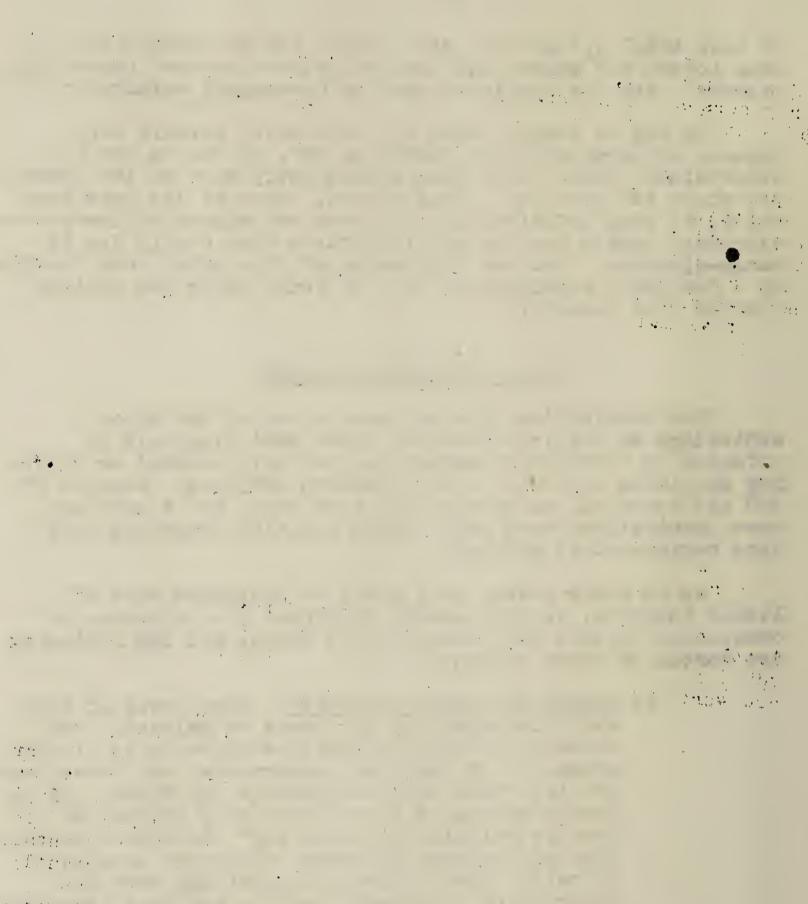
The examination of specimens is one of the minor activities of the laboratories, since most diagnosis is effected by Veterinery Inspectors, and only unusual or doubtful specimens are sent to the Research Officers. Details of 508 are recorded, as egainst 392 last year, but a good many more examinations were made, since positive diagnoses only were registered at Malakal.

As in other years, most positive diagnoses were of little interest, as they merely confirmed the existence of conditions already well known in the Sudan, but the following are worthy of short comment.

- (i) <u>Demodectic mange in cattle</u>. Four cases of this were discovered by Mr. Evans at Malakal. The disease, although probably world-wide in distribution, is of very rare occurrence, and these cases are the first ever recorded, in the Sudan. It is hardly necessary to add that they originated in that pathologist's "lucky dip" the Nube Mountains area of Southern Kordofan, which can constantly be relied upon to produce something rare and interesting - although usually not very importent.
- (11) Equine mange. This is hardly ever seen in the Sudan, but this year, probably for fear of infection spreading to the large numbers of horses and mules engaged in military operations, an unusually sharp look-out seems to have been kept. Three cases of psoroptic and two of sarcoptic were diagnosed. The detection of these cases stimulates one to record a long-standing conviction that

equine mange is unlikely ever to be a serious problem in the Sudan. It exists, and native standards of horsemastership afford it every encouragement to spread; nevertheless one only encounters odd cases at long intervals.

(iii) <u>Anthrax.</u> The excuse for mentioning this disease specially is the rareness with which it is usually seen. It was provisionally attributed to a consignment of dry millet stalks imported for feeding purposes from Gezira Province, although no enthrax has been seen for several years in that Province. The usual administrative measures prevented the occurrence of further cases.



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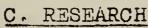
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- (iv) <u>Castric habronema tumours.</u> It is not the practice in this Report to draw particular attention to worm infestations, because as a class they are neither important nor interesting. However, cutaneous infection with hebronema lervee is recorded every year, ond one may on this one occasion mention the sdult worms in order to report on their frequency. Usually one does not examine the stomach for their presence, but this year it was decided to inspect a successive dozen or two old horses destroyed for surgical reasons. Of 21 horses examined at Khartoum and Malakal, twelve had tumours containing H. megastoma and probably all (certainly all in which identifications were carried out) had numerous H.muscae embedded in the fundic mucus. Rare H.microstoma were also identified.
 - (v) Taenia pisiformis in a log. The excuse for mentioning this is that Cysticercus pisiformis in a rabbit was recorded last year, when it was stated that the adult worm had not yet been seen in the Sudan. Now it has been seen.

Other less interesting diagnoses included:-

- : Epizootic lymphongitis, cryptococcus pneumonia, cryptococcus conjunctivitis; ulcerative cellulitis (C.ovis), Tryp.brucei, Babesia caballi Nuttallia equi, cutaneous habronemiasis, ring-worm, lice, and various common septic and balminthic infections.
- MULES : Epizootic lymphongitis, ulcerative callulitis, ringworm, and various common septic infections.
- DONKEYS : As mules.
- CATTLE : Tryp.congolense, Tryp.uniforma, Theileria annulate, Actinomyces fercinicus, psoroptic menge, septic and helminthic infections.
- CAMELS. : Tryp. evensi, worms.
- FUWLS : Spirochectosis, tapeworms (Railletina).

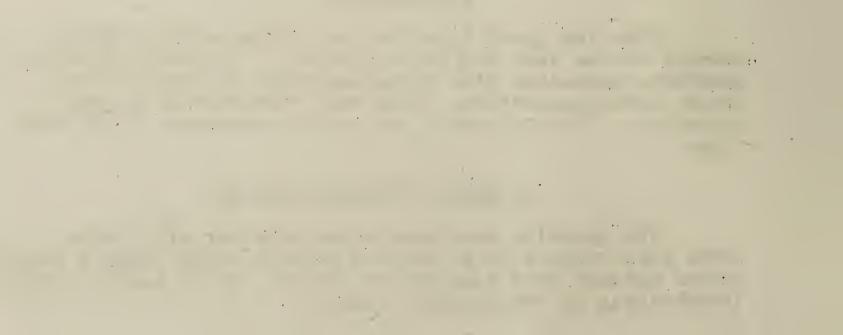


With the great increase in routine work, nothing worthy of the name has been possible. Two small problems, however, connected with horse-sickness vaccination and dried meat preparation, arose and demanded some ad hoc The following are brief summaries of the work sttention. done.

I. HORSE SICKNESS VACCINE

The question has been raised whether all deaths from what appears to be horse-sickness among animals vaccinated against this disease are indeed due to horse-sickness. Douttarises on two counts, namely:

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- (i) it is said that there is probably a disease closely simulating horse-sickness, against which one could not expect the vaccine to protect, and
- (11) the post-mortem appearances in vaccinotic a enimals which die are frequently not "typical". If this point is tenable, it may support point (1).

As against the two items, it may be argued that:

- (i) further correspondence with Kenya tends to show that if there is a second disease simulating horsesickness it is certainly very rare, and
- (ii) since the enimals in which post-mortem appearances are not typical have been vaccinated, it is reasonable to assume that vaccination may have modified the pathological processes of the disease, even if it has not always been able to prevent infection.

In 1939 a few horses were injected with blood from vaccinated animals which had died, and none developed symptoms of horse-sickness. There was, however, still the doubt whether those horses were immune. It seemed improbable, but was elways possible (see this Report for 1939, p.39).

This year the Director of Veterinary Services, Kenya, in the course of correspondence on the subject, offered to supply some virulent virus, with a view to confirming, or otherwise, the susceptibility of test horses which withstood the injection of suspected blood samples.

The offer was gratefully accepted, and five further horses were injected with suspected samples, all surviving without development of any symptoms. Unfortunately, however, they also survived subsequent injection with the virus obtained from Kenya, thus leaving the matter still in doubt.

One had hardly expected to find so large a series of immune horses, especially as all had spent their lives in Khartoum, which is relatively (but not absolutely) free from horse-sickness. They were, however, all old horses, and one must presume that, small though the chances are of acquiring the disease in Khartoum, nevertheless a horse can hardly live for several years in the town without acquiring it. The surprising feature, in the light of clinical experience, is that so many immune horses should be found in a place where so few deaths normally occur.

As pointed out collier in this Report, the matter is bordly worth serious investigation at a time when other duties

are at heavy, since it matters little whether two per cent. or so of vaccinated horses die of horse-sickness or whether there is sometother unidentified disease that kills a few horses accessionally. The total loss, whatever the cause, is economically negligible.

II. DRIED MEAT

Drive meat, both solted and unsalted, is normally prepared in relatively small quantities in several parts of the Sulan. In the clurse of military operations against Italian East Africa it was prepared in a very large scale, the same and the three the second the comparison of the state to some that

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and large reserve stocks were stored at convenient centres. It was then found that some of these stocks, while remaining quite free from pubrefection, became heavily infested with "horn beetles" (Dermestes vulpinus) and their larvee, and the problem presented to the laboratory was to prevent this.

A good deal of work was done in preparing experimental samples of dried meat according to various techniques and then adding adult beetles and seeing if larvae would appear. The experiments had to be suspended towards the end of the year, because, with the onset of relatively cool dry weather, the beetles would not breed in "control" samples. Two general conclusions can, however, slready be drawn with fair certainty:-

- (i) Unsalted meat, although doubtless suitable for preparation on a domestic scale, is quite unsuitable for bulk storage, no matter how theroughly it is bried. Throughout the greater part of the year born beetles will get into it and breed at a tremendous rate, soon converting the stock into a secthing mass of larvae.
- (ii) Salted ment can be prepared according to two techniques :-
 - (a) Rubbing on salt and immediately hanging up the strips to dry, and
 - (b) Pickling the strips in salt or strong brine for several hours (usually overnight) before hanging up to ary.

Of these two methods, the first is quite useless if prolonged bulk storage is contemplated, no matter how lavishly the strips be salted. The salt does not penetrate, but the beetles subsequently do, and the strips rapidly become bollow shells filled with larvae. The pickling method allows the salt to penetrate evenly, and prevents the development of larvae in the depth, but has the two objections that it takes more time and that the final product is apt to be unpalatably salt.

The experiment had to be suspended when what remained to be secertained was the lowest concentration of salt that would prove effective when employing the pickling technique.

D. MICCELGANEOUS

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1. Hice Curing demonstrations

A good many hides are saved in the laboratories durings the year, and these are used for demonstrating the suspension method of sun curing. Most of this work is done of Molakal, where more hides become available, and where more demonstrate ion is needed, on account of the small size/the field veterinary staff in the southern Provinces. A comparison between the prices fetche, by our bides and the average market price of hides at the time of sole is the final lemonstration.



Altogether 7.325 Kg. of hides were sold, all between January and June, for a total price of LE.611 and, or about LE.63.4 per metric ton. (in Khartoun). The average market price of dried hides at that time (Customs valuation, Wadi Halfa) was LE.67 per metric ton. The final demonstration therefore shows that care in flaying and curing may add anything up to 25 per cent. to the value of a hide. It is regretted that the fact is not more generally taken to heart.

2. Publications.

For the second successive year, great increases in routine work have made it impossible to do any research worthy of publication in scientific journals.

SUMMARY

Last year's summary stated "The volume of routine work, which reached its highest recorded point last year (i.e. 1939), has shown no signs of diminishing. No research has been possible." This year routine work has expanded more than ever. The increase calling for the greatest additional expenditure of effort has been the preparation of cattle plague vaccine. Normally this item would also have called for greatly increased expenditure, but the system of cettle barter described in the body of the Report has made it unnecessary to ask for any increase in budgetary expenditure.

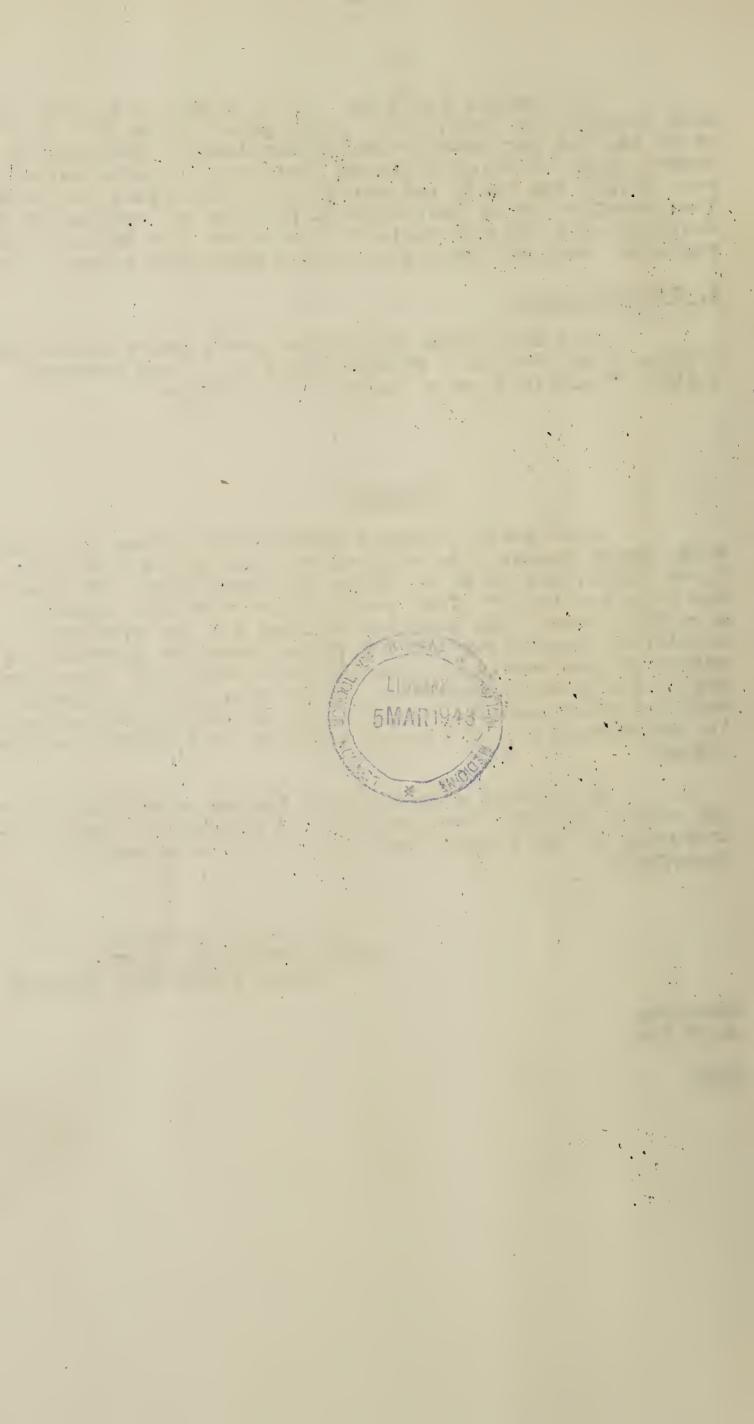
Additional work has been thrown on all members of the staff, but they have regarded it as part of their contribution to the general war effort, and have responded cheerfully.

> Sgå. S.C.J.Bennett. SENIOR RESEARCH OFFICER, SUDAN VETERINARY SERVICE.

Khartoum, 29.1.1942.

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