

Army Remount Department.

ANNUAL ADMINISTRATION REPORT

OF THE

ARMY REMOUNT DEPARTMENT IN INDIA

FOR THE YEAR

1903-04.



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Simla, the 1st December 1904.

FROM

COLONEL H. GOAD,
DIRECTOR-GENERAL, ARMY REMOUNT
DEPARTMENT,

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,
MILITARY DEPARTMENT,
SIMLA.

SIR,

I HAVE the honour to submit, for the information of the Government of India, the Annual Administration Report of the Army Remount Department for the official year 1903-04.

I have the honour to be,

SIR,

Your most obedient servant,

H. GOAD, *Colonel,*

Director-General, Army Remount Department.

GOVERNMENT OF INDIA.

ANNUAL ADMINISTRATION REPORT
OF THE
ARMY REMOUNT DEPARTMENT IN INDIA

FOR THE OFFICIAL YEAR

1903-04.

PART I.
REMOUNTS.

1. *Officers of the Department.*—The work of the Remount Depôts was carried out satisfactorily by the following officers :—

Superintendents of Remount Depôts.

Ahmednagar Remount Depôt. { Major R. C. Broome, from the 31st October 1903.
Captain E. Brandreth, from the 1st April to the 24th September 1903.

Hosur Remount Depôt ... Major G. C. Birdwood, from the 1st April 1903 to the 14th February 1904.

Saharanpur Remount Depôt. { Captain E. Brandreth, from 5th October 1903.
Captain F. Shakespear, from the 1st April to the 4th October 1903.

Hapur Remount Depôt ... { Superintendent, Major C. H. H. Gough, from the 1st April 1903 to the 9th February 1904.
Probationer, Captain A. C. Stewart, from the 31st May to 21st July 1904.
Lieutenant D. H. Vanrenen, from the 20th September 1903 to 31st May 1904.

Mona Remount Depôt ... { Captain L. T. Hay, from the 2nd June to the 9th November 1903.
Captain G. H. Badcock, from the 10th November 1903 to the 23rd February 1904.
Major G. C. Birdwood, from the 24th February to the 31st March 1904.

Veterinary Officers.

<i>Abmednagar Remount Depôt and Deccan Sub- sidiary Circle.</i>	} Captain F. D. Hunt, A.V.D.
<i>Hosur Remount Depôt ...</i>	} Captain A. E. Clarke, A.V.D.
<i>Mona Remount Depôt and Jhelum Canal Colony Circle.</i>	} Captain R. L. Cranford, A.V.D., from the 23rd April 1903 to the 6th February 1904. Lieutenant E. S. Gillett, from the 7th February 1904.
<i>Saharanpur Remount Depôt and part of the Lahore Circle.</i>	} Captain W. F. Shore, A.V.D., from the 1st April to 10th November 1903, and from the 2nd Feb- ruary to 31st March 1904. Lieutenant E. S. Gillett, A.V.D., from the 6th December 1903 to the 1st February 1904.
<i>Hapur Remount Depôt and the United Provin- ces Circle.</i>	} Captain T. W. Rudd, A.V.D.

2. *Mona Remount Depôt and Young Stock Run.*—The statistical information concerning this depôt will now be given with that for other remount depôts, but reference may be made here to the progress made towards the completion of the depôt.

Such of the buildings as remained unfinished last year have been completed; as were also the following works:—

- (1) Horse Hospital and Stables for 100 horses.
- (2) Stables for 300 young stock.
- (3) The workshops.
- (4) Chaff cutting and grain crushing sheds.

The items below had also been commenced and were on a fair way to completion by the 31st March 1904:—

- (5) Two Horse Hospitals.
- (6) Two young stock stables.
- (7) Line Overseer's quarters.

With regard to the works undertaken departmentally:—

- (1) Seven blocks of menials' quarters.
- (2) Twenty choukidars' huts.
- (3) Seven miles of kutch road, with 19 kutch culverts,

were made during the year; 2,700 acres of jungle were cleared; 800 acres of land levelled for cultivation; trees were planted in the several compounds, in the bazaar, and alongside the roads; a large amount of bank and ditch, and iron wire fencing, was erected; 27 young stock paddocks, 24 segregation paddocks, and one remount paddock were laid out and fenced.

From the foregoing it will be seen that a large amount of work has been carried out during the year, and that satisfactory progress is being made towards the completion of the Mona young stock run and depôt.

On the 6th of October I inspected the young stock at the Mona Depôt and made the following remark on them:—"Stock doing well. The 3-year-olds are the best lot I have seen for twelve years,—with great bone."

3. *Cost of maintaining the reserve.*—The cost of maintaining the war reserve of 1,000 horses during 1903-04 is compared below with the figures of the preceding year:—

Years.	Feed and keep.	Movement.	Departmental charges.	Total cost per annum.	Total cost per 1,000 remounts.
	Rs.	Rs.	Rs.	Rs.	Rs.
1903-04	189	40	99	328	3,28,000
1902-03	233	19	74	326	3,26,000

The slight increase in the total cost does not call for any remark.

4. *Modified liberty system.*—This system was again carried on with some of our Australian horses during the year with favourable results, and my recommendations for making this measure a permanency have now been approved by Government.

5. *Land.*—The addition of the Jegur lands to the acreage of the Hosur Depot proved such a satisfactory measure that I proposed to Government a further addition to the depot acreage of a plot of 320 acres, but, for the want of funds, Government were unable to accept my proposal last year.

The following is a comparative statement of results in hay obtained from the localities named at the Hosur Depot:—

Old depot lands	...	...	6,750 lbs. per acre.
New Jegur lands	...	...	4,729 " "
Leased lands	...	...	3,560 " "

The results of the Jegur land compare favourably with the old depot land, considering that the former has been under grass for only 2 years, and the net result of the hay harvest was most satisfactory, enabling the remounts to be fed on home-grown fodder during the greater part of the year.

Funds were allotted in Military Department No. 4043-D., dated 3rd August 1903, for expenditure connected with the acquisition of the proprietary right to the use of the water in the Poonapalli Tank at the Hosur Depot. As however the preparation of the statements of cost involved the consideration of complicated questions arising out of the nature of the tenure, it was found impossible to complete the acquisition during the official year 1903-04, and the matter is still pending.

6. *Standards of height of troop horses.*—Efforts to reduce the heights of remounts have been most successful. The statement given below shows the average heights of the several classes of Australian remounts purchased during the year under review:—

	H.	L.
Royal Horse Artillery	15	2½
Royal Field Artillery	15	1
Heavy and Howitzer Artillery	15	1½
Medium Cavalry	15	¾
Hussars	15	¾

7. *Arabs and Persians.*—One hundred and eighty were purchased during the season, but these were obtained with difficulty. The number of Arabs landed, (horses and ponies), is supposed to have been a record for recent years, but taken all round, they were the worst lot landed for many years, and the number of ponies out of all proportion to the number of horses. The reason for the

large importations, according to the Arab dealers, is that during the previous year, due to the Delhi Durbar, the demand was so great and the prices obtained so good that the news spread over Arabia, and every Arab who could raise sufficient money to buy an animal rushed into the trade, thinking the prices of the previous year would be repeated. The market was, in consequence, glutted with inferior ponies. A reaction is anticipated, with a considerable decrease in the number likely to be imported during the coming season, but with a possible improvement in quality.

8. *Mounted Infantry ponies.*—The statement given below shews the number of Mounted Infantry ponies that were withdrawn from the Schools in India for service with the Indian contingent sent to Somaliland, and the number purchased to replace them during the year under review:—

School.	No. withdrawn.	No. purchased and supplied to school.
Umballa	350*	350
Sialkot	182	182
Fatehgarh	226	226†
Bangalore	169	169
Poona	194	194
Total	1,121	1,121

* Includes 55 ponies transferred to the Fatehgarh school.

† Excludes 55 ponies received from the Umballa school.

The ponies were of good stamp.

9. *Mules.*—The purchase of mules by specially appointed Mule Remount Agents was only continued during May and June of the year under review, after which the purchase for the Supply and Transport Corps, the Army Remount Department, and the Imperial Service Troops was conducted by the Depot and Circle Superintendents. This department was required to purchase in India:—

	Number.
Transport mules	1,574
Transport ponies	211
Machine gun mules	532
Mountain Artillery mules	600
Sappers and Pioneer mules	51
Imperial Service Troop mules	200
Total	3,168

Of these, only the following were purchased:—

Transport mules	245
Transport ponies	208
Machine gun mules	275
Mountain Artillery mules	466
Sappers and Pioneers	9
Imperial Service Troop mules ... ..	...
Young mules	10
Total	1,213

Every possible endeavour was made to obtain the full numbers required; special contracts were made with well-known mule choudries in India, and with a Chinese Contractor. Major Willoughby* was also deputed to the Burma-Chinese Frontier for the purpose. Despite every effort however, it was found impossible with the means at our disposal, to obtain the number of mules up to the standard laid down; and the Government of India eventually decided in their letter No. 765-D., dated 3rd February 1903, that, as the staff of the Army Remount Department was insufficient for the purpose of purchasing all mules required by Government this duty should be again undertaken by the Supply and Transport Corps, the Remount Department only purchasing Ordnance mules and also young mule stock of all classes.

In order to make good the shortage of mules Major Arbutnot was specially deputed to purchase in Persia, and Major Gough to Argentine to pass 750 mules to be imported by Mr. Tetley from Buenos Aires. The numbers so obtained will be shown in the report for 1904-05.

10. *Health.*—The health of the establishment and of the animals throughout the department was generally very good.

At Ahmednagar, however, a virulent epidemic of plague broke out between the months of July and October, cases occurring in the Superintendent's bungalow and among the depôt establishment. At the beginning of the outbreak cases were sent to the city plague hospital and contacts were placed in huts erected by this Department. But, as the epidemic grew worse, this had to be given up and contacts sent to the city segregation camp.

Plague was also prevalent in almost all the villages around the Hosur depôt, including the town of Hosur which had to be evacuated. Owing however to the timely precautionary measures adopted and the advance disinfection, the spread of the disease into the Remount Depôt was checked.

At Saharanpur, there were 11 cases of cholera during the year, of which 9 proved fatal.

I am glad to be able to state that there was no outbreak of influenza amongst the Australian horses landed in Bombay this season, attributable to the thorough overhauling and cleansing given to the premises of the Bombay Stable Company, which did them great credit.

There have been no cases of Lymphangitis Epizootica in any of the Remount Depôts during the year under review.

11. *Farm profits or losses.*—The following figures show the profits or losses from the several farms during 1903-04 and the previous year:—

	1903-04.	1902-03.
	Rs.	Rs.
Saharanpur	54,090	53,473
Hapur	60,175	27,819
Mona	11,855 loss.	...
Hosur	82,579	53,340
Ahmednagar	1,048 loss.	5,928 loss.

The large increase in the profits at Hapur is due to a much larger outturn, and a smaller expenditure, than in the previous year.

The loss at the farm in Mona is partly attributable to the heavy expenses involved in putting new land under cultivation, clearing, etc., but mainly to the fact that the rates on which the balance sheet was prepared were those of the Shahpur District which in no possible way gives the value of articles at a place like Mona in the Jhelum Canal Colony where at present nothing is obtainable.

Such articles as green grass, lucerne, green oats, oat hay, oat bhoosa, poolas, carrots, etc., are absolutely unobtainable in the Colony and Mr. Hailey, the Colonization Officer, confirms this fact. Under the circumstances I proposed (though they would be infinitely more favourable than anything could be obtained in the Jhelum Canal Colony) to work on the rates in force at Saharanpur. To this, however, the Controller has demurred. Next year I will ask the Colonization Officer to let me have what he considers fair market rates for Mona. But it is manifestly absurd to take the market rates on which this balance sheet has been prepared, and which are extraordinarily favourable, as an indication of the market value of articles which are grown at Mona, taking for instance green grass which is practically unobtainable and which has therefore a high market value as it also has a higher outturn value owing to the amount of labor which has to be employed to grow it.

The increased profit at Hosur is due chiefly to the increased outturn of forage, due to the new Jegur lands and the lands rented for grass the previous year.

It will be noticed that the loss at Ahmednagar has been considerably reduced.

12. *Purchase of country-bred stock between 9 and 18 months of age.*—In accordance with the instructions contained in Military Department No. 4306-D., dated the 14th August 1903, I have attached a statement at Appendix I, showing:—

- (a) The number of young horse stock purchased below 18 months of age present on the 1st April;
- (b) The casualties in this number occurring between April 1st and March 31st;
- (c) The percentage of casualties.

In addition to this, the Government of India require to be furnished with information shewing—

- I.—Whether the introduction of this system has resulted in securing an increased number of country-bred remounts for the service;
 - II.—The general health of these young stock, and
 - III.—Their average cost on issue to the service.
- I.—The number of country-bred stock purchased from the time this system was established, and for three years previously, is as follows:—

- (a) Before the introduction of the system of purchasing stock under 18 months:—

	No.
1896-97	106
1897-98	126
1898-99	129

- (b) Since the introduction of the system:—

	No.
1899-1900	122
1900-01	251
1901-02	267
1902-03	253
1903-04	182

- II.—The health of these young stock has been satisfactory, and the actual deaths from disease were 16, out of 181 purchased, up to the end of the year.

- III.—Only 23 stock have been issued to date:—

	No.
In 1902-03	5
„ 1903-04	18

The cost of maintenance of these young stock is included in the general results of the country-bred stock given at paragraph 21.

13. *Shallow trenching for farm*—At the Saharanpur Depôt 30 bighas were trenched during the year. Twelve bighas were sown with barley giving an outturn of 1,84,640 lbs or 15,360 lbs. per bigha; three bighas with oats, giving an outturn of 14,400 lbs. or 6,400 lbs. per bigha, a very excellent crop. The same system will be carried out next year.

Trenching on the Allahabad system is still being carried out at Hapur on a small scale with the sweepings from the depôt bazaar, and dhoob grass is to be planted. A small area of land was trenched last year, grass planted, and the plot put under constant irrigation. The result was a heavy outturn of superior quality dhoob grass. The small area of land trenched at Hapur during 1902-03 had not given good results as the crop was entirely dependent on the rainfall, there being no other means of irrigation.

As reported last year, three small plots of land at Hosur of half an acre each were experimented upon in accordance with Major Meagher's recommendations. The results were not very satisfactory either during 1902-03 or during 1903-04, when the extra outturn was compared with the considerably increased outlay.

No doubt, the methods suggested by Major Meagher are very good, but they require the supply of a much larger quantity of manure than can be made available at Hosur. This makes it impossible to extend the system at this depôt. The trenching system was also tried at Hosur. It was certainly productive of excellent results, but owing to the insufficiency of manure and water, it will be quite impossible to extend the system at the Hosur Farm where manure is limited and water barely sufficient for lucerne cultivation.

14. *Purchase of Australian remounts.*—The statements given below show:—

- (a) the number of Australian remounts obtained during the past two years, and
(b) the average prices paid.

(a) *Number purchased.*

		Calcutta.	Madras.	Bombay.
		No.	No.	No.
1903-04	{ British Service ...	1,655	333	333*
	{ Madras Cavalry ...	...	...	...
1902-03	{ British Service ...	1,575†	380	485
	{ Madras Cavalry ...	...	514	48

* Includes one horse purchased by the Officer Commanding, 12th Royal Lancers.

† Includes one horse purchased by the Officer Commanding, 11th Battery, Royal Field Artillery.

The decrease in the numbers purchased in Madras and Bombay is due to the fact that in 1902-03 extra horses were bought to mount two British Cavalry regiments coming to India without horses in lieu of two regiments that went to South Africa taking their horses with them, and also to the purchases in 1902-03 for the Ammunition Columns. This reduction was nullified in Calcutta by the purchase in 1903-04 of 344 extra horses on account of the Heavy Batteries.

(b) *Average price.*

		Calcutta.	Madras.	Bombay.
		Rs.	Rs.	Rs.
1903-04	{ British Service ...	669	670	671*
	{ Madras Cavalry ...	...	...	...
1902-03	{ British Service ...	710	718	719
	{ Madras Cavalry ...	...	400	400

* Excludes the price of one horse purchased by the Officer Commanding, 11th Battery, Royal Field Artillery.

The decrease in the average purchase rate is due to the extra payment in 1902-03 of £3 per head compensation and to a more favourable rate of exchange.

15. *Purchase of Arab and Persian Remounts.*—The number of Arab and Persian Remounts purchased in Bombay, together with the prices paid, were :—

Detail.	ARAB.		PERSIAN.	
	No.	Purchase cost.	No.	Purchase cost.
		Rs.		Rs.
1903-04	172	706	8	556
1902-03	173	715	8	584

The remarks made at paragraph 7 of this report explain the fall in the purchase cost.

16. *Purchase of country-breds.*—The number of young stock purchased, the average prices by ages paid, together with the general average cost, were :—

Age.	Years.	MONA.		HAPUR.		AHMEDNAGAR.	
		No.	Average cost.	No.	Average cost.	No.	Average cost.
			Rs.		Rs.		Rs.
Under one year ...	1903-04	17	161	...	...	3	157
	1902-03	5	104	1	210	2	185
	1901-02	...	...	3	178	4	118
One to two years ...	1903-04	68	233	...	...	33	259
	1902-03	22	247	8	220	19	260
	1901-02	...	...	30	254	29	248
Two to three years ...	1903-04	38	309	...	...	5	321
	1902-03	7	308	9	343	...	...
	1901-02	...	...	17	374	8	320
Three to four years ...	1903-04	9	474	...	...	...	...
	1902-03	1	425	2	461	...	...
	1901-02	...	...	...	...	...	...
Four years and over ...	1903-04	2	700	...	...	8	728
	1902-03	...	...	...	...	...	...
	1901-02	...	...	...	...	1	900
TOTAL ...	1903-04	134	269	...	...	48	337
	1902-03	35	257	20	299	21	252
	1901-02	...	...	50	290	49	267

The average age of the stock purchased during 1903-04 was :—

	Months.
Mona	21
Ahmednagar	31

The increases in the average prices are due to ordinary market fluctuations and to the purchase of somewhat older stock than were bought during the

previous year. The high cost and average age at Ahmednagar is due to the purchase of certain animals of mature age.

17. *Purchase of mules.*—The following mules were purchased during the year under review, with the average prices paid for each class:—

Class.					No.	Average price.
						Rs.
Artillery ...	...	...	...	...	279	258
					196	218
Maxim Gun	...	...	...	...	275	219
Young Mules	..	...	...	...	10	105

18. *Average cost of issues.*—The average cost of the horses issued to the service during 1903-04 and the preceding year, such horses bearing all depôt charges except those for the war reserve, is given in the following statement:—

Years.	Initial cost.	DEPÔT CHARGES.				Average cost per remount.
		Feed and keep.	Movement.	Departmental charges.	Total.	
		Rs.	Rs.	Rs.	Rs.		Rs.
1903-04	691	122	69	171	362	1,053
1902-03	701	148	37	144	329	1,030

The slight increase is due to the movement of a larger number of horses to and from remount depôts than during the previous year, (consequent on the issue of a larger number of horses to the service, and from purchasing depôts to remount depôts), and to increased departmental charges consequent on the conversion of the Hapur Depôt into one for Australian remounts.

19. *Feed and keep.*—The following statement shows the average number of horses of each class present daily in the department, and their general monthly average cost per head in feed and keep during 1903-1904, and the preceding year:—

Class.	1903-04.			1902-03.		
	No. present.	Feed.	Keep.	No. present.	Feed.	Keep.
		Rs. A. P.	Rs. A. P.		Rs. A. P.	Rs. A. P.
Australians	2,644	12 10 6	4 12 8	2,275	15 4 7	5 1 0
Arabs and Persians	107	14 9 5	6 6 10	37	16 7 7	16 7 6
Country-bred remounts	3	8 4 1	6 6 10	3	13 7 2	16 7 6
Full-grown young stock	25	18 4 4	13 12 7	72	12 1 11	13 5 7
Young stock	237	12 6 4	4 15 11	264	13 6 1	5 11 11

The decrease in the average rates is due to a larger number of stock being maintained and to more favourable rates; where a smaller number of stock have been maintained the rates have increased.

20. *Issues of remounts.*—The number of remounts of each class issued to the service during 1903-04 and the previous year is as given below :—

Class.					1903-04.	1902-03.
					No.	No.
Australians	...	...	...	...	2,492	2,325
Arabs and Persians	...	...	...	...	210	32
Country-breds	...	...	...	...	57	115
Total					2,759	2,472

The increased issues in Australians is due to the fact that owing to the existence of influenza at the Ahmednagar Depot in 1902-03, ~~the~~ remounts were issued during that year but had to be retained for issue in 1903-04.

Owing to Government having decided in Military Department No. 5576-D., dated 17th October 1902, that Arabs should be castrated before issue, very few Arabs could be issued during 1902-03, but were issued in 1903-04 after they had recovered from the effects of the castration.

The large issue of country-breds in 1902-03 was due to the fact that country-breds which should have issued in 1901-02 could not be sent to the service in that year owing to the absence of certain regiments in South Africa. They were therefore all issued in 1902-03.

21. *Cost of maintaining country-bred horses.*—The following statement shows the average cost per head of the country-breds maintained in the depôts during 1903-04 and the preceding year :—

Years..					Mona.	Hapur.	Ahmednagar..
					Rs.	Rs.	Rs.
1903-04	...	...	...	...	809	4,373	1,637
1902-03	...	...	...	...	1,013	2,837	1,775

The decrease in the average cost in 1903-04 at Mona is due to the maintenance charges, etc., of the year under review, which were added to the cost of the horses remaining from the previous year's stock, having been averaged on a larger number of young stock maintained during the year.

The increase at Hapur is due to the maintenance charges, etc., of the year under review, having been added to the cost of the few horses remaining from the previous year's stock, and the total cost thus arrived at having been averaged on the very small number of young stock still remaining here.

The decrease at Ahmednagar is due to the expenditure for the year under review having been averaged on a larger number of horses, and I trust that the Ahmednagar figure will continue to fall.

22. *Issues of mules.*—The following statement shows the number and average cost of the mules issued to the service during 1903-04 compared with the results of the previous year :—

Year.					No.	Average cost.
						Rs.
1903-04	...	...	...	...	338	992
1902-03	...	...	...	...	339	1,101

The decrease in the issue cost is due to the smaller expenditure on account of departmental charges, which were divided between a larger number of animals maintained.

The high price still obtaining is due to 109 of the issues of 1903-04 being American mules.

23. *Importations.*—The importations for Government during the last two years were :—

Year.	Calcutta.	Madras.	Bombay.
1903-04	2337	721	762
1902-03	2,409	1,375	934

The decrease is due to no horses having been imported on account of Madras Cavalry as none were required.

24. *Commissions.*—The statements given at appendices II and III, show the commissions granted to shippers and importations to be made during the year under review compared with the numbers presented and purchased, as also the commissions granted for horses to be bought during 1904-05.

25. *Issues to the service.*—The numbers that issued during 1903-04, to the different branches of the service were :—

Royal Horse Artillery	...	...	...	...	359
Royal Field Artillery	...	...	...	...	1255
Heavy and Howitzer Batteries	...	...	...	...	377
British Cavalry	...	...	...	...	600
Madras Cavalry	...	...	...	...	153
Chargers	...	...	...	...	42
His Excellency the Viceroy and Governor's Body Guards	...	...	...	...	11
His Excellency the Commander-in-Chief's Stables	...	...	...	...	6
Imperial Cadet Corps	...	...	...	...	2
			Total	...	2,805

26. *Horses broken to draught.*—A total of 1,115 artillery horses were issued to the service broken to draught, as compared with 1,032 similarly issued during 1902-03.

27. *Officers' chargers.*—A total of 42 officers' chargers were selected during the year under review as compared with 84 selected during the preceding year. The falling off is due to the supply of troop horses on hire as chargers.

28. *Receipts and issues of country-breds.*—In accordance with the orders contained in Military Department No. 1276-F., dated 15th May 1903, the statement given below contains information regarding :—

- (a) the year of receipt in the depôt of each of the country-bred remounts issued during 1903-04, and
- (b) the year of receipt of those remaining on the 31st March 1904.

Year of purchase.	MONA.		HAPUR.		AHMEDNAGAR.	
	Number issued.	Present on 31st March 1904.	Number issued.	Present on 31st March 1904.	Number issued.	Present on 31st March 1904.
1895-96	1
1896-97	2
1897-98	1	1
1898-99	1	1
1899-00	2	...	16	4
1900-01	19	5	13	11
1901-02	2	15	1	40
1902-03	...	34	3	8	...	21
1903-04	...	146	...	...	...	52
TOTAL	...	180	26	28	32	133

* These stock have been retained for transfer to brood mares on 1st April 1904.

29. *Country-bred purchases.*—At appendix IV will be found a statement giving the names of the places where the country-bred stock obtained during the year under review were purchased, and the names of the officers who purchased them.

30. *Country-bred issues.*—The two statements at Appendices V and VI show the names of the officers who purchased the country-bred remounts that passed through the depôts during the year under review, and the names of the places at which these horses were purchased.

31. *Rejections and casualties.*—The actual numbers cast and sold, that died or were destroyed during the past two years were :—

Years.	HORSES.		MULES.	
	No. of casualties.	Percentage.	No. of casualties.	Percentage.
1903-04	137	4'54	12	1'34
1902-03	207	7'81	19	3'65

PART II.

HORSE, MULE AND DONKEY BREEDING

INTRODUCTORY.

32. On the 1st of May 1903 the Government of India were pleased to issue the following order:—

(Army Circulars, India, dated 1st May 1903, Clause 48).

“ With the approval of the Right Hon'ble the Secretary of State for India, the Government of India have decided that in the selected districts noted in the

• Bawalpindi Circle	{	Gujranwala, Rawalpindi Hazara, Jhelum and Attock.
Jhelum Canal Colony Circle.	{	Jhelum Canal Colony, Shahpur, Jhang and Chen- ab Canal Colony.
Lahore Circle.	{	Lahore, Multan, Dera- Ghazi Khan, Amritsar and Ferozepore.
Baluchistan Circle.	{	Baluchistan and Sind.
United Provinces Circle.	{	Bulandshahr, Meerut, Aligarh, and Musuffer- nagar.
Deccan Subsidiary Circle.	{	Poona and Ahmednagar.

margin, the control of operations connected with horse, mule and donkey breeding, whether with Imperial or with District Board Stallions, shall be transferred from the Civil Veterinary Department to the Army Remount Department.”

Under the above order the Army Remount Department assumed charge on the 1st of May 1903 of Imperial horse, mule and donkey breeding in the districts named* and the appointments enumerated in paragraph 35 were made. With the

exception of Captain Templer, who had, under the authority of Military Department letter No. 3559-D., dated 3rd July 1902, assumed temporary charge of the Jhelum Canal Colony District on the 12th September 1902, all officers were entirely new to the work. They have been occupied during the year under report in getting thoroughly in touch with their duties and with the District Officers, principal native gentlemen and horse breeders of their districts, endeavouring to make the latter understand the good results which we hope to obtain from certain modifications in the general practice of horse-breeding which we shall endeavour to get the owners of mares to observe. They have also studied the possibilities of carrying out the recommendation of the Commission regarding concentration of stallions in their districts and we hope to act on this to a considerable extent during the year.

In Military Department No. 4637-D., dated 28th August 1903, Government addressed Local Governments and Administrations informing them that in the event of Native States requiring advice or assistance in matters connected with their horse-breeding studs, application should in future be made to the Director-General, Army Remount Department.

In continuation thereof, the Government of India desired (Military Department No. 7034-D., dated 17th December 1903) that although the Director-General and his officers should assist the Native States with their advice on matters connected with horse-breeding whenever such advice was asked for, they did not consider it desirable that any officer of the Army Remount Department should visit the studs of any Native States except on the definite invitation of the Chief of the state concerned. In their No. 6965-D., dated 15th December 1903, the Government of India also concurred in the proposal of the

Bombay Government that the control of pony-breeding in the selected* districts of that Presidency, which had hitherto been in the hands of the Provincial Government, should be undertaken by the Army Remount Department as it was found that the scheme of keeping horse and pony breeding in those districts distinct would be a most inconvenient arrangement and one likely to lead both to confusion and unnecessary trouble and expense.

* Ahmednagar and Poona.

33. In the Autumn of 1902, just before the Army Remount Department took over the selected districts from the Civil Veterinary Department it was discovered that Dourine (equine syphilis) existed in some of the districts in which horse-breeding flourishes. This is of course a severe blow to the industry and will handicap our operations for some years, in fact until the disease is stamped out. We owe this discovery to the valuable investigations of Major Pease, Principal, and Captain Smith, Professor, Lahore Veterinary College. Unfortunately the existence of this disease was not actually discovered until the autumn of 1902 (though I understand from Colonel Morgan that a case was once

† Appendix A. suspected by him in the Bombay Presidency) when the report† says regarding two horses in the Lahore Veterinary school hospital: "It was found very difficult to be certain that this was Dourine as we had no history of the occurrence of the disease in this country and the cases which came into our hands were all in an advanced stage and consequently difficult to diagnose. Our suspicions however were increased when we found on consulting the records that horses had been cast and destroyed for a mysterious chronic disease of the sheath for some years past. From blood taken from the centre of freshly formed patches we were able to demonstrate the trypanosoma and to say definitely that these cases are Dourine, and that the Punjab and Derajat are infected areas."

Thus the disease having existed for many years before it was discovered and the Trypanosoma demonstrated, it had got a thorough grip of the breeding stock, and will be exceedingly difficult to stamp out. Treatment of the disease has proved of no avail. Even very slight cases remain infective for years, consequently it is never safe to use for breeding purposes an animal which has manifested symptoms. The generative organs gradually undergo degeneration and if death does not take place during the acute stages, sterility invariably ensues.

This department owes a debt of gratitude to Major Pease for the very great assistance he has given us in the matter, and his—Major Pease's—pamphlets ("Note" and "Further Note on Dourine"—See Appendices A and B) are the text books on the disease in India and have been of the greatest assistance.

To combat the disease the following steps have been taken in different districts:—

- (i) No mare to be served except by stallions at stands to which they are told off. At fairs and other places where large numbers of mares are likely to be brought for covering, local arrangements are made to meet the difficulty.
- (ii) In districts where Dourine has manifested itself badly mares will not ordinarily be branded after two years of age, after that age enquiries are made to show that they have not been covered by other stallions. (This rule was necessary as young mares were often covered by other stallions and were affected with Dourine before being branded and covered by Imperial stallions).
- (iii) Veterinary Assistants at stallion stands are instructed as to the symptoms of Dourine and examine all mares presented for covering. If the mares are infected or suspected of being infected, the Assistants refuse the service of a stallion.
- (iv) The last covering certificate must be produced before a mare can be served.
- (v) When a mare is found to be infected or suspected a report is made to the Circle Officer. The name and residence of the owner and a description of the mare is given in the report.

- (vi) On receipt of the report the Circle Officer deputed the Veterinary Officer to inspect the mares, and if they are found to be infected, the name and residence of the owner and a description of the mare is registered. An extract from the register is furnished to all stands in the district with orders to refuse covering.

These steps though of the greatest assistance towards checking the disease have for the time being practically reduced horse-breeding operations very greatly, and without legislation which Government have decided is not practicable, the difficulties in stamping out the disease are great. (A bad case of Dourine was lately discovered at the Dera Ghazi Khan horse fair in a privately owned country-bred stallion, and "Pitcher," a thorough-bred English stallion was infected through covering a mare which had previously been covered by this country-bred).

At the same time as regards our actual losses, I am glad to be able to report that the measures we have taken show a great improvement, for, from 1st May to 31st December 1903, 37 stallions were found to be infected. From 1st January to 1st August 1904 (I am working into the year in advance of this report) though these months included the heaviest covering months we only had 6 cases, which demonstrates the value of the system we have introduced to check the ravages of the disease.

Our losses in stallions owing to this disease from 1st May 1903 to 1st August 1904 have been as follows:—

Thoroughbred English	...	...	...	...	...	4
Thoroughbred Australian	...	...	...	...	...	6
Arabs	...	...	...	...	...	26
Hackneys	...	...	...	...	...	2
Donkeys	...	...	...	...	...	4

and when the * value, (roughly Rs. 1,76,920) is taken into consideration, apart from the enormous number of mares which the disease has rendered barren

(this is borne out by the falling off in foaling results for the year, * the numbers being 2,592 as against 3,873 in the previous year) the total loss to Government is very serious indeed.

Out of a total of 43 stallions infected up to date only six have been infected during the present calendar year; and of the balance 25 were found to be suffering from Dourine before 1st September 1903.

The first thorough inspection in May 1903 of all stallions handed over resulted in 12 Imperial stallions (including 1 donkey) and 4 District Board stallions being found to be suffering from the disease and by August 17 more were found to be infected. Up to the present time no fewer than 38 stallions

† Two have since been pronounced free. • have been destroyed for Dourine, 27 Imperial and 11 Provincial and 5† are still

under suspicion. It would appear that the steps taken in the Bulandshahr and Rawalpindi districts have decidedly improved matters and the steps taken later on when the Dera Ghazi Khan district was found to be badly infected will I hope have similar results, but meantime these measures are a terrible check to the horse-breeding industry.

The Superintendent, Jhelum Canal Colony Circle, has taken every possible precaution to avoid the introduction of this mischievous disease into the Jhelum Canal Colony, and I trust his endeavours may continue to be successful.

34. Operations in the Jhelum Canal Colony received a severe check from the outbreak of plague which occurred in the month of April 1904 resulting in a very large number of owners running away from their allotments taking their mares with them, and as this was just in the heart of the covering months a very large number of mares will I fear not have been covered this year in the Colony.

* I understand from the Inspector-General, Civil Veterinary Department, that they have also lost 4 T. B. E.'s; 3 T. B. A.'s; 9 Arabs; 1 Hackney; 1 Norfolk Trotter and 2 donkeys (Italian).

35. The Officers in charge of the horsebreeding operations were the following:—

<i>Jhelum Canal Colony Circle</i>	....	{	Superintendent—Captain Templer.
		{	Probationer—Lieutenant Bruce.
		{	Veterinary Officers—Captain Cranford and Lieutenant Gillett.
<i>Baluchistan Circle</i>	...	{	Superintendent—Major H. McN. Patterson.
		{	Veterinary Officer—Lieutenant Quinlan.
<i>United Provinces Circle</i>	...	{	Superintendent—Major Humfrey.
		{	Veterinary Officer—Captain Rudd.
<i>Lahore Circle</i>	...	{	Superintendent—Captain Orr.
		{	Veterinary Officer—Captain Shore.
<i>Bawalpindi Circle</i>	...	{	Superintendent—Captains Pritohard and Stewart.
		{	Veterinary Officer—Captain Brown.
<i>Deccan Subsidiary Circle</i>	..	{	Superintendent—Captain Hewlett.
		{	Veterinary Officer—Captain Hunt.

These officers were all new to their charges, all had very heavy work and I am glad to say are mostly in thorough touch with their districts. Where work has generally been heavy and well carried out, it is somewhat invidious to particularize any one of those who have done well, but I feel that in this instance I must do so, for Captain Templer's work has been of special value to Government. On 12th September 1902 he took over temporary charge of the Jhelum Canal Colony and working under exceptional difficulties both as to inaugurating the new lines decided on for this colony and as to climate, due to the amount of fever existing, (owing to turning up virgin soil) has, with the assistance of Lieutenant Bruce, as far as he has gone, succeeded admirably.

We have also to thank the Colonisation Officer, Mr. W. M. Hailey, C.S., for the very great assistance he has given Captain Templer. Had we not had Mr. Hailey's most cordial help we could not have hoped to make the progress which I think we can claim.

36. It may be well here to give a short sketch of the conditions, etc., Government decided on for the new departure in the Jhelum Canal Colony.

In his letters Nos. 138 and 169-Camp, dated 7th and 12th January 1901, the President of the Horse-Breeding Commission suggested to Government that the whole of the area which had been set aside for ordinary peasant colonisation in the Canal Colonies in the Punjab, amounting to 402,000 acres or 14,500 squares should be allotted to settlers who would agree to keep mares approved by Government—that the area granted to each Colonist should be two squares and that the land should be held on special terms limiting succession to a single heir.

In Military Department No. 5362-D., dated 3rd October 1902, Government laid down instructions (for the guidance of the special officer) regarding the class of mare to be passed for the Jhelum Canal Colony, conditions as to age, height, etc. In Military Department No. 5597-D., dated 1st November 1902, Government sanctioned the transfer as a temporary measure of 20 stallions and the necessary establishments from the Civil Veterinary Department to the Jhelum Canal Colony and also the entertainment of additional temporary establishment.

With Military Department No. 5753-D., dated 27th October 1902, the Government of India forwarded a copy of the Revenue Department letter No. 1610-161-6, dated 17th October 1902, to the Punjab Government conveying the sanction of Government to the modified scheme for colonisation on horsebreeding conditions of the land commanded by the Jhelum Canal. Regarding the class of colonists to be accepted and the conditions on which the land is to be granted, one of the chief conditions stipulated was that each grantee

will have to produce a mare fit for breeding remounts approved by an officer of Government and branded by him. He will undertake to breed from this mare utilising the service of a Government stallion and to give Government a lien on the produce up to the age of 18 months. In the event of the mare dying or proving barren, etc., he will be bound to produce another approved mare within three months. In case of a breach of any conditions the grant will be subject to forfeiture or to fine in lieu of forfeiture. It was decided not to go in for mule-breeding in the Jhelum Canal Colony, so as not to allow inferior mares to come in at the start and to have a high standard from the commencement.

In Military Department No. 7158-D., dated 23rd December 1903, the Government of India sanctioned the adoption experimentally of certain proposals submitted by the Punjab Government for making grants of land to lambardars in the Chenab Canal Colony in order to encourage mule-breeding.

The scheme is briefly to make the lambardars or headmen of villages grants of land subject to mule breeding conditions in the same way as grants are made to peasants and others in the Jhelum Canal Colony on horse-breeding conditions, with the difference that the proposed conditions have not been made *obligatory* on lambardars already appointed under the old conditions.

37. I have now given a brief *résumé* of the conditions under which Imperial Horse-Breeding in India was transferred to the charge of this Department and will now give the statistical results, etc., for the year—the produce obtained, however, is the result of the previous year's work of the Civil Veterinary Department who were then in charge of horse and mule breeding operations and their work was undoubtedly much hampered by the unsuspected presence of Dourine.

PART A.—IMPERIAL REPORT.

I.—HORSE-BREEDING.

38. *Stallions on the Register.*—A reference to Table I will show that 319 horse and pony stallions were received from the Civil Veterinary Department. Thirty eight were added and 50 removed from the strength, leaving a balance of 307 on the 31st March 1904. Of the 36 received by importation from England and purchase in India, my remarks will be found recorded below. Of the 50 removed from the register, 37 died, were destroyed or sold, and of the rest 9 were returned to the Civil Veterinary Department, 3 were cast and transferred to the Remount Depot, Mona, and one presented to the Palitana State.

39. *Ages of stallions.*—Table II shows that of the 273 allotted horse and pony stallions remaining at the end of the year, 109 were up to 10 years of age, 125 over 10 years and up to 15 years, and 39 over 15 years of age.

40. *Cost of feed and keep.*—A reference to Table III will show that the general average cost of feed and keep of stallions was Rs. 363-11-9 for horse stallions and Rs. 371 for pony stallions. The latter figure concerns the Deccan Circle where alone Imperial pony stallions are kept and where the cost of feed and keep is higher than in other parts of the country.

41. *Stallions at work.*—The number of horse stallions actually employed on stud work during the year was, as will be found recorded in Table IV, 220-11. The remainder were either unacclimatized or ineffective from sickness or other causes.

NOTE.—For purposes of comparison the Civil Veterinary Department figures for the past year have been taken so far as they are applicable to the selected districts.

42. *Mares covered.*—Table IV shows that 11,164 mares were covered by Government stallions during the year.

The average of mares covered per stallion is 50-72 against 57-40 last year.

43. *Produce.*—The number of foals produced during the year as shown in Table V is 2,592.

44. *Stallions imported and purchased.*—The number and classes of stallions received either by importation from England or purchase in India, are detailed below:—

From England ...	Thoroughbred English ...	12
Imported by Messrs. Krcrouse Madden and Mackinnon.	Thoroughbred Australians	8
Purchased in India	Thoroughbred English ...	1
	Arabs ...	12
	Country bred ...	3
Received from Remount Depot, Ahmednagar ...	Country bred	2
TOTAL		38

The average prices paid for horses purchased in India, were—

	Rs.
For Thoroughbred Australians imported by Messrs. Krcrouse Madden and Mackinnon, £350 or ...	5,250 each.
For Arabs purchased in India ...	2,511 "

The average cost of the 12 thoroughbred English stallions imported from England, was £282-14-0. This, however, represents the actual price paid and does not include transit and other incidental charges.

Thoroughbred English—Twelve thoroughbred English stallions were imported from England during the season. The first lot received in December consisting of 'Mount Thomas,' 'Millinite,' 'Irish Frieze,' 'Mambrino,' 'The Deacon' and 'Black Drake' were all of a good stamp and thoroughly suitable.

The second batch received in March consisting of 'Kiltullagh,' 'Portberry,' 'Silver King,' 'Pom Pom,' 'St. Expedit' and 'Kentish Glory,' was an unsatisfactory one; 'Kentish Glory' is a good horse; otherwise—excepting 'Kiltullagh,' they were all too light in bone and with the exception of 'Kentish Glory' they had certain defects which rendered them unsuitable as stallions for this country. I have personally explained their respective faults to Colonel Deane who I feel sure will in future send the stamp of horse required.

Arabs.—The Committee appointed for the purchase of Arab stallions in Bombay was composed of—

Colonel H. Goad	...	...	...	...	President.
Colonel J. W. A. Morgan	...	...	...	...	} Members.
Major F. J. M. Edwards, D.S.O.	...	...	...	...

The Committee assembled in the first instance at Poona on 1st October 1903 and purchased two stallions. They next met in Bombay on 11th December 1903 and bought five more, and finally completed their purchases by securing five at Bombay last February. They had great difficulty in obtaining the horses required. Several are of high class and all of a class to get good remounts. The number of Arabs imported during the season was in excess of the last few years, but the general standard was lower; a very great amount of rubbish being imported this year.

Thoroughbred Australians.—The Committee appointed for the purchase of Australian stallions in Madras was composed of—

Colonel H. Goad	...	...	...	...	President.
Major H. C. Hamilton	...	...	...	...	} Members.
Major W. D. Gunn	...	...	...	...

They bought eight stallions imported by Messrs. Krcrouse, Madden and Mackinnon, which were classed as follows: 'Little Jack,' 'Flying Pieman' and 'Certainty'—very good. 'Advent,' 'Glencoe,' and 'Chieveley'—good. 'Haymaker' and 'Gresham' passable.

The Committee laid down the following rules for the future guidance of stallion importers—

1. All stallions must be in the Stud Book.
2. No stallion will be accepted with less than $7\frac{3}{8}$ inches leg, this measurement being taken with the tape drawn *very* tight and measurement taken at least two inches below the knee.
3. No stallion over 8 years of age will be accepted unless a very exceptional horse.
4. Stallions must be real stout horses with substance; good racing performances are a decided recommendation, but cannot be accepted at a sacrifice of bone and power. All stallions must have good fore-hands.
45. *Castration*.—Table VIII shows that 1,042 colts were castrated by Veterinary Assistants paid from Imperial Funds.

46. *Relative success of stallions as sires*.—The Abstract in Table IX, giving the produce of Government stallions that won prizes at Horse Fairs shows that the Stud-bred sire heads the list with a proportion of 14, followed by the thoroughbred Australian 4.81, thoroughbred English 4.18, Arabs 2.69,

Hackneys and Norfolk Trotters 1·83 and Country-breds 1·0. The long lead of the Stud-bred is due largely to the fact that he is the only one of his class in the Department and is an extraordinarily good stock-getter. This animal was bred in General Parrott's stud and shows what India can do in the way of breeding good stallions.

47. *Country-bred Remounts purchased.*—As shown in Table X, the number of remounts purchased during the year was 1,216 as follows:—

Army Remount Department	...	...	...	182
Native Cavalry	...	...	...	803
Police	...	...	...	142
Imperial Service Troops	...	...	...	89

48. *Casualties.*—Table XI shows that during the year 4 horses died and 27 were destroyed, giving a percentage of 12·34. Full particulars of each stallion died or destroyed will be found in Table XI (A).

49. *Stallions sold.*—Table XII furnishes particulars of 9 horses sold during the year; of which 1 was a bad stock getter, 3 were unfit for employment as sires, and 5 were cast for disease.

50. *Branded mares.*—Table XIII. The year under report opened with a balance of 16,005 branded mares for horse-breeding and 468 for pony-breeding on the registers and closed with 15,813 and 1,752, respectively. The number branded during the year amounted to 5,190 for horse-breeding, 1,326 for pony-breeding and 526 for mule-breeding.

II.—MULE-BREEDING.

51. *Donkey stallions on the Register.*—Table I will show that 353 donkey stallions were received from the Civil Veterinary Department that 32 were added, 20 by importation, and 12 by purchase from the Government Cattle Farm, Hissar. Forty two were removed from the strength, leaving a balance on the last day of the year of 343. Of this latter number, 155 were up to 10 years of age, 118 over 10 and up to 15 years, and 20 were over 15 years of age (*vide* Table II). The remaining 50 were unallotted.

52. *Cost of feed and keep.*—Table III shows the average cost as Rs. 175-14-1 per annum.

53. *Donkey stallions at stud.*—Tables VI and VII show that the number of donkey stallions actually employed during the year, at stud, was 232 against 266 in 1902-03, of these, 26·61 and 25·33 respectively, were used solely for donkey-breeding purposes.

54. *Mares covered.*—Tables VI and VII. The number of mares served by donkey stallions was 14,262 pony mares and 1,190 donkey mares, against 14,823 and 1,426 respectively, in the previous year. The average number of mares covered per stallion was:—

Pony mares	...	...	...	69·43 against 61·63
Donkey mares	...	...	...	44·72 „ 56·28

55. *Produce.*—Table VII. The results of the previous year's coverings are—

Mule foals	...	...	...	...	2,683
Donkey foals	...	...	...	...	233

56. *Stallions imported.*—During the year 20 Cyprian donkeys were received. Owing to the poor quality of these and to the very unbusiness-like methods of the authorities in Cyprus, Government on my recommendation decided to terminate the agreement and to procure no more donkey stallions from Cyprus.

Arrangements have been made to purchase 21 American donkeys. They are expected to arrive in November.

Twelve donkey stallions were purchased from the Hissar Government Cattle Farm at a cost of Rs. 400 each. (Two of these were sold to the Bhurtpur Durbar). They are of excellent class and do great credit to the Hissar Farm under Civil Veterinary Department management.

57. *Casualties*.—A reference to Table XI will show that during the year under report 11 donkey stallions died and 25 were destroyed; giving a percentage of 13.58. Particulars as to causes of death and destruction will be found recorded in Table XI (A).

58. *Sales*.—Table XII gives particulars of 3 donkey stallions sold during the year. It will be observed that of this number, one was cast and sold as impotent and two were worn out and useless for stud work.

59. In February a tour was made by the Superintendent, Jhelum Canal Colony, in the Chenab Colony in connection with the scheme for mule breeding there. Four hundred mares were presented for inspection, a number being the property of lambardars to whom the "Conditions" do not apply. Of these 96 were branded and registered and it was carefully explained to the people the class of mare that was required. A further inspection will take place this autumn, when it is expected a larger number of mares will be reviewed, and of the correct stamp. Arrangements are being made in the meantime in consultation with the Colonisation Officer for the distribution and accommodation of donkey stallions to meet the requirements.

60 *Maps*.—Sketch maps of the circles showing the position of stallion stands and the number of stallions at each stand accompany this report.

PART B.—PROVINCIAL REPORT.

I.—HORSE-BREEDING.

61. *Stallions on the Register.*—A reference to Table I will show that there were 88 stallions at the beginning of the year; 13 were added to the Registers and 19 removed, leaving a closing balance of 82.

62. *Cost of feed and keep.*—The cost of feed and keep of pony and donkey stallions is given in Table II. The figures being—

						Rs.
Ponies	...	...	...	...	...	218
Donkeys	...	...	...	...	...	129

The highest average was in the Rawalpindi circle, Rs. 250 for ponies and Rs. 192 for donkeys.

63. *Stallions at work.*—Table III shows that of 82 stallions on the Register, 77 were actually employed at stud work, against 85 in the previous year.

64. *Mares covered.*—Table III shows that 5,040 mares were covered against 5,030 in the previous year (Table IV). The average of mares served per stallion employed is 65.45 against 59.17.

65. *Casualties.*—An abstract of casualties given in Table VII shows that 2 ponies died and 13 were destroyed, a percentage of 17.0. Table VII (A) gives particulars of casualties.

66. *Sales.*—Table VIII records 3 pony stallions as sold during the year, being unfit for further stud work. The average price realized was Rs. 51.

II.—MULE-BREEDING.

67. *Stallions on Register.*—Table V shows that of 16 donkey stallions on the Registers, 7 were actually employed at stud against 5 in the previous year (Table VI). The cost of feed and keep of these animals (as shown in Table II), averaged Rs. 129 per annum.

68. *Mares covered.*—The number of mares covered will be seen by a reference to Tables V and VI :—

Pony mares	...	...	...	...	305 against 299 last year.
Donkey mares	...	...	...	...	272 " 221 " "

69. *Produce.*—Table VI. The result of the previous year's coverings shows 68 mule foals and 45 donkey foals.

PART C.—NATIVE STATES.

70. One Imperial Stallion, "Master Lurgan," thoroughbred English, has been lent to the Vankaner State in the Bombay Presidency. He served 53 mares during the year under report and 21 mares last year. Of the 21 mares served in 1902-03, 4 mares foaled and 17 did not hold.

Besides Vankaner, 7 States carry on horse-breeding operations with their own stallions. Returns received from these States are summarised below :—

State.	MARES SERVED.		RESULTS FROM THE COVERAGES OF 1902-03.		
	1903-04.	1902-03.	Foals.	Not held.	Not known.
Janagarh	86	70	18	17	35
Bhavnagar	Information not received.	203	30	39	34
Porbunder		46	8	4	34
Gondal		27	13	11	3
Rajkot		77	32	38	7
Manwader		33	18	14	...
Palitana	Returns not received.				
Total	86	455	119	173	163

HORSE FAIRS AND SHOWS.

71. Table XIV is an abstract of particulars regarding Horse Fairs and Shows held during the year 1903-04.

RAWALPINDI CIRCLE.

72. In the Rawalpindi Circle two Fairs were held. The number of animals competing was 4,099 against 4,410 last year.

Gujranwala and Rawalpindi.

The number of remounts bought by the Army Remount Department was 8 and by Native Cavalry Regiments 20.

Gujranwala.—The Fair was much interfered with by rain, there being only 689 animals present as compared with 1,393 last year. Five remounts were purchased for Government. There were no good mules of any sort at the Fair.

Rawalpindi.—This Fair showed an increase of 403 in the number present and of 47 in those competing for prizes. Three remounts were purchased for Government and 20 for Native Cavalry. Ten mules were purchased by Government and 45 by others. Remounts were difficult to purchase, prices were very high and owners were, I am glad to say, not parting with fillies.

JHELUM CANAL COLONY CIRCLE.

73. Three shows were held in this Circle. The number of animals present was 5,877 against 6,405 last year. The competitors show a satisfactory increase—1,132 against 1,037. The number of remounts purchased was 33 and mules 20.

Lyalpur, Jhang and Shahpur.

Lyalpur.—Though a fair of quite recent institution, it is an extremely promising one. The quality and number of brood mares were good, and the young stock very fair. At present owners are mostly new to horse-breeding, but are undeniably keen and when they have gained more experience should get good results. The improved agricultural condition of this district has given horse and mule-breeding a marked impetus.

Jhang.—A disappointing fair, due to the prejudice which still exists amongst breeders against the use of Government stallions and especially Arabs. The district contains many indigenous mares of a useful stamp, which, if served by good Arabs or thoroughbred English stallions, would undoubtedly breed good young stock. Owners are for the most part hereditary horse breeders. This fair will, I feel sure, improve in time, and Captain Templer hopes to overcome the prejudice against Arabs by giving this district some specially selected horses. Only two mules were purchased and these by private persons.

Shahpur.—This fair continues to enjoy the reputation of being one of the best in India. The increase in numbers and steady improvement in quality of the brood mares is most satisfactory as is also the quality of their young stock. Twelve remounts and 6 mules were purchased for Government and 21 remounts for Native Cavalry. Twelve mules were bought by others.

LAHORE CIRCLE.

74. Four shows were held in this Circle, but the number competing for prizes was less than last year, viz., 1,314 against 1,570. The decrease is due to many mares having been bought for the Jhelum Canal Colony, and many young animals for Native Cavalry runs. The abandonment of the Jellalabad fair tended in a great measure to the decrease. The following remounts were purchased:—

For Government	...	...	...	...	26
„ Native Cavalry	...	...	...	...	303
„ Police	...	...	...	...	8

Sixty mules were purchased by Government and 722 by others.

Amritsar (Dewali Fair).—Though the number attending the fair was greater than last year the number competing for prizes was less. The classes of animals competing were indifferent with the exception of class III fillies. A high price was asked for mules and they seemed to be entirely in the hands of dealers. Six British and 80 Native cavalry remounts were purchased and 16 mules for Government and regimental purposes.

Dera Ghazi Khan.—Owing to many mares having been bought for the Jhelum Canal Colony, also many young stock for Native cavalry runs the number of animals present was less than last year. The classes as a whole were decidedly good and zemindars appeared keen to compete. The number of remounts purchased was 10 for Government and 125 for Native cavalry. Fourteen mules were purchased by Government, and 57 by others.

Multan.—The fair showed a slight increase on last year. The class for branded mares and fillies was quite good, the remaining classes and the mules very indifferent. The number of remounts purchased was 6, and of mules, 15 were purchased by outsiders. The interest taken this year by the civil authorities should make this fair more popular next year.

Amritsar Baisakhi Fair.—The attendance was very large and the exhibits of good quality, especially the young stock. The number of remounts purchased was 7 for British cavalry and 100 for Native cavalry. The mule class also was good; 30 were purchased by Government and 2 by others.

BALUCHISTAN CIRCLE.

75. In this Circle five shows were held. The numbers competing for prizes show an increase over last year, 3,404 against 3,005. The number of remounts purchased was 327 and mules 93.

Quetta, Sibi, Jacobabad, Moro and Shikarpur.

Quetta.—The number exhibited was 522 against 539 in the previous year. The classes for branded mares, fillies and ponies were very good, the remainder poor. Sixty-eight remounts were purchased:—15 for Government, 41 for Native cavalry and 12 for Imperial Service Lancers—against 217 in the previous year when Native cavalry were stocking their runs.

Sibi.—The number present was 764 against 515 last year. The classes in the main were very good but the mules and ponies exhibited were poor. Twenty-one remounts were purchased for Native Cavalry. Very few suitable young stock were shown.

Jacobabad.—The number and quality of the animals exhibited were very good. Eleven remounts and 20 mules were purchased for Government 148 and 36 for Native cavalry and 67 remounts for Police.

Moro.—With the exception of branded mares, mares for mule breeding and donkeys, the animals competing were of a very poor stamp. One remount and 5 mules were purchased for Native cavalry and 2 remounts for Police.

Shikarpur.—The class of animals competing was good, with the exception of the yearling and gelding classes which were poor. Nine remounts were purchased for the Police, 4 mules for Government and 31 mules for Native cavalry.

In the Upper Sind Frontier district there is a good demand for stallions and horse breeding flourishes owing to many of the inhabitants being Baluchis. Very good young stock suitable for army purposes can be obtained. But in Lower Sind mares are very small and young stock utterly neglected. There is also a prejudice against branding mares and Government stallions are not in favour. A few Police remounts can be obtained, but very few if any fit for army purposes. The Sindhis are an indolent people and will not take the trouble necessary to breed good horses.

UNITED PROVINCES CIRCLE.

76. Five shows were held in this Circle. The total number of animals attending the four district shows was 7,975 as compared with 5,256 last year and those competing 1,735 as compared with 1,710 in the previous year. Twenty-nine remounts were purchased for Government against 10 in the previous year and 197 for Native and Imperial Service cavalry as compared with 175.

Garhmuktesar.—Practically only a mule fair. The class of mules extremely poor and prices asked for young mules very high. Only one ordnance mule was purchased.

Aligarh.—There was an increase in the numbers competing for prizes—233 against 211 in the previous year. Twenty-six remounts and 2 mules, also 30 mounted infantry ponies were purchased.

Bulandshahr.—This fair produced the best class of young animal in the United Provinces Circle: the zemindars in the district seem to take more interest in horse-breeding than in other districts and treat their young stock better. There was an increase of 228 in the animals present, but a decrease of 66 in the number competing for prizes this year. The decrease may be attributed to heavy rain having fallen during the fair, and also to the Holi festival falling within the period of the show. Fourteen young stock and 2 mules were purchased for Government, 24 remounts were also purchased for Native cavalry.

Muzaffernagar.—There was an increase of 605 animals attending the fair and of 37 competing for prizes. Nine young stock and 2 mules were purchased for Government and 32 remounts were purchased for Native and Imperial Service cavalry. Two mules were also purchased by the Supply and Transport corps. The power and substance shown by the ponies were very good.

Nauchandi.—The number of animals attending the fair was 1,530 as compared with 1,543 last year, but 518 only competed against 596 in the previous year. Only one young stock for Government was purchased. Seventy-three remounts and 2 mules were purchased for Imperial Service cavalry. Seventeen remounts were purchased for the Police. This fair was much inferior to the others, apparently because many animals from the Meerut district had taken prizes at the Bulandshahr and Muzaffernagar shows and were consequently debarred from competing for prizes at Nauchandi. The show also took place rather late in the season when zemindars were occupied with their crops.

DECCAN SUBSIDIARY CIRCLE.

77. Only one show is held in this Circle. The total number of animals competing was 507 against 347, the previous year, showing a satisfactory increase, though, owing to plague at Ahmednagar some of the breeders from the northern district did not attend. The brood mares were a very good class. The number of remounts purchased was 5 for Government and 3 for the Police.

Deccan Horse Show at Ahmednagar.

GENERAL.

EQUINE DISEASES.

78. In addition to Dourine which is prevalent in the United Provinces, Rawal Pindi and Lahore Circles the following outbreaks of disease occurred during the year :—

Jhelum Canal Colony Circle.—Surra broke out in October in the Shahpur district over areas previously visited by the disease and is attributable to the country being flooded by heavy rains and by breeches in the canals. Fifty-three deaths occurred, and the outbreak ceased about the beginning of January. Fourteen cases were detected in the Jhelum Canal Colony having been contracted in and imported from Shahpur. The cases were isolated and the disease checked.

Lahore.—In November there was an outbreak of Surra in the Mamdot State stud near Jallalabad in the Ferozepur district. Prompt measures were taken to suppress the disease, but it resulted in severe loss to the Mamdot stud. To avoid the danger of the disease spreading, the Jallalabad fair fixed for the 25th February was abandoned.

HEALTH.

79. *Jhelum Canal Colony Circle.*—The health of the staff was bad from September when malarial fever became prevalent in a virulent form. This was particularly the case in the Shahpur district and the Jhelum Canal Colony where it continued well into January and where the entire establishment suffered.

In March plague appeared in the Jhelum Canal Colony and Shahpur, and these districts have since suffered from one of the most virulent outbreaks of this disease with the unfortunate result that many of the colonists bolted to their original homes taking their mares with them. These mares were not covered.

Baluchistan.—Cholera and small-pox were prevalent during the summer, and the strict quarantine regulations considerably hampered the movements of Zemindars, preventing them from bringing their mares to the stands for covering.

Appendix I.

Statement shewing year by year—

(a) The number of young stock present on the 1st of April,

(b) The casualties between April 1st and March 31st,

(c) The percentage of casualties,

of young horse stock purchased at an age lower than 18 months, and between June 1899 and the 31st March 1904.

Year of purchase.	Number present at the opening of the year.	Number purchased during the year.	CASUALTIES DURING THE YEAR.			Number on which percentage is calculated i.e. total of columns 2 and 3.	Percentage of casualties.	Issued to service.	Present at the close of the year.
			Died and destroyed.	Cast and sold.	Total.				
1	2	3	4	5	6	7	8	9	10
1899-1900	.....	27	1	1	2	27	7.4	.....	25
1900-1901	25	24	1	1	2	49	4.08	.....	47
1901-1902	47	33	3	4	7	79	8.86	.....	72
1902-1903	72	32	11	5	16	104	15.38	5	83
1903-1904	83	66	(a) 2	(b) 5	7	149	4.66	19	124

(a) 1 destroyed for spavin, off hock; 1 died from strangles.

(b) 1 cast as unsound; 4 cast as unsuitable.

Appendix II.

Statement showing the names of Australian shippers to whom commissions were given for British service horses to be landed during 1903-04, together with the numbers presented and actually purchased.

CALCUTTA.				MADRAS.				BOMBAY.			
Names of shippers.	Commissioned.	Presented.	Purchased.	Names of shippers.	Commissioned.	Presented.	Purchased.	Names of shippers.	Commissioned.	Presented.	Purchased.
Mr. C. F. Glasscock	185	211	187	Messrs. Krcrouse, Madden and Mackinnon	172	256	141	Mr. Baldock	85	160	121
" J. Gove	173	236	181	Mr. Gidney	76	138	61	" Naples	85	124	50
" S. Margrett	159	229	161	" Derham	76	165	76	" Tullock	85	189	79
" H. Hurley	157	218	158	" W. J. Keates	54	162	54	" Hunter	45	212	47
" W. J. Lyons	128	156	128	Uncommissioned	12	...	...	" Cotgrave	25	67	34
" M. F. Howard	105	131	105	... ..	...	...	...	Uncommissioned	7	...	...
" R. McKenna	102	129	102	... ..	...	...	...	... ..	...	...	...
" R. Gilder	101	138	113	... ..	...	...	...	... ..	...	...	...
" S. F. Reynolds	99	136	99	... ..	...	...	...	... ..	...	...	...
" J. Gascard	98	130	103	... ..	...	...	...	... ..	...	...	...
" H. P. Varenen	96	140	97	... ..	...	...	...	... ..	...	...	...
" J. S. Love	79	121	79	... ..	...	...	...	... ..	...	...	...
" M. L. Paterson	58	90	65	... ..	...	...	...	... ..	...	...	...
" W. Hawkins	28	52	28	... ..	...	...	...	... ..	...	...	...
" H. Hegarty	19	69	37	... ..	...	...	...	... ..	...	...	...
" F. Shiels	10	18	11	... ..	...	...	...	... ..	...	...	...
Uncommissioned	12	...	...	... ..	...	...	...	... ..	...	...	...
			
			
TOTAL	1,609	2,204	1,654*	TOTAL	390	721	332†	TOTAL	332	762	331†

* Excludes one Australian purchased from Sir Edward Law.
 Ditto from Colonel Eccles,
 Ditto from Sir Donald Robertson.

Appendix III.

Statement showing the names of shippers to whom commissions have been granted for the importation of horses during 1904-05.

CALCUTTA.					MADRAS.					BOMBAY.							
Shippers.					Shippers.					Shippers.							
Number commissioned.					Number commissioned.					Number commissioned.							
Mr. C. F. Glasscock	328	Messrs. Krcrouse, Madden and Mackinnon	...	...	...	...	411	Mr. J. L. Tullock	...	...	...	...	173
" J. Gove	308	Mr. Gidney	...	...	...	...	170	" R. J. Hunter	...	...	...	...	91
" S. Margrett	282	" Derham	...	...	...	...	181	" R. G. Baldock	...	...	...	...	176
" H. Hurley	279	" W. J. Keates	...	...	...	...	134	" T. C. Naples	...	...	...	...	149
" W. J. Lyons	227	Uncommissioned	...	...	...	...	12	" G. W. Cotgrave	...	...	...	...	71
" M. F. Howard	189							Uncommissioned	...	...	...	...	9
" G. McKenna	181	MADRAS CAVALRY,						Mr. Leopold Hauser	...	...	...	...	80
" A. Gilder	179	Mr. J. S. Love	...	...	...	...	100						
" S. F. Reynolds	177	Uncommissioned	...	...	...	...	11	MADRAS CAVALRY.					
" J. Gascard	176							Mr. R. C. Baldock	...	...	...	...	20
" H. P. Vanrenen	173							G. W. Cotgrave	...	...	...	...	80
" J. S. Love	141							" W. Moran	...	...	...	...	14
" M. L. Paterson	104												
" H. Hegarty	33												
" W. Hawkins	52												
" F. Shiels	17												
Colonel Brough	300												
Messrs. Moncreiffe	100												
Colonel Mackay	45												
Uncommissioned	12												
TOTAL	2,891	TOTAL	1,002						

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Appendix IV.

Statement showing the names of the places where the 182 country-bred stock were purchased during the year 1903-04, the number bought and the names of the officers buying them.

Names of places.	No.	By whom purchased.
Amritsar	12	{ 6 Captain F. Shakespear. 6 " S. A. M. Orr.
Quetta	15	Major H. McN. Patterson.
Batesar	1	" C. H. Gough.
Gurhmuktesar	3	Major B. J. H. Humfrey.
Babugarh	8	Ditto.
Chak Ram Dass (J. C. C.)	1	Captain C. F. Templer.
Kalra	3	Ditto.
Haripur	1	Captain A. C. Stewart.
Massan	2	Ditto.
Khan Kali-Dugram	1	Ditto.
Mona	6	Captain C. F. Templer.
Lahore	1	" S. A. M. Orr.
Multan	4	Ditto.
Fatehganj	1	" A. C. Stewart.
Moneypur	4	{ 2 " C. F. Templer. 2 Colonel H. Goad.
Jhang	1	Lieutenant J. Bruce.
Gujranwala	5	Captain A. C. Stewart.
Dera Ghazi Khan	10	" S. A. M. Orr.
Gulaothi (Bulandshahr)	4	Major B. J. H. Humfrey.
Aligarh	5	Ditto.
Bulundshahr	14	Ditto.
Goughabad	7	Colonel H. Goad.
Shahpur	12	Captain C. F. Templer.
Muzaffarnagar	9	Major B. J. H. Humfrey.
Gujrat	1	Captain C. F. Templer.
Rawalpindi	3	" A. C. Stewart.
Ahmednagar District	2	" E. Brandreth.
" Fair	5	Lieutenant-Colonel R. Broome.
Palitana	5	Ditto.
Bhavnagar	4	Ditto.
Rajkote	9	Ditto.
Wankanir	6	Ditto.
Districts	2	Captain A. Hewlett.
Jacobabad	11	Major H. McN. Patterson.
Bombay	1	Captain F. D. Hunt, A.V.D.
Jodhpore	3	Colonel H. Goad.
TOTAL	182	

Appendix V.

Statement showing the names of officers who purchased the 84 country-bred stock that were issued to the British service or cast and sold during the official year 1903-04 with fit and unfit proportions of those purchased by each.

Name of purchasing officer.	British service.	Cast and sold.	Total.	REMARKS.
Lieut.-Col. Broome ...	20	..	20	
Major Gough ...	7	2	9	
Captain Brandreth ...	1	...	1	
" Turner ...	2	1	3	
" Templer ...	16	6	22	
" Hay ...	1	...	1	
" Shakespear ...	2	11	13	
Colonel Morgan ...	8	...	8	
Depôt foals ...	1	6	7	
TOTAL ...	58	26	84	

Appendix VI.

Statement showing the names of the places at which the 84 country-breds obtained that were either issued to the British service or cast and sold during the official year 1903-04 with fit and unfit proportions from each place.

Name of place at which purchased.	British service.	Cost and sold.	Total.	REMARKS.
Rawalpindi	2	...	2	
Babugarh ... ..	...	1	1	
Garhmuktesar	1	...	1	
Bulandshahr	3	4	7	
Amritsar	1	...	1	
Meerut (Nowchandi)	1	5	6	
Bhag	2	2	4	
Shahpur	3	...	3	
Quetta	2	1	3	
Civil Veterinary Department	2	...	2	
Sibi	3	4	7	
Dera Ghazi Khan	5	...	5	
Toba Tek Singh	1	...	1	
Aligarh ... ..	...	1	1	
Muzuffarnagar ... ..	...	2	2	
Poona District	1	...	1	
Ahmedabad	1	...	1	
Bhavnagar	6	...	6	
Wankanir	2	...	2	
Jacobabad	6	...	6	
Ahmednagar District	9	...	9	
" Fair	4	...	4	
Rajkote	2	...	2	
Depôt foals	1	6	7	
TOTAL	58	26	. 84	

IMPERIAL.

TABLE I.

Return of Government HORSE, PONY AND DONKEY STALLIONS for the year 1903-04.

DETAILS.	GOVERNMENT HORSE AND PONY STALLIONS.											GOVERNMENT DONKEY STALLIONS.													
	HORSES.							PONIES.				Total horses and ponies.													
	1 horse-bred Eng. sh.	Norfolk trotters.	Hackney.	Australian.	Arab.	Stud-bred.	Country-bred.	Total.	Arab.	Country-bred.	Total.		Spanish (Cuban-ponies).	Arab.	Home-bred.	Italian.	American.	Portian.	Cyprian.	Glaucl.	Mebed.	Chitese.	Zambart.	Fuzabi and country-bred.	Total.
Received from Civil Veterinary Department during 1903-04	89	1	3	59	160	1	1	307	11	1	12	319	88	6	3	104	10	10	135	1	2	2	1	21	346
Increase																									
Received by importation	12			3				20				20						20							20
Purchased in India	1				12		3	16				16												15	15
Received from Remount Depot, Ahmednagar							3	3				3												1	1
Total	96	1	3	62	172	1	6	345	11	1	12	367	88	6	3	104	10	10	155	1	2	2	1	26	366
Decrease																									
Presented to Palliana State	1							1				1													1
Returned to Civil Veterinary Department							6	6	3		3	9													9
Sent to Madras Mule-Breeding Company															1										1
Died	1			6				4				4	1			1			6					1	11
Destroyed	6		3	3	16			27				27	3		1	16		3	1					3	26
Sold	1		1		4			6				6												3	6
Cast and transferred to Remount Depot, Mena					3			3				3													3
Total	9		3	6	20			47			3	50	4		1	19		3	9					6	62
Balance on 31st March 1904	87	1		60	143	1	6	298	6	1	9	307	84	6	3	85	9	7	140	1	2	2	1	47	346
In Bawal Field Circle	14			10	18			39				39	9	1	3	14	1	4	51				1	39	121
Jhelum Canal Colony Circle	14			12	23		3	62				62	3		10				6					6	36
Lahore Circle	14	1		13	23	1		61				61	10	3	19	1	3		27			1		7	98
Baluchistan Circle	7			9	26			62				62	6	1	15	3	1		20	1	3				60
United Provinces Circle (allotted and unallotted)	33			14	35		1	72				72	6	3	12	5	1		36			1		6	88
Deccan Subansary Circle	6			3	12		2	21	6	1	9	31													31
Total	87	1		60	143	1	6	298	6	1	9	307	84	6	3	85	9	7	140	1	2	2	1	47	346

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IMPERIAL.

TABLE II.

Statement showing the AGES OF STALLIONS on the register on 31st March 1904.

Circle.	HORSES AND PONIES.				DONKEYS.				REMARKS.
	Up to 10 years.	Over 10 and up to 15 years.	Over 15 years.	Total.	Up to 10 years.	Over 10 and up to 15 years.	Over 15 years.	Total.	
Rawal Pindi ...	18	13	8	39	67	46	8	121	
Jhelum Canal Colony.	25	27	10	62	12	9	5	26	
Lahore ...	15	28	8	51	39	24	5	68	
Baluchistan ...	18	27	7	52	16	22	2	40	
United Provinces...	22	15	1	*38	21	17	...	†38	* Allotted stallions; 34 unallotted not shown.
Deccan Subsidiary	11	15	5	31	...	...	...	...	† Allotted stallions; 50 unallotted not shown.
Total ...	109	125	39	273	155	118	20	293	

TABLE III.

Cost of FEED AND KEEP OF STALLIONS during 1903-04.

Circle.	AVERAGE COST PER STALLION PER ANNUM.					
	HORSE.		PONY.		DONKEY.	
	Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Rawal Pindi ...	327 7 0	...	...	...	155 7 0	...
Jhelum Canal Colony.	342 11 3	...	...	...	139 8 11	...
Lahore ...	344 1 11	...	...	...	145 13 7	...
Baluchistan ...	445 2 8	...	...	...	291 2 5	...
United Provinces...	288 15 8	...	...	...	147 6 5	...
Deccan Subsidiary	434 0 0	...	371 0 0	...	...	...
General average	363 11 9	...	371 0 0	...	175 14 1	...

IMPERIAL.

TABLE IV.

SERVICES OF Horse and Pony STALLIONS during 1903-04.

Horse or pony.	Circle.	Stallions on register at end of year.	Stallions actually employed at stud.	Number of mares covered.	AVERAGE OF MARES COVERED PER STALLION EMPLOYED AT STUD.	
					Year under report.	Previous year.
Horse	Rawal Pindi	39	24	1,450	60.04	63.50
	Jhelum Canal Colony	62	35	3,005	85.85	89.00
	Lahore	51	40	2,684	67.10	63.06
	Baluchistan	52	55.7	1,839	71.38	98.46
	United Provinces	38	36	1,156	33.1	57.58
Pony	Deccan Subsidiary	31	29.41	1,030	35.02	30.79
	TOTAL	273	220.11	11,164	60.72	67.40

TABLE V.

PRODUCE OF Horse and Pony STALLIONS during 1903-04.

Horse or pony.	Circle.	STALLIONS ACTUALLY EMPLOYED AT STUD.	NUMBER OF MARES COVERED.	RESULTS OF PREVIOUS YEAR'S COVERINGS.			Average of produce per stallion.
				Previous year.	Previous year.	Number of produce.		Number not held.	Number not known.
Horse	Rawal Pindi	13.64	1,139	202	690	47	14.80
	Jhelum Canal Colony	16	1,424	340	833 [*]	251	21.25
	Lahore	43	2,713	799	1,311†	602	18.58
	Baluchistan	53.97	2,741	538	1,363	620	19.68
	United Provinces	36	2,073	483	1,322	268	13.41
Pony	Deccan Subsidiary	28.35	873	230	636	107	8.11
	TOTAL	190.96	10,962	2,592	6,275	2,035	13.51

* Including 61 blanks.

† Including 6 blanks.

IMPERIAL.

TABLE VI.

SERVICES of DONKEY STALLIONS during 1903-04.

Circle,	Stallions on register at end of year.	DONKEY STALLIONS ACTUALLY EMPLOYED AS STUD.		NUMBER OF MARES COVERED.		AVERAGE OF MARES COVERED PER STALLION EMPLOYED AS STUD.			
		For Mule-breeding.	For Donkey-breeding.	Pony.	Donkey.	PONY MARES.		DONKEY MARES.	
						Year under report.	Previous year.	Year under report.	Previous year.
Rawal Pindi ...	121	59	11	4,761	710	80.69	73.32	64.55	66.52
Jhelum Canal Colony ...	26	21	5	1,681	118	80.04	73.75	23.6	59.00
Lahore ...	68	56	4	4,226	232	75.46	72.01	58.00	62.00
Baluchistan ...	38	38.48	61	2,049	20	89.57	50.11	32.79	...
United Provinces ...	38	31	6	1,545	110	49.83	42.88	13.3	25.56
Deccan Subsidiary ...	...	...	...	...	...	...	...	...	...
TOTAL ...	291	205.48	26.61	14,262	1,190	69.48	61.68	44.72	56.28

IMPERIAL.

TABLE VII.

PRODUCE of DONKEY STALLIONS during 1903-04.

CIRCLE.	DONKEY STALLIONS ACTUALLY EMPLOYED AT STUD.		NUMBER OF MARES COVERED.		RESULT OF PREVIOUS YEAR'S COVERINGS.						AVERAGE PER STALLION.		REMARKS.
	For mule-breeding.	For donkey-breeding.	Pony mares.	Donkey mares.	Pony mares.			Donkey mares.			Pony mares.	Donkey mares.	
	Previous year.	Previous year.	Previous year.	Previous year.	Number of mule produce.	Number not held.	Number not known.	Number of donkey produce.	Number not held.	Number not known.	Mule produce.	Donkey produce.	
Rawal Pindi	75-40	12-33	5,151	878	973	4,133	45	152	721	5	12-90	12-32	
Jhelum Canal Colony	24	1	1,770	59	308	1,303*	159	9	49	1	12-83	9-00	
Lahore	55	6	3,961	310	825	1,984†	1,152	39	219	52	15-00	7-80	
Baluchistan	35	...	1,254	...	220	1,142	392	...	...	...	6-28	...	
United Provinces	51	7	2,187	179	357	1,427	403	33	133	13	7	4-90	
Deccan Subdivision	...	...	...	...	...	...	...	...	...	...	...	...
Total	240-40	25-33	14,823	1,426	2,683	9,989	2,151	233	1,122	71	11-16	9-23	

* Including 34 abortions.
 † " 155 "

IMPERIAL.

TABLE VIII.

Number of COLTS CASTRATED during 1903-04.

Circle.	HORSE STOCK.		MULE STOCK.		TOTAL.		NUMBER OF DEATHS RESULTING FROM CASTRATION.		REMARKS.
	Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	
Rawal Pindi	67	...	7	...	74	...	...	...
Jhelum Canal Colony	152	...	3	...	155	...	...	...
Lahore	183	...	19	...	202	...	...	...
Baluchistan	284	...	4	...	288	...	...	...
United Provinces	292	...	31	...	323	...	...	...
Deccan Subsidiary	...	...	...	...	...	...	...	...
Total	978	...	64	...	1,042	...	...	...

IMPERIAL.

TABLE IX.

Abstract of PRIZES WON BY the PRODUCE OF Government STALLIONS at Horse Fairs during 1903-04.

Class of sires.	Number of sires of each class.	NUMBER OF PRIZES AWARDED.					PROPORTION OF PRIZES TO EACH SIRE.				
		1st Prize.	2nd Prize.	3rd Prize.	Other Prizes.	Total.	1st Prize.	2nd Prize.	3rd Prize.	Other Prizes.	Total.
Thorough-bred English ...	123	106	73	65	272	516	.86	.59	.52	2.21	4.18
Hackney and Norfolk Trotters ...	45	9	12	6	56	83	.2	.26	.13	1.24	1.83
Australians... ..	79	41	47	37	257	382	.51	.59	.46	3.25	4.81
Arabs	171	48	50	52	312	462	.28	.29	.3	1.82	2.69
Stud-breds... ..	1	1	...	1	12	14	1	...	1	12	14.00
Country-breds	1	...	...	...	1	1	...	...	...	1	1.00
Total	420	205	182	161	910	1,458	2.85	1.73	2.41	21.52	28.51

IMPERIAL.

TABLE X.

Abstract of Country-bred REMOUNTS PURCHASED during the year 1903-04.

By whom purchased.	Number. purchased.	PEDIGERS.		PERCENTAGE OF PEDIGERS.	
		Furnished.	Not furnished.	Furnished.	Not furnished.
Army Remount Department	182	114	68	62·63	37·37
Native Cavalry Regiments	803	153	650	19·06	80·94
North-West Frontier Police	14	...	14	...	...
United Provinces	10	...	10	...	...
Punjab	27	...	27	...	...
Bombay Presidency	14	...	14	...	...
Sind	77	...	77	...	...
Imperial Service Troops	89	...	89	...	...
TOTAL	1,216	267	949	21·95	78·05

IMPERIAL.

TABLE XI.

Abstract of CASUALTIES of Horse, Pony, and Donkey STALLIONS during the year 1903-04.

Circle.	NUMBER DIED.			NUMBER DESTROYED.			TOTAL.			PERCENTAGE OF CASUALTIES.			REMARKS.
	Horse.	Pony.	Donkey.	Horse.	Pony.	Donkey.	Horse.	Pony.	Donkey.	Horse.	Pony.	Donkey.	
Rawal Pindi ... ..	...	...	8	3	...	5	3	...	8	4.76	...	5.97	
Jhelum Canal Colony ... ..	...	...	...	2	...	6	2	...	6	6.45	...	22.22	
Lahore	1	...	2	4	...	4	5	...	6	8.76	...	8.10	
Baluchistan ... ..	...	...	...	4	...	1	4	...	1	12.50	...	2.85	
United Provinces	3	...	6	12	...	9	15	...	15	11.81	...	14.41	
Deccan Subsidiary ... ..	...	...	...	2	...	...	2	...	...	10.00	...	...
Total	4	...	11	27	...	25	31	...	36	12.34	...	13.59	

Note.—The percentages are calculated on stock existing at the beginning of the year under report.

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IMPERIAL.

TABLE XI (A).

CASUALTY ROLL OF HORSE AND DONKEY STALLIONS 1903-1904.

IMPERIAL.

TABLE XI (A).

CASUALTY ROLL of Horse and Donkey STALLIONS 1903-1904.

Brand No.	Name.	Class.	Casualty.	Cause of Casualty.
HORSE STALLIONS.				
RAWAL PINDI CIRCLE.				
82	Quartus ...	Arab ...	Destroyed	Incurable disease.
2512	Inoculation ...	T. B. E. ...	"	} Dourina.
209	Kronas ...	Arab ...	"	
JHELUM CANAL COLONY CIRCLE.				
220	Galamorn ...	T. B. E. ...	Destroyed ...	Old and worn out.
2563	Waterfall ...	"	"	Impotent and unsound.
LAHORE CIRCLE.				
163	Ketchup (Faquir) ...	Arab ...	Destroyed ...	Dourina.
169	Lord Richmond ...	T. B. A. ...	Died ...	Enteritis.
57	Quadratic ...	Arab ...	Destroyed	} Dourina.
6	The Member III ...	Hackney ...	"	
128	Ascot Vale ...	T. B. A. ...	"	Kumree.

BALUCHISTAN CIRCLE.											
2610	The Dummy	...	...	...	...	T. B. E.	...	...	Destroyed	...	} Dourine.
108	Quorum	...	...	...	...	Arab	...	...	..	...
136	Moonstone	...	...	...	...	"	...	...	"	...
2	Quadrant	...	...	...	...	"	...	...	"	...
UNITED PROVINCES CIRCLE.											
208	Kincaird	...	...	...	...	Arab	...	...	Destroyed	...	Dourine.
63	Black Flag	...	...	...	...	T. B. A.	...	...	Died	...	Rupture of stomach.
302	Trus Haven	...	...	...	...	T. B. E.	...	...	Died	...	Intestinal complications.
198	Favonius	...	...	...	...	T. B. A.	...	...	Destroyed	...	Dourine.
81	Buckthorn	...	...	...	...	T. B. A.	...	...	Cast and destroyed	...	Spavin and lame.
236	Mendicant	...	...	...	...	Arab	...	...	Destroyed	...	} Dourine.
110	Quart	...	...	...	...	"	...	...	"	...
2569	Brandon Creek Champion	...	...	...	...	Hack	...	...	"	...
172	Miraculeux	T. B. A.	Died	...		Colic.
13	Quadruple	...	...	...	...	Arab	...	...	Destroyed	...	} Dourine.
2674	Quantus	...	...	...	...	"	...	...	"	...
165	Keystone	...	...	...	...	"	...	...	"	...
2352	Jugger	...	...	...	...	"	...	...	"	...
2668	Quoit	...	...	...	...	"	...	...	"	...
240	Miscreant	...	...	...	...	"	...	...	"	...
DECCAN SUBSIDIARY CIRCLE.											
...	Adonis	...	...	...	...	T. B. E.	...	...	"	...	Worn out and diseased.
...	Trustee	...	...	...	...	"	...	...	"	...	Old and worn out.

TABLE XI (A)—contd.

CASUALTY ROLL of Horse and Donkey STALLIONS, 1903-1904—contd.

Brand No.	Name.	Class.	Casualty.	Cause of casualty.
DONKEY STALLIONS.				
RAWAL PINDI CIRCLE.				
525	Herda	Italian	Destroyed	Spavin.
372	Gaipura	"	"	} Old and worn out.
341	Pachmarhi	"	"	
380	Khusarupur	"	"	
463	Neemcha	Persian	"	
163	Bhogpur	Cyprian	Died	Colic.
175	Modna	"	"	Gastro-enteritis.
348	Ghun	"	"	Colic.
JHELUM CANAL COLONY CIRCLE.				
90	Maled	Italian	Destroyed	Chronic disease near forefoot and ring bogs off fore.
64	Sandero	Punjabi	"	Very small, bad conformation and unsuitable.
384	Maharajpur	Italian	"	} Old and worn out.
383	Bharthana	"	"	
431	Janga	"	"	
373	Ghotki	"	"	Old and very bad feet.
LAHORE CIRCLE.				
1143	Goripur	Cyprian	Died	Colic.

529	Dhakhbak	...	...	...	Italian	...	Destroyed	...	Bursatee.
495	Sasor	...	...	...	"	...	"	...	"
294	Sarouta	...	...	...	Catalonian	...	"	...	"
63	Mori	...	...	...	Punjabi	...	"	...	Dourine.
541	Zanzibar	...	...	...	Cyprian	...	Died	...	Enteritis.
BALUCHISTAN CIRCLE.									
15	Achnera	...	...	...	Cyprian	...	"	...	Old age.
UNITED PROVINCES CIRCLE.									
112	Imlani	...	...	...	C. B.	...	Died	...	Lung disease.
421	Bhakkar	...	...	...	Cyprian	...	"	...	Failure of the heart's action.
469	Gujranwala	...	...	...	Persian	...	Cast and destroyed	...	Old and worn out.
528	Jhatpat	...	...	...	Italian	...	" " "	...	Dourine.
490	Gajbaj	...	...	...	"	...	" " "	...	Bursatee.
188	Dwarkanath	...	...	...	Home bred	...	" " "	...	Old and worn out.
338	Bellary	...	...	...	Italian	...	" " "	...	Bad stock getter.
606	Serai	...	...	...	C. B.	...	" " "	...	Dourine.
227	Dasia	...	...	...	Catalonian	...	" " "	...	A poor stock getter.
233	Kopaganj	...	...	...	"	...	" " "	...	Incurable sore on penis.
288	Ahar	...	...	...	"	...	Died	...	Colic.
260	Biral	...	...	...	Cyprian	...	"	...	Pneumonia.
439	Shamnagar	...	...	...	Italian	...	Died	...	Colic.
428	Tota	...	...	...	Cyprian	...	"	...	Snake bite.
370	Chausa	...	...	...	Italian	...	Cast and destroyed	...	Old and worn out.
DECCAN SUBSIDIARY CIRCLE.									

NW.

IMPERIAL.

TABLE XII.

Government Horse and Donkey STALLIONS SOLD during 1903-04.

Brand No.	Name.	Class.	Age.	Horse, Pony or Donkey.	Name of purchaser.	Amount sold for	Cause of sale.
			Years.			Rs. A. P.	
<i>Jhelum Canal Colony Circle.</i>							
307	Mars	Arab	5	Horse	Castrated and transferred to Remount Depôt, Mona	...	Spavin.
302	Musioian	"	6	"	" " " " " "	...	"
184	Kronji	"	9	"	" " " " " "	...	Bone spavin.
<i>Lahore Circle.</i>							
2564	Redan	Hackney	13	Horse	Doctor Kallan Khan, Lahore	71 4 0	Unfit for stud purposes.
<i>Baluchistan Circle.</i>							
101	Queen's Shilling	"	10	Horse	Captain Holbrook, 24th Baluchistan Infantry, Quetta	540 0 0	Castrated and sold for suspected Dourine.
303	Maddington	T. B. E.	4½	"	Major H. M. Maxwell, Superintendent, Civil Veterinary Department, Baluchistan and Sind.	410 0 0	Castrated and sold as unfit for stud purposes, bad conformation.
19	Faust	Italian	18½	Donkey	Wadera Sardar Khan, Rind of Shoran	25 0 0	Cast and sold, impotent.
...	Pharoah	"	17½	"	Jumman Khan, Ismail Khan, Ghazni	25 0 0	Worn out and useless for stud purposes.
...	Maidas	"	18½	"	" " " " " "	25 0 0	" " "
<i>United Provinces Circle.</i>							
109	Qualification	Arab	10½	Horse	A. B. Fforde, Esq.	185 0 0	Castrated and sold being unsuitable for stud purposes.
<i>Deccan Circle.</i>							
...	Maxim II	Arab	9	Horse	Mr. Essa	600 0 0	Very bad stock getter.
...	Jagadish	"	5½	"	" " " " " "	670 0 0	Diseased.

IMPERIAL

TABLE XIII.

Return of *BRANDED MARES* for the year 1903-04.

Details.	BRANDED MARES.					REMARKS.
	For horse-breed- ing.	For pony-breed- ing.	For mule-breed- ing.	For donkey- breeding.	Total.	
Balance on 1st May 1903	16,005	468	526		16,478	
Increase... { Branded during the year	5,190	1,323	526		7,042	
{ Received by transfer from other districts	1,191				1,191	
Total	22,386	1,794	526		24,706	
Decrease... { Died	6,678	42			6,615*	* Details not available from Baluchistan Circle.
{ Sold or transferred to other districts						
{ Stolen						
{ Struck off the register...						
Total	6,678	42			6,615	
Balance on 31st March 1904	15,618	1,752	526		18,091	
Rawal Pindi Circle	2,271				2,271	
Jhelum Canal Colony Circle	4,187				4,187	
Lahore Circle	4,018				4,018	
Baluchistan Circle	2,884				2,884	
United Provinces Circle	2,187	1,022	526		3,705	
Deccan Subsidiary Circle	826	730			1,556	
Total	15,618	1,752	526		18,091	

Abstract of particulars regarding HORSE FAIRS AND SHOWS held during the year 1903-04.

Circle.	Number of Fairs or Shows held.	Total number of animals present.		Total number competing for prizes.		Total number horse stock (not including branded mares) present.		Number of remounts purchased.				Price paid for remounts.			Number of mules purchased.			Price paid for mules.			Amount allotted for Prizes.						
		Year under report.	Previous year.	Year under report.	Previous year.	Belonging to breeders.	Belonging to dealers.	For Remount Department.	For Native Cavalry.	For Police.	Total.	Highest price.	Lowest price.	Average price.	By Government.	By others.	Total.	Highest price.	Lowest price.	Average price.	From Imperial Funds.	From Provincial Funds.	From Local Funds.	From private subscriptions.	Total.	Amount actually awarded.	Number of medals awarded.
Bawal Pindi	2	4,099	4,410	798	753	1,230	135	8	20	1	29	300	100	201 6 10	60	1,009	1,009	329	50	167 0 0	2,500	...	850 0 0	...	2,350 0 0	2,090	2
Jhelum Canal Colony	3	5,877	6,405	1,133	1,037	4,540	...	12	31	...	88	425	150	226 0 0	6	14	20	325	55	165 8 0	2,400	...	2,075 0 0	...	4,475 0 0	2,593	3
Lahore	4	13,555	12,766	1,544	1,570	5,667	5,116	53	208	6	242	600	80	228 8 9	60	723	723	400	20	123 10 9	2,667	650	300 0 0	100 0 0	4,017 0 0	4,423	4
Baluchistan	5	2,469	2,008	2,404	2,005	1,827	255	25	204	97	327	400	93	235 11 8	21	72	95	375	50	183 7 5	5,800	...	2,350 0 0	...	14,180 0 0	11,275	5
United Provinces	6	7,975	6,254	1,735	1,710	2,829	2,449	20	180	42	326	300	41	223 0 9	9	9	200	75	166 0 0	4,550	2,600	300 0 0	...	7,410 0 0	7,410	6	
Deccan	1	607	347	307	347	355	...	5	...	3	8	250	160	272 0 0	...	...	...	...	...	...	2,000	...	6,726 4 0	327 8 0	2,063 12 0	1,899	1

PROVINCIAL.

Table I.

Return of District PONY AND DONKEY STALLIONS for the year 1903-04.

Details.	DISTRICT PONY STALLIONS.				DISTRICT DONKEY STALLIONS.			
	Arabs.	Perahan.	Country-bred.	Total.	Italian.	Country-bred.	Home-bred.	Total.
Balance on 1st April 1903	84	2	2	88	7	1	1	9
Increase {								
Purchased in India	19	...	...	13	...	...	...	...
By transfer from Provincial Government.	...	...	...	...	...	5	...	5
By transfer from C. V. D.	...	...	...	...	2	...	...	2
Total	97	2	2	101	9	6	1	16
Decrease {								
Died	2	...	...	2	...	...	...	...
Destroyed	13	...	...	13	...	...	...	...
Sold	3	...	...	3	...	...	...	...
Made over to Mamdot Stud	1	...	...	1	...	...	...	...
Total	19	...	...	19	...	...	...	...
Balance on 31st March 1904	78	2	2	82	9	6	1	16
Rawal Pindi Circle	12	1	...	13	...	5	...	5
Jhelum Canal Colony Circle	10	...	1	11	4	...	...	4
Lahore Circle	22	...	1	23	5	...	1	6
Baluchistan Circle	...	...	...	...	...	...	...	...
United Provinces Circle	34	1	...	35	...	1	...	1
Deccan Subsidiary Circle	...	...	...	...	...	...	...	...
Total	78	2	2	82	9	6	1	16

Table II.

Cost of FEED AND KEEP OF District STALLIONS during 1903-04.

Circle.	AVERAGE COST PER STALLION PER ANNUM.			
	PONY.		DONKEY.	
	Year under report.	Previous year.	Year under report.	Previous year.
	Rs.	A. P.	Rs.	A. P.
Rawal Pindi	250	7 11	191	13 8
Jhelum Canal Colony	236	2 2	55	4 7
Lahore	207	12 3	137	3 9
Baluchistan	...	...	...	...
United Provinces	178	11 8	130	0 0
Deccan Subsidiary	...	...	...	...
General Average	218	4 6	128	9 6

PROVINCIAL.

TABLE III.

SERVICES OF DISTRICT STALLIONS during 1903-04.

Circle.	Stallions on register at end of year.	Stallions actually employed at stud.	Number of mares covered.	AVERAGE OF MARES COVERED PER STALLION EMPLOYED AT STUD.	
				Year under report.	Previous year.
Rawal Pindi	13	13	902	69-38	61-50
Jhelum Canal Colony	11	12	870	72-50	59-00
Lahore	23	24	1,593	66-37	60-81
Baluchistan ... ..	...	...	...	...	...
United Provinces	35	28	1,675	59-22	54-65
Deccan Subsidiary ... ..	...	...	...	...	...
Total	83	77	5,040	65-45	59-17

TABLE IV.

PRODUCE of STALLIONS during 1903-04.

Circle.	Stallions actually employed at stud.	Number of mares covered.	RESULT OF COVERINGS.			Average of produce per stallion.
			Number of produce.	Number not held.	Number not known.	
Rawal Pindi	10	615	268	216	133	26-60
Jhelum Canal Colony	11	649	174	387	88	15-81
Lahore	23	1,470	323	400	747	14-68
Baluchistan ... ..	...	...	...	...	...	...
United Provinces	42	2,296	533	1,363	400	12-69
Deccan Subsidiary ... ..	...	...	...	...	...	...
TOTAL	85	5,030	1,296	2,366	1,368	15-24

PROVINCIAL.

TABLE V.

SERVICES OF DONKEY STALLIONS during 1903-04.

Circle.	Stallions on register at end of year.	DONKEY STALLIONS ACTUALLY EMPLOYED AT STUD.		NUMBER OF MARES COVERED.		AVERAGE OF MARES COVERED PER STALLION EMPLOYED AS STUD.			
		For mule-breeding.	For donkey-breeding.	Pony mares.	Donkey mares.	PONY MARES.		DONKEY MARES.	
						Year under report.	Previous year.	Year under report.	Previous year.
Rawal Pindi	5	...	5	...	227	...	...	45.4	35.6
Jhelum Canal Colony	4	...	4	...	45	...	...	11.25	14.3
Lahore	6	6	...	263	...	43.63	67.75	...	...
Baluchistan	...	...	...	...	...	...	...	...	...
United Provinces	*1	1	...	42	...	42.00	32.00	...	...
Deccan Subsidiary	...	...	...	...	...	...	...	...	...
Total	16	7	9	305	272	43.57	59.8	30.23	27.62

* This donkey stallion is standing at the Instruction Farm near Meerut.

PROVINCIAL.

TABLE VI.

PRODUCE OF DONKEY STALLIONS during 1903-04.

Circles.	DONKEY STALLIONS ACTUALLY EMPLOYED AS SEED.		NUMBER OF MARES COVERED.		RESULT OF COVERING.						AVERAGES PER STALLION.	
	For male-breeding.	For donkey-breeding.	Pony mares.	Donkey mares.	Pony mares.			Donkey mares.			Pony mares.	Donkey mares.
					Number of mule produce.	Number not held.	Number not known.	Number of donkey produce.	Number not held.	Number not known.		
Rawal Pindi	5	...	178	...	...	...	39	40	98	...	7-8
Jhelum Canal Colony	3	...	43	...	...	...	6	30	7	...	2-0
Lahore	4	...	271	...	58	143	65	...	...	...	14-5
Baluchistan
United Provinces	1	...	28	...	10	9	9	...	...	...	10-0
Deccan Subsidiary
Total	5	8	299	221	68	157	74	45	76	100	13-0	5-82

TABLE VII.

Abstract of CASUALTIES OF STALLIONS during 1903-04.

Circles.	NUMBER DIED.		NUMBER DESTROYED.		TOTAL.		PERCENTAGE OF CASUALTIES.	
	Pony.	Donkey.	Pony.	Donkey.	Pony.	Donkey.	Pony.	Donkey.
Rawal Pindi
Jhelum Canal Colony	2	...	2	...	13-30	...
Lahore	2	...	2	...	9-09	...
Baluchistan
United Provinces	2	9	...	11	...	27-50	...
Deccan Subsidiary
Total	...	2	1	...	15	...	17-0	...

NOTE.—Percentages are calculated on stock existing at the beginning of the year under report.

PROVINCIAL.

TABLE VII (A).

CASUALTY ROLL OF STALLIONS during 1903-04.

Brand No.	Name.	Class.	Casualty.	Cause of casualty.	REMARKS.	
<i>Rawal Pindi Circle.</i>						
	Nil.					
<i>Jhelum Canal Colony Circle.</i>						
...	Smudge ...	Arab	} Destroyed	Suffering from spavin; unfit for stud work.		
...	Tim Whifer ...	"				
<i>Lahore Circle.</i>						
...	Gem ...	Arab	} Destroyed	Aged. Dourine.		
...	Maintop ...	"				
<i>United Provinces Circle.</i>						
15	Reel ...	Arab	} Destroyed	Dourine.		
20	Raffle ...	"				
38	Bat ...	"	} Died	Colic.		
2407	Maina ...	"				
2416	Captain Sahib ...	"				
2472	Chabee ...	"				
2578	Gulban ...	"				
37	Karma ...	"	Destroyed	Dourine.		
2411	Cheer ...	"				
2451	Sakhawat ...	"				
9	Rahmat ...	"				

PROVINCIAL.

TABLE VIII.

Abstract SALES OF STALLIONS during 1903-04.

Circle.	Number sold,	Average price realized.	REMARKS.
Rawal Pindi	1	50	Spavin.
Jhelum Canal Colony,	2	53	Old and worn out.
Lahore ... ..	...	...
Baluchistan ... ..	...	...
United Provinces ... ..	...	...
Deccan Subsidiary ... ..	...	...
Total	8	51	

APPENDIX A.

**Note on Dourine or Maladie du coït, by H. T. Pease, F.Z.S., F.R.M.S.,
Principal, and A. Smith, F.R.C.V.S., Professor, Punjab Veteri-
nary College, Lahore.**

The occurrence of Dourine, amongst brood mares and stallions in India, has not been noted until discovered by us, and the Trypanosoma demonstrated. It is an extremely important disease. (1) As it seriously affects the horse-breeding industry, being contagious, and leading to numerous deaths, and to sterility both in mares and stallions. (2) As it is very difficult to detect and diagnose, especially in its early and late stages, requiring a skilled Veterinarian and Microscopist for this purpose. (3) Because it is very insidious in its attack, and unusually chronic in its course, the affected animals being capable of themselves infecting others although, at times, showing no distinctive symptoms of the disease.

It is therefore considered advisable to issue the following note, which has been carefully compiled from selected authors, and contains the results of our own observations. No claim is made for originality, our object being simply to render available, in a handy form, existing information on the subject.

In the autumn of this year, two horses, belonging to the Horse-Breeding Department, were admitted to the hospital suffering from chronic disease of the scrotum, apparently a specific form of Lymphangitis, there being considerable swelling of sheath and penis, œdema of limbs and under belly, enlargement of inguinal glands, testicle and cord, and abscess formation in the scrotum. Careful observation of these cases revealed the fact that peculiar plaques or patches appeared now and again on the skin, and as these resembled the patches which are pathognomonic of Dourine, we suspected that possibly these cases might be due to that disease. It was found, however, very difficult to be certain that this was the case owing to the fact that we had absolutely no history of the occurrence of the disease in this country, no information of outbreaks amongst mares and the cases which came into our hands were all in an advanced stage, and consequently difficult to diagnose. Our suspicions, however, were increased when we found on consulting the records, that horses belonging to this Department have been cast and destroyed for a mysterious chronic disease of the sheath for some years past. For instance in 1894-95 two were so cast, 1895-96 five, in 1896-97 two, in 1897-98 two, in 1898-99 four, in 1899-1900 eleven, and in 1900-01 six. In order to decide the question, and acting on the assumption that the disease Dourine is due to a Trypanosoma resembling that of Surra, as has been stated by Schneider and Buffard, careful microscopical examination of the blood of the two horses was made for some days; however, although blood from the general circulation and œdema were taken these proved negative. Later, however, acting on the suggestion of the above authors, we were able to demonstrate the Trypanosoma in the blood taken from the centre of the freshly formed patches, and to say definitely that these cases are Dourine, and that the Punjab and Derajat are infected areas.

It is scarcely necessary to point out what an important bearing this has on horse-breeding, for Dourine is a very serious and mortal disease, killing off about 70 to 80 per cent. of infected animals, and as it is transmitted by Coitus it will be at once evident that where it exists horse-breeding must suffer severely. All we can so far say is, that stallions which have come under our notice infected have seldom recovered, and it is therefore to be feared that considerable losses must have occurred in some of the horse-breeding districts. On this point, however, without special enquiry, it would not be possible to ascertain the real facts of the case, for it would be extremely unlikely that the Indian horse-breeder should attribute any disease amongst his mares to Dourine, because, in the first place, his attention would not be likely to be called to the occurrence of disease in mares belonging to others, which had become infected by the same stallions, owing to their being distributed over such a wide area.

Again, the disease runs a chronic course, and death would not result for some months at least, and then probably with symptoms so closely resembling those of Surra as to lead to their being attributed to the latter disease. Although the mortality amongst stallions has been high, it is likely that more cases would have occurred but for the reason that mares which have become infected during one covering season were either not fit to be covered or had died before the next. It is also probable that more horses than appear on the records have been attacked, and cast or destroyed for other causes. Without a careful enquiry, however, it is not possible to make any definite statement regarding the importance of the disease in India, but seeing that in all other countries where it has appeared the losses represent about a third of the mares covered, as well as a number of stallions, besides inducing sterility, it appears to us of very great importance indeed; and if after enquiry it is found that the disease follows the same course which it takes in other countries, the necessity for employing skilled Veterinarians for the supervision of the brood stock, the Horse-Breeding Department and the adoption of measures for stamping out the disease will be evident.

Cases of Dourine amongst Imperial Horse-Breeding Stallions and those of District Boards in the Punjab.

Of two cases lately under observation in the Punjab Veterinary College Hospital, the first a Government T. B. E. stallion "Harden," came under observation in December 1900 by Mr. Smith, and was then suffering from considerably enlarged sheath and scrotum with abscess formation. The horse was sent for treatment to the Punjab Veterinary College and when admitted was in good condition. The disease was considered to be specific Lymphangitis from dirt. The abscess formation ceased and the œdema dispersed after a course of arsenic and nux vomica, and the horse was discharged apparently well after about two months. He returned to District service and continued to serve mares from March 1901 till June 1902, when he was sent to Mirpore to be under observation and treatment during July, August and September. He was at this time in very low condition; the penis, sheath, scrotum and external inguinal glands were much enlarged and numerous abscesses had formed about the scrotum. He was again sent to the Punjab Veterinary College where he arrived in the above condition on the 30th September 1902. On admission he was found to be greatly emaciated; sheath, scrotum and inguinal glands much enlarged, hard and suppurating, numerous abscesses, having already formed and some being still in course of formation; there was considerable œdema under the abdomen and the hind legs were swollen. The horse looked very much like a Surra case, but there were no petechiæ on the membranes, which were, however, pallid. The horse walked fairly well but dragged the hind legs at the trot. The temperature was 102° F., the pulse weak. The appetite was good. The animal remained under treatment for some days, when the peculiar patches, characteristic of Dourine, appeared on the body. These were, however, fully formed when discovered, and a microscopical examination of the blood taken from them failed to reveal the organism, as did also a long and careful daily microscopical examination of the blood from the general circulation.

After the patches had first been discovered, a careful watch was kept for the appearance of more patches, and two days later three new patches made their appearance. Blood taken from a newly formed patch contained the *Trypanosoma* of Dourine, and no further doubt was entertained as to the nature of malady. From that date onward the case progressed, new patches appearing at intervals and old ones disappearing, the parasite being invariably present in the newly formed patches, and being observed by us and also by Mr. Walker. The horse gradually lost condition, but the appetite remained good. The œdema and abscess formation continued as before. The horse was destroyed on the 13th December.

Post Mortem.—Typical of profound anæmia; general pallidity and bloodlessness of organs; collections of yellow gelatinous material under skin and in various parts, from which when cut serous fluid oozed in great quantity. The liver enlarged and softened showing signs of old Peri hepatitis. Spleen slightly

List of Stallions destroyed for chronic enlarged sheath or penis during the years 1899-1900, 1900-1901 and 1901-1902.

	IMPERIAL.				PROVINCIAL OR DISTRICT BOARD.			
	HORSES.		DONKEYS.		HORSES OR FOALS.		DONKEYS.	
	Name.	Breed.	Name.	Breed.	Name.	Breed.	Name.	Breed.
1899-1900 ...	Corn Stalk ...	W.	Ranaghat	Cyp.	Fakhta	Per.		
	Freedom ...	H. B. E.						
	Presentation ...	H.						
	Churra ...	A.						
	Reliance II ...	N. T.						
	Camarino ...	H.						
	Bedag ...	A.						
	The Pilot ...	H. B.						
	Lord Welham..	R.						
1900-1901 ...	Generalissimo ...	A.						
	The Salt ...	T. B. E.						
	The Stour ...	T. B. E.						
	Good Luck ...	A.						
	Bara Singa ...	A.						
	Euphrates ...	A.						
1901-1902 ...	Quarryman ...	A.	Lodhran	Ita.	Baccarat	A.		
	Quartette ...	A.						

(Sd.) J. B. D'SILVA,

20th December 1902.

Superintendent,

for Inspector-General,

Civil Veterinary Department.

NOMENCLATURE.

Dourine.—The Arabs have given the disease the name "Dourine" because they believe that it was caused by not keeping the genital organs clean. Dourine means, I believe, "dirty."

It has received various other names at different times "Maladie du Coït" because contagion is ordinarily produced by coitus. It is also named "Maladie venerienne," "venereal disease," "verole," or "Equine Syphilis," as it has been considered by some to be identical with human syphilis. It has been also named "Affection paralytique des reproducteurs," that is paralytic disease of brood animals, because paralysis is a common symptom. Again, "Glanders of the genital organs," "Paralysis epizootic." The Germans have named it "Exzemausschlag," "Chanker krankheit," "Gutartige Beschalkkrankheit," "Besartige Beschalkkrankheit," "Pseudo Syphilis." In India, "sprain of penis," "chronic œdema of sheath," etc.

enlarged. Lungs emphysematous. The inguinal glands enormously enlarged; scrotum greatly thickened by formation of new tissue, amongst which a very small testicle, about the size of a golf ball, attached to an enormously thickened cord was found with difficulty. Herewith are the temperature charts and photograph of "Harden."

2nd Observation.—District Board Arab Stallion "Shamsher" admitted to hospital of the Punjab Veterinary College for treatment on the 8th of October. Horse in good condition, coat glossy and soft. Temperature 101°. Horse looking well, with the exception that the scrotum is enlarged and suppurating, and the external inguinal glands are also enlarged, the condition being similar to that of "Harden." Appetite good.

On the 9th the temperature rose to 104° F., but fell by next day. The animal was put on arsenic and nux vomica for a week, and the abscesses lanced, and washed out with perchloride. There was apparently some improvement, but on the arsenic being discontinued for ten days, characteristic Dourine patches appeared, and in them the organism was found. Daily observation of the blood from the general circulation failed to show any Trypanosoma.

The case continued as usual, now an eruption of the characteristic patches, then skin clean. Temperature varying but slightly and not above 101° F. Appetite good, and condition fair. This horse was handed over to the Imperial Bacteriologist for observation in December. His temperature charts are herewith, also a photograph showing the enlarged sheath and a patch.

List of Stallions destroyed for chronic enlarged sheath or penis during the years 1899-1900, 1900-1901 and 1901-1902.

	IMPERIAL.				PROVINCIAL OR DISTRICT BOARD.			
	HORSE.		DONKEY.		HORSE OR PONY.		DONKEY.	
	Name.	Breed.	Name.	Breed.	Name.	Breed.	Name.	Breed.
1899-1900	Corn Stalk	W.	Ranaghat	Cyp.	Fakhta	Per.		
	Freedom	H. B. E.						
	Presentation	H.						
	Churra	A.						
	Reliance II	N. T.						
	Camarino	H.						
	Bedag	A.						
	The Pilot	H. B.						
	Lord Welham	R.						
1900-1901	Generalissimo	A.						
	The Salt	T. B. E.						
	The Stour	T. B. E.						
	Good Luck	A.						
	Bara Singa	A.						
	Euphrates	A.						
1901-1902	Quarryman	A.	Lodhran	Ita.	Baccarat	A.		
	Quartette	A.						

(Sd.) J. B. D'SILVA,

20th December 1902.

Superintendent,

for Inspector-General,

Civil Veterinary Department.

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Geographical Distribution.

This is a malady which has only come into notice within a comparatively recent date, and we cannot do better, in attempting to define its geographical limits, than give a brief sketch of its history. The first notice of the disease is that given by the German Veterinarian, Ammon, in 1796, and again in 1799, he observed it in the district of Trakehnen, North Prussia, affecting mares and stallions. It persisted in this locality until 1801, when Count Lindenau, master of the horse to the King of Prussia, caused it to be carefully studied by Reckleben, and two years afterwards (1803) Ammon and Dickhauser gave an excellent description in Tennecker's Gazette (vol. iii). From 1801, the malady disappeared from Prussia, but extended northwards, causing much loss in Lithuania; and returning again to Trakehnen in 1807, where it once more came under the cognizance of Ammon.

Such is the early history of the disease; but it was believed to have been seen in Southern Russia before this period, and Renner mentions that it prevailed among the horses in the Imperial Stud at Skopin and in the Government of Kazan, Pottchinkoff and Nischnei-Novgored, where it was studied by Kersting, and to which it had been brought by English stallions (?). It may be mentioned, however, that doubts have been entertained as to the reliability of Renner's statement.

In 1815, Woltersdorf, Veterinary Surgeon of the Bomberg district, Austria, observed it in the neighbourhood of Wanbau; and Havemann, Director of the Veterinary School of Hanover, remarked it in 1816 in a stallion in the vicinity of Blockley, Hanover. This animal infected several mares, which, in their turn, propagated the malady; so that it prevailed in that country until 1820. In 1817-18, it again showed itself in Lithuania, and re-appeared in 1819 towards the Austrian frontier, at Oberschliessen, district of Liebschutz. It showed itself in 1821 near Steiermarck and Pharau, where it attacked a large number of animals; it also broke out in Silesia and at the stud of Lembus. In Styria, it pursued its course as a veritable epizooty.

In 1826, it re-appeared in Silesia in a small number of animals and in a benignant form. From 1827 to 1830, it caused a great mortality in Bohemia, and in the spring of 1830, it appeared for the first time in Switzerland, in the Canton of Berne.

Latour and Dayot, from 1830 to 1832, observed a disease of an eruptive nature affecting the genital organs of horses in France (*Recueil de Med. Vet.* for 1835); but, according to competent authorities, it does not appear that this was the malady now under consideration.

In 1833, it again broke out at Oberschliessen and manifested itself in provinces of Liebschutz and Oeltz in Upper Silesia; in 1836, it was particularly severe in the latter province, in the districts of Striegau, Oeltz, Grotthau, Beissz, Fauer and Friestadt.

Pomerania was visited with the benignant form in 1839, and in 1840 it re-appeared in Silesia on an extensive scale, and in a malignant form, in the districts of Bartenstein and Schippenbeif; and again in that country in 1841, at which period it was seen at Gumbinnen in Lithuania. In Wurtemberg some mild cases were observed.

The disease had now assumed such serious proportions and was causing so much alarm in the stud-farms and among private horse-breeders, that several legislative enactments were adopted and enforced; at the same time Veterinary Surgeons were beginning to devote their energies towards investigating its nature, and the most efficient prophylactic measures to be devised against it. These checked its progress in Germany, and the cases that subsequently occurred were less serious.

In 1847, it was reported in Algeria by the French Military Veterinary Surgeon Signol, who saw it in the province of Constantine, and who described it as an "Epizootic paraplegia" that had appeared among the horses of the

Rigas tribe. Not aware of the existence of the malady on the European Continent, he designated it by one of its chief symptoms, he also mentioned that the Arabs had long been acquainted with it, that it appeared in a serious form every fifteen or twenty years, and that one of these crises, the one to which he was a witness in 1847, destroyed six hundred horses.

General Dumas, author of the "Chevaux du Sahara," alludes to the frequency and ravages of the disease among the horse of the Tribes in the province of Constantine; and Bonjol, another Army Veterinary Surgeon, reports it as causing great havoc in the Bhiras tribe. In 1852, it carried off a large number of mares in the circle of Bou-Arreidj, and in 1853, it prevailed in the circle of Setif.

It was not until the spring of 1851 that it revealed itself in France, among the brood mares in the plain of Tarbes, where it for the first time attracted the attention of French Veterinary Surgeons, being chiefly studied by Roturior and Louchard, Military Veterinary Surgeons, and by an official commission. In 1851, the malady was located in thirty-one communes around Tarbes, containing 1,874 mares. In December of that year, Louchard recognised it in 127 mares which had been put to Government stallions, and to stallions belonging to private individuals. The first had covered 750 mares, and 100 become diseased, the other 27 were infected by private stallions. Out of the total number fifty two died. It had nearly ceased in the following year.

In 1852, the disease appeared in the valley of Lourdes, and near Argeles; and Professor Yvart and Lafosse, of the Veterinary School of Toulouse, undertook, by a series of experiments, to demonstrate its contagiousness.

It re-appeared in some mares and stallions at Tarbes in 1856, 1857 and 1858, and at this period it was studied by Reynal, Director of the Alfort Veterinary School. It also manifested itself again in 1861.

With regard to the origin of this disease in France Trelut, Veterinary Surgeon to the Stallion Depot at Tarbes, in two able memoirs on the subject, traces its advent to the importation of a stallion from Syria in 1851, and again by two other stallions from the same country in 1861. He asserts that it was perhaps perpetuated in the South of France, because it there found itself in a climate resembling that of Syria, where it nearly always prevails; and also because no steps were taken to thoroughly eradicate it.

From time to time, Dourine is imported into the Basses Pyrenees by mares which have passed the summer in the mountains in the pastures and which have been covered by infected Spanish stallions.

In 1875 to 1881, Dourine was found in the Hungarian stud and was studied by Professor Van Thanhoffer of Buda Pesth.

The disease has been carefully studied in France by St. Cyr, Trasbot, Laquerrierre, Beuse and Nocard. An outbreak occurred in the De Wett country of Illinois in 1889.

This is, so far as I can trace it, the geographical limit of this curious disease. It has not been witnessed as yet in England, Belgium, Italy, Spain or Africa, as far as I am aware; but there can be no doubt that if diseased stallions or mares are imported to those regions now exempted from its effects, it will appear there, as it has done in Russia (where it is frequent and violent, particularly in the Southern Governments) Germany, Hungary, Bohemia and France.

Symptoms of Chronic Dourine.

Symptoms in the Stallion.—This is the most common form and of it three distinct phases are recognised. Its commencement in the stallion is often insidious and in some cases difficult to recognise.

W. L. Williams. in his report states "Its commencement is far more insidious in the stallion than in the mare, being in many cases wholly unrecognisable for months." Some times the symptoms appear early, in other cases the development of the disease is tardy and apparently unnoticeable, or the primary symptoms may appear for a few days or weeks, then disappear entirely and the stallion remain apparently well for months, and yet be capable of transmitting the malady for some months, without affording other evidence of disease. As a rule, however, symptoms are fairly well marked in all cases to the careful observer.

1st Phase "Œdematous."—The first phase is characterised by the changes which are limited to the genital organs. The second phase by the invasion of and changes in the skin and ganglia, and the third by symptoms referable to the nervous system. In some cases the surface of the penis presents red patches, erosions or eruptions of various kinds, but these lesions are far from constant or essential, and their characters are extremely variable.

In naturally acquired Dourine, the first symptoms are visible from 15th to 20th day after the infective coitus, and consist of slight though well marked and peculiar swelling or œdema of the lower portion of the prepuce, of an indolent doughy nature. This is very likely to escape the notice of the attendant unless he is very observant. It gradually extends to the whole of the prepuce, the sheath, scrotum and inguinal region, the skin being thickened, smooth and shining, and in some cases along the abdomen to the chest. Usually the swelling is cold and painless, but sometimes it is hot and tender. It may be permanent or intermittent, persisting or completely disappearing. Certain amount of the glans penis, if carefully examined, shows an infiltration, notably towards its free extremity, and it is frequently in a state of semi-erection. During erection the glands appear more voluminous than ordinary, and the superficial inguinal glands are enlarged.

The Urethral Mucous Membrane is inflamed towards the orifice of the tube (meatus urinarius), and the submucous tissue is infiltrated, the mucous membrane being often everted. The testicles and cord are more or less engorged and painful on pressure. The appetite always remains good, and the temperature varies from 100° to 101° F. Coitus at this stage is readily and fairly easily performed, although it may be rendered difficult by the abnormal volume of the glans or by pain when the penis enters the vagina. In about a month any general engorgement which may be present may be absorbed, and the swelling become more dense and painless and localised to the generative organs. A circular ring of thickened tissue, hard and tense, surrounds the orifice of the sheath and presses on the penis. Urination is painful. This may in some cases almost totally disappear in from a few days to a few weeks, only the glans remaining infiltrated, but leaving no tangible trace of the disease except the power of transmitting it to mares; or it may remain for months, either to be complicated with or succeeded by other symptoms. At this stage the loins become weak and the animal begins to lose condition. It is said that in some rare cases these symptoms may not be developed, but it is most probable that they did appear and were overlooked or attributed to some other cause, such as injuries, which often occur, and were soon forgotten by the attendant. In such, the first symptoms will be those of the 2nd stage, namely aggravation of the general symptoms and the appearance of characteristic patches which are *the pathognomonic symptom of the disease*. The animal becomes weak and thin, and weakness of the hind quarters causing the animal to give occasionally, is noticed, together with abnormal sensibility of the loins. They appear, according to Buffard, on the 40th to the 45th day after infection and are very characteristic in their appearance. They are salient and rounded, and look as though they had been caused by slipping a disc of metal under the skin, the diameter varying from that of a five shilling piece to that of the palm of the hand. Over them the hair stands on end and the skin feels somewhat thickened, but is non-adherent, neither hot nor painful; the only modification undergone appears to be thickening and horripilation of the part. They are generally more distinctly marked on light than dark colored horses, indeed, with the latter it is usually necessary to pass the hand carefully over the body to feel them, or to stand so as to catch the light to be able to see them at all and in some cases there is nothing but a slight unevenness of the hair. In most cases, however, they may be easily recognised on

careful examination. The swellings in some cases are slightly œdematous, and often there is some slight exudation of serum over them which mats the hair together. The appearance of the patches is sometimes preceded 24 to 48 hours by a crop of papules, which disappear in the course of a day, either without leaving any trace or only a slight exudation of serum, which will cause a few hairs to stick together. Their mode of appearance is irregular. Sometimes they appear in crops successively and at intervals of one or several days. Their evolution is rapid, from 24 to 36 hours, and persisting for a few days 5 to 8, they suddenly disappear leaving no alteration beyond perhaps a little serous exudation at their seat.

The duration of the patches is very variable, they may remain for five or eight days or they may disappear in the course of a few hours. They very often disappear rapidly with exercise. These eruptions may occur in crops following each other closely. They are found all over the trunk and neck but most constantly on the neck, shoulders, croup and flanks. *These plaques are the only pathognomonic symptoms of Dourine, and it is in the blood which may be taken from them that the parasite (Trypanosoma) which causes it, is most easily found.* In addition to these symptoms the animal rapidly loses condition, and weakness of the hind quarters comes on. There is progressive anæmia and its consequences, and in many cases abscesses appear on the scrotum and sheath. The lymphatic glands, in all parts, enlarge, and the inguinal glands may enlarge and suppurate. The appetite, however, remains good. The condition gradually becomes worse until the third phase, which is characterised by great and progressive anæmia and paraplegia, is reached. In this stage the mucous membranes are pale rose in color, and great emaciation sets in, the animal being unable to move without support. The appetite is irregular and capricious; superficial and deep abscesses of the scrotum and sheath continue to form and are very indolent in healing. The urine is thick and passed with some difficulty. Later paraplegia becomes complete, and the horse dies in from two to 10 months (Buffard), eight months to one or two years according to Nocard, with whom we agree.

Symptoms of Dourine in the Mare.—The symptoms are less marked in the mare than in the horse. The first noticed appear five or six or nine days after coitus. It consists in the occurrence of a uni or bilateral œdematous swelling of the vulva, which extends up to the anus and perineum, and which is hot at first but quickly becomes cold and painless. The mucous membrane is of a deep red colour, and a discharge of clear sticky mucus occurs from the inferior commissure, and is more apparent after urination and increases after a few days, becoming glue like, yellow and viscid, and collects about and soils the tail and perineum. The mucous membrane often becomes the seat of red patches and is thickened at certain points. The swelling of the lips of the vulva is intermittent and variable, extending sometimes downwards along the perineum to the mammary gland. There usually occurs, in a large proportion of cases, a peculiar loss of pigment in the skin of the vulva, perineum and anus, beginning usually in spots of variable size and shape and gradually extending. The vaginal discharge may vary greatly in amount, and may cease after a few months or remain for a year or more. It is usually dirty, white or greyish in colour, but may be yellow; it often possesses an offensive odour, becomes viscid and glutinous, adhering to and irritating or excoriating the adjacent parts. Coitus increases it, and aggravates in every way the symptoms of the disease. The clitoris is swollen and erect in most cases, and the mare continues sexually excited, passes urine in small quantities at a time, and keeps whisking her tail about.

Infected mares do not usually conceive, and the few that do almost invariably abort by the sixth month, and in cases where the foal is carried for the full period, it is almost sure to be weakly and shortlived. There is frequently considerable pruritis, evinced by rubbing the tail and hind quarters, and licking and biting various parts of the body. Comparatively early in the course we have œdema of the legs and abdomen.

The inguinal glands generally enlarge, and may suppurate, and the mammæ inflame. Enlargement of the submaxillary glands is frequently present, and in some cases, there is seen a viscid, sticky discharge from the nose, closely resembling that of glanders.

Later on, generally in eight to 10 weeks or later, the characteristic patches appear; and at about the same time there may be noticed weakness, or even actual lameness, of one or more of the hind limbs. The course of the disease is then the same as that in the horse. In some cases the primary swellings are followed by sudden acute paralysis, with or without an attack of vertigo, which carries the animal off in a few days, after the first appearance of the patches.

Symptoms of Dourine in the Ass.—The symptoms of Dourine in the ass, both male and female, are obscure, and frequently the first cause to arouse suspicion will be the fact that the disease becomes noticeable in the District in which a jack is covering. The Arabs maintain that one attack gives immunity, and that a breeding jack that resists Dourine is immune, and therefore of increased value. The only symptom that can be relied upon is an œdematous condition of the extremity of the penis, which causes obliteration of the folds of the mucous membrane at the orifice of the urethra, which appears as if it was turned inside out. This is particularly well seen when the penis is in a state of semi-erection.

Œdema of the prepuce comes on but slowly and the patches are very rare in the ass. In jacks that are very susceptible, which are not common, the symptoms are similar to those seen in the horse. Emaciation is very pronounced, also engorgement of the sheath and scrotum, and paralysis is early.

Animals affected.—The only animals apparently naturally affected are solipeds, the horse, mare and ass. The disease can, however, be conveyed by subcutaneous inoculation of infected blood, to the dog and rabbit, and brought back from them to the horse.

Schneider and Buffard have successfully inoculated the horse, dog, rabbit, rat, mouse and donkey with infected blood.

Period of Incubation.—The period of incubation in spontaneous Dourine is 15 to 20 days, Nocard, Lafosse, Schneider and Buffard.

In the mare from five to 10 days. In the dog, in inoculated cases, 12 to 20 days.

Etiology.—Dourine is essentially a contagious disease, running a more chronic than acute course as a rule, its course being slow and remittent. It has long been recognised that it is transmitted and spread by coitus, and hence we have been able to conclude that the cause of the disease must be present in the genital mucous membrane. Its contagious nature has been generally proved and admitted by the observation of numerous facts in Germany, Austria, Russia, Algeria and France, and it sometimes assumes an epizootic form. So long ago as 1861-62, Prince and Lafosse, of Toulouse, caused four stallions affected with the disease to cover 15 absolutely healthy mares, out of which 10 became infected and five escaped; of the affected ones four died, one was very ill, and recovered, and five had slight attacks. Two healthy stallions were caused to cover the sick mares, and contracted the disease, but in different degrees; in one it was not well marked, but in the second it was severe. In 1877, M. Trasbot caused two mares to be infected by Coitus with a diseased stallion and, moreover, contagion is shown from the fact that a diseased animal introduced into a district, previously free from it, will spread it; also by the course of the disease which tends to become epizootic in countries where it is introduced, and only in animals used for reproduction; and that it extends during the covering season and disappears when proper sanitary measures are taken and sick animals quarantined or destroyed. As we have already said, the disease is transmitted naturally by Coitus, and is not as a general rule by cohabitation without sexual intercourse. Experiments were also made at Tarbes to prove the contagiousness of the disease. A stallion which had been affected with a swelling of the prepuce since 1856 but had not been used in 1857, was put to a healthy mare towards the end of 1858. This mare soon had tumefaction of the labia and redness and thickening of the vagina. Another stallion which had been affected, for a long time, with a suspicious engorgement of the sheath was put to an artillery mare which afterwards developed the disease.

We agree with Schneider and Buffard in attributing the disease to the presence in the blood of a Trypanosoma, closely resembling that of Surra, but

differing from it in its behaviour in the system. The general symptoms are similar to those seen in Surra, but the course of the disease is very slow, and the behaviour of the *Trypanosoma* quite different.

In the year 1896, Dr. Rouget noticed a parasite of this genus in the blood of a stallion suffering from Dourine, and he made a contribution to the *Annales de l'Institut Pasteur*, in December of that year, entitled "Contributions to the study of the *Trypanosoma*," in which it was suggested that the parasite was related to the *Trypanosoma* causing Surra. In the year 1899, Surgeon-Major G. Schneider, of the Bacteriological Laboratory of the Military Hospital, Oran, Algeria, and Veterinary-Surgeon M. Buffard, of the French Army, communicated through Dr. Bergeron, a note on a parasite discovered in the blood of animals suffering from Dourine or *Maladie du Colt*, which was read before the *Academie de Medicine* on the 25th July 1899. This parasite was discovered in the blood of a stallion suffering from Dourine, and in dogs which were experimentally inoculated from it. At the commencement of an attack it has been noticed that the parasites are present in considerable numbers, and there is usually severe urethritis and vaginitis, and it therefore seems probable that primary infection takes place in the urethral and vaginal mucous membrane. In the last stages of the disease, especially when the patches have vanished, the parasites are generally few in number, and may hence altogether escape observation. The detection of the parasite in naturally contracted Dourine is not easy. The dimensions of the parasite according to Schneider are 20 to 30 μ \times 1.5 to 2 μ , but certain individuals are smaller, and probably have not reached maturity. Schneider also gives figures of the different forms of the parasite, but all these I have not seen, the only form so far found here being the mature *Trypanosoma*. Careful examination of stained specimens will, however, probably reveal them. The above author has also noticed the expulsion from the body of the parasite of a number of refractile bodies, but this also I have not observed.

The cases which have so far come under my notice in India and have only been cases of old standing, these being the only cases sent into hospital here. The early cases having so far escaped notice I have found it very difficult to detect the *Trypanosoma*, owing to the fewness of its numbers in old cases. Blood from the general circulation was for a long time examined, but so far I have not been able to detect any parasites in it.

In blood taken from the centre of the characteristic patches, however, a careful and searching examination will generally reveal them when the patch is newly formed, but in patches of a few hours maturity it is not easily detected. It may also be found in recent œdemata whilst they are extending but as soon as they become stationary, or begin to subside, it disappears, and it is not often in œdemata of long standing.

It is, as a rule, found with great difficulty in the general circulation although it must evidently exist, because blood taken from the general circulation is capable, in many cases, of producing the disease by inoculation.

The best chance of finding it, is to take blood from the centre of a recent patch, and carefully search for it. Schneider found that it was often not present in the blood taken from the skin a short distance from the patch. The same authority states that it exists in considerable numbers in the semen, and that it is easily found in the mucous discharge from the vagina of affected mares. Hertwig has transmitted the disease by inoculating the mucous membrane of healthy mares by secretions taken from the vaginal mucous membrane of diseased mares. Different persons are said to have in certain cases, Blaise, for instance, has successfully produced it by the subcutaneous inoculation of diseased blood. Nocard has produced it by inoculating with spinal cord from a diseased animal, the anterior chamber of the eye of a dog.

Many of the unsuccessful attempts at inoculation are due to the fact that the habits of the *Trypanosoma* were not known. Schneider and Buffard, by inoculating with blood taken from the patches, and containing the *Trypanosoma*, have been successful in nearly all cases, and have passed the disease through the dog and donkey, back to the horse and mare.

Characters and evolution of the parasite.—The following is a description of the parasite as given by Schneider and Buffard. They describe the forms found in the blood taken from an ass in various stages of the disease.

When slight œdematous swelling constitutes the sole objective symptom there appear in the exudate—

1st—Numerous very mobile granules resembling, in every particular, those which they have seen the Trypanosoma expel from the body. Fig. 14.

2nd.—Immobile, refractile, round or ovoid corpuscles, either isolated or in masses, resembling large staphylococci and presenting when stained a central mass deeply coloured. These have been observed in India. Fig. 15.

3rd.—Bodies shaped like Fig. 3 either motile or not, these are Trypanosoma with bodies enlarged throughout, provided with several nucleoli and masses of chromatine. Sometimes two or three masses of chromatine are found disposed in the long axis of the parasite Fig. 3, a nucleolus accompanying each either close to it or at a little distance. Sometimes the nucleoli and masses of chromatine are grouped in two or four at the anterior part of the Trypanosoma which then appears globular, the thin end of the parasite sometimes appearing as a small point surmounting the swollen portion (Figs. 1 and 2).

Twenty-four hours after the engorgement has become stationary they find—

(1) The elements which have already been described.

(2) Isolated Trypanosoma of various sizes, some short and thick and only slightly motile, without an undulating membrane, but furnished with a nucleolus and an all defined mass of chromatine; others larger and thinner, with better defined flagellum, and more motile. In these young forms the nucleus and the mass of chromatine are near each other (Figs. 4, 5 and 6).

(3) Large pyriform bodies apparently non-motile, provided with one, two or more appendices as in Figs. 7, 8 and 9. These bodies contain nucleoli and masses of chromatine.

(4) Groups of Trypanosoma united in two, four or more, and non-motile, not having yet definite characteristics, and in various stages of development Figs. 10, 11 and 12. In the exudate numerous eosinophyle corpuscles, polynuclear or mononuclear, may be found. During all the period of the development of swelling adult parasites may be discovered in the exudate, but these become less and less numerous. At last, rare as the swelling becomes stationary or decreases, mature trypanosoma. The cycle re-commences with a new congestion. All the forms we have described appear and change so rapidly that it is next to impossible to study them in detail. Moreover, when the engorgement has become considerable we are almost certain to find both adult parasites and intermediary forms present in it. If these observations be compared with those of Lydia Rabinowitsch and W. Kempner it is easy to see that the evolution of the Trypanosoma of Dourine does not differ from that of other Trypanosomes. They consider that the special granules emitted by the adult parasite play a part in the development, the ovoid corpuscles with deeply stained nucleus (Figs. 14 and 15) and the incomplete forms 16, 17, 18 representing successive stages.

When the Trypanosoma has made its appearance at the seat of inoculation it may be accepted as a principle, that each external manifestation of the disease corresponds to the local presence of the parasite, and that whether the disease evolves with its complete symptomatology as in the horse and dog, or whether it progresses insidiously as in the ass, the blood of the œdematous regions contains, or has contained the parasite.

The parasite is always present in the patches *when they are newly formed*. If we puncture the skin and draw blood from a patch which is forming we find the parasite in comparatively great numbers, whilst blood taken at a short distance from it shows none. The contrast formed by the relative abundance is striking.

As the patch extends the size the parasites become fewer, and in the preparations after 24 to 36 hours, is only very occasionally found in them.

The patch of Dourine may be somewhat variable in character, but it is always due to the same cause, *vis.*, the presence of the Trypanosoma.

From the time that the œdema and patches appear, the parasite may occasionally be found in the blood of the general circulation, but usually in very few numbers.

The general character of the disease is intermittence, and when the parasite has developed at the point of inoculation and has invaded the general circulation, the disease develops in cycles, each crop of hæmatozoa corresponding to fresh symptoms.

When patches and œdemata do not appear it is extremely probable that the parasite is no longer present in the general circulation.

In the dog, which is susceptible to Dourine, the parasite is always more abundant. Its presence or absence is independent of the fever, and it appears to be absent from time to time, pointing to intermittence in the disease.

With the parasites coexist motile granules, leucocytosis and progressive destruction of red corpuscles, which are characteristic of the disease.

The parasite may be found, either in its adult or embryonic form, in the semen, milk, vaginal secretions, vulva and penis.

It is present at death, but has disappeared within 48 hours afterwards.

Is Dourine due to the presence of a Trypanosoma?

From the experiments which have already been made, and of which a record has already been given in regard to the cases quoted by Schneider and Buffard, it appears certain that the Trypanosoma, found by these authors, is not an extraneous organism which has accidentally obtained entrance to the system of animals already ill from the disease, for the following reasons:—

- 1stly.*—Because of the presence of Trypanosoma in the blood of animals suffering from Dourine in various localities in Algeria far removed from each other, and also because the same parasite has now been detected in the same conditions, in a country so remote as India, in exactly the same circumstances, and in the same conditions.
- 2ndly.*—That the disease has been reproduced by inoculation of blood containing the Trypanosoma from horses suffering from Dourine to healthy dogs, with symptoms closely resembling Dourine; and, moreover, control experiments with the horse shows that this is the case.
 - (b) That the disease may be conveyed to the donkey, in a modified form, and back to the horse in the same way.
 - (c) That the horse can infect the mare with true Dourine by Coitus.
 - (d) Because the disease has all the characters of a Trypanosomiasis, notably severe and progressive anæmia, with œdemata and the rest of the symptoms attendant on it, closely resembling Surra in this way.
 - (e) That blood which has been kept for a sufficiently long time to destroy the Trypanosoma will not produce Dourine on inoculation, although it was capable of doing so when freshly taken.
 - (f) It would appear that the organism is the active cause of the disease on account of its activity and virulent properties, as a minute quantity placed on a mucous membrane, or coitus which lasts only for a couple of minutes, is sufficient to reproduce it. The disease has been transmitted to the mare by coitus after having passed through four hosts, *vis.*, stallion, dog, ass, mare. The experiment appears to conclusively prove specificity of the parasite. Recognised in the semen,

the organism was discovered in the vaginal secretion ten days afterwards, and in the skin patches 15 days after the first symptom of Dourine.

Resistance of the virus.—As in Surra, so in this disease, the organism lives for only a very short time outside the body. The following experiment by Schneider and Buffard this will be clear.

Blood in which the Trypanosoma was detected was taken at the same time from a horse, mare and dog. It was kept in a sealed tube for 24 hours. Two dogs were then inoculated, developing typical Dourine and Trypanosoma.

Two dogs were inoculated 48 hours after with the same blood. Beyond a slight rise in temperature there was no result. Two dogs were inoculated five days afterwards with the same blood, with no results. Hence, it appears that the parasite perishes in 48 hours.

Diagnosis.—In the early stage of the disease, when there is only localised œdema of the prepuce and glans, it is extremely difficult to give an opinion, and this is more especially the case in a country where the disease is not known to exist, as has so far been the case in India; but the discovery of the pathogenic agent will probably in future be a great aid to diagnosis to the expert; still owing to the great difficulty in finding this, diagnosis will not be by any means easy. Microscopic examination will always be necessary, and a more cursory one will not be reliable. The best way to detect the Trypanosoma, in early cases, will be to take blood either from the œdema of penis or sheath, and to make a very careful examination of it. We may also make use of a few drops of blood, taken from this part, to inoculate a dog by subcutaneous injection under the abdomen. This for the stallion.

In the case of a suspected mare we may inoculate a dog, either with the blood taken from the inflamed vaginal mucous membrane, or with the mucus, the former being preferable.

If we can get no result from the microscopic examination of fresh blood, it will be necessary to make stained preparations, and several specimens will probably have to be examined before the parasite is detected.

In this regard it will be useful to know that the parasite stains well with methyl blue, carbolic theonine, after fixing the preparation with equal parts of alcohol and ether. If strong solutions be used the anterior granule is deeply stained, and appears as a very sharply defined spot. The oval corpuscle at the other end is less deeply coloured. Protoplasm takes on a uniform stain, except in the immediate neighbourhood of the bodies at the ends, which have a light ring round them. Double staining by Laveran, Czenzunke or Romanewsky's processes, give good results. By the last method both the globule and corpuscle are coloured red, representing the nucleus and mass of chromatine described by Rabinowitsch and Kempner.

When the patches appear, they are not only diagnostic, but it is also far easier to find the parasite by a careful microscopic examination of the blood from the freshly developed patches, if taken early, and from the middle of a newly forming patch.

Mortality and loss.—Dourine is a very fatal and tedious disease, the recoveries generally being few and far between. Rodlaff, alluding to its contagiousness and mortality, mentions that at the station of Sierakewa, one hundred and seven mares were put to diseased stallions, and out of this number 54 died, and the majority of others had not recovered their health for a year afterwards. At Tarbes, out of 750 mares put to infected horses 127 became diseased and fifty died. In Prussia, at one station, fifty-eight mares were contaminated out of 150, and 48 succumbed. In another instance, out of 321 mares the loss was 160, and of 14 stallions ten caught the malady and five died. The loss therefore seems to be variable, although always very serious, the mortality being greater amongst stallions than mares. We have no records to assist us in determining what the mortality and loss in brood mares and stallions is in this country.

Extension of the disease.—The disease being contagious is spread by diseased stallions or mares, and most generally of course by the former, although the mare infects the horse more easily than he does the mare, owing to the anatomical characters of the parts.

The stallion, however, when infected spreads the disease more particularly during the covering season, and it is during that season that we must expect to find the disease in its epizootic form.

Fleming states that in the second year of its appearance in a district it is widespread, and that in the third year it begins to decline in virulency. We have so far no information at all on this point in India.

Owing to the long incubation and duration of the malady it may be carried to the most distant countries by one infected animal.

From the figures at present accessible, it would appear that of the animals exposed to infection, about one-third or more, in some cases two-thirds, became diseased, and of these between seventy and eighty per cent. die.

Pathological Anatomy.—As in Surra, so in this disease, the chief changes found in *post mortem* are those referable to profound anæmia. In animals which have died or been destroyed in the last stages of the disease the signs of anæmia and emaciation are marked. Distributed through the various tissues of the body we find patches of gelatinous exudation, and this is specially found in the subcutaneous and intermuscular connective tissues. The muscles wasted, pale, and flabby, especially those of the thigh and croup.

The synovial capsules of the hip may be found filled with reddish coloured synovia, and the membrane injected, and those of other joints are often dropsical. Lymphatic glands are uniformly enlarged, pale, yellow and friable, and suppurate in some cases, especially those of the inguinal region.

Spleen.—The spleen is said to be enlarged in some cases.

The lymphatic vessels of the diseased parts are generally inflamed and hypertrophied, in fact in those cases showing much swelling of sheath and scrotum this is very marked. In some cases these are the predominating changes. The lymphatics of the testicle and cord are inflamed, containing a yellow lymph and very prominent, standing out in lines over the surface. The cord is considerably thickened.

In mares, the uterine mucous membrane is generally found to be the seat of catarrhal inflammation, hypertrophied and thickened, brownish in colour, and spotted or marbled, and there may, in some cases, be papules, vesicles or ulcers on it. Similar changes may be found on the mucous membrane of the vulva and vagina. The lips of the vulva are œdematous, swollen, and may be the seat of eruptions, but these are not constant.

Some writers are of opinion that the essential lesions of Dourine are in the nervous system, and described changes in the cord and membranes.

Experimental Dourine.—Schneider and Buffard state that the Trypanosoma is inoculable to the following animals in order of comparative receptivity:—Horse, dog, rabbit, rat, mouse and ass. The fresh blood containing the Trypanosoma is the best material to use, but all products containing blood are virulent. The substance of the spinal cord taken from the softened patches, the semen, and vaginal discharges, are also virulent.

Blood taken from infected animals is often capable of producing disease although the presence of the Trypanosoma cannot be detected in it by an ordinary microscopical examination. In certain cases, however, the blood appears to be free from the parasites, and its inoculation is followed by negative results, and the above authors believed that the trypanosoma comes in crops, as is the case in Surra, and that in the interval there are none in the blood of the general circulation, which, however, is not the case in Surra.

The Trypanosoma may be transmitted experimentally by—

- (1) Subcutaneous inoculation of infected blood which is the best medium.

- (2) By smearing the conjunctiva or the vaginal mucous membrane with the infected material.
- (3) By Coitus.
- (4) By inoculation with spinal cord from a softened patch into the anterior chamber of the eye.

From the results of experiments made by those authors it appears that the period of incubation (7-20 days), and the character of the symptoms, depend absolutely on the quantity of the *Trypanosoma* injected. The more parasites the infective material contains the more rapid the evolution of Dourine; this is not so in Surra. Some animals also have apparently some immunity. They also consider that age influences the course of the malady, stating that young dogs succumb more quickly than older ones.

Symptoms of inoculated Dourine in the dog.—In 1892 M. Nocard made known that Dourine was transmissible to the dog by inoculation with softened spinal cord into the anterior chamber of the eye. Schneider and Buffard have succeeded by using blood containing the *Trypanosoma* and injecting it subcutaneously into the abdomen, and they have further been able to transmit the disease to a horse by inoculating him with the blood from the dog so infected.

They describe the resulting disease in the dog as follows:—

Course of the disease in the dog.—This may be divided into four periods.

Period of incubation.—The duration of this period varies from 12 to 20 days, according to the age and susceptibility of the subject. The inoculation is sometimes followed by intense fever of a continued type, without marked daily variation. More frequently it is not for from six to eight days after inoculation that any fever is noticed. The temperature oscillates between 102.2° and 103.1° F.

Period of invasion.—The first apparent symptom consists in the appearance at the seat of inoculation, of a hot painful swelling depressed at its centre. This persists for a day or two and is accompanied often by œdema under the belly, genital organs, inguinal and crural regions, and acute balanitis. In the bitch the initial œdema is less and may be localised. Severe inflammation of the genitourinary mucous membrane, with an abundant vaginal discharge, is always seen. If the bitch be in pup she generally aborts. The animal is restless but lies down a good deal, licking the vulva frequently. The animal walks with difficulty, with the back arched and sensible to pressure. The temperature remains between 102° and 103° F. The appetite remains good. The œdema of the belly soon disappears, but that of the sheath remains for a considerable time.

The period of acme.—Loss of strength and condition, locomotary troubles, localised œdemata, and the appearance of plaques, constitute the most marked symptoms. The loss of condition is rapid although the appetite remains good.

The locomotary troubles are characteristic. The hind quarters are stiff, and the animal seems to move all in one piece. The hind limbs are spread apart and under the body.

If the dog has been clipped, or has short hair, we may discover circular patches on the skin as in the horse, and if those be punctured when freshly forming, the blood taken from them will be found to contain numerous hæmatozoa. Cœxistant with them we have œdemata of various parts of the body, chiefly of the flank, and sometimes of the face. The œdema and patches last two or three days and then disappear.

Opacity of the cornea sometimes takes place. The animals remain dull. Temperature between 102° and 104° F. Appetite good.

Period of cachexia.—Sometimes death occurs suddenly, the animal being seized with paralysis; more frequently loss of condition becomes extreme, the

animal being scarcely more than skin and bone. Finally the appetite is lost, and at the least exertion great difficulty in respiration becomes manifest. Death is generally sudden, being due to syncope.

Post Mortem appearances.—In the bitch there is always severe inflammation of the genito urinary mucous membrane. There is generally slight serous infiltration into the subcutaneous tissue under the belly and inside the thighs. The muscles wasted and pale in colour. There is swelling of the inguinal glands. There may be some increase in pleural and ascitic fluid; lungs and heart pale; spinal cord generally slightly softened in the dorsolumbar region. The blood fluid and light in colour.

Experimental Dourine transmitted from the bitch to the Dog by Coitus (Schneider and Buffard).

(1) A bitch was infected by inoculation.

(2) Two dogs became infected after having lined the bitch.

Note on No. 1.—Bitch, four years old, infected by blood taken from a patch on a horse suffering from Dourine. The blood was injected into the vagina. It contained the Trypanosoma. The injection was made on the 30th August 1899. There were no abrasions on the vagina. Temperature 101° F. to 102° F.

September 14th.—Profuse discharge from the vulva, and intense inflammation of the mucous membrane. Temperature 101° F. to 101.5° F.

September 22nd.—Abortion. Temperature 101°.

September 25th.—The discharge is thickened and lighter in colour.

September 26th and 27th.—Discharge has become serous; intense inflammation of the vaginal mucous membrane. Trypanosoma present in the blood obtained by puncturing the vagina.

October 3rd to 6th.—Trypanosoma present in the vaginal discharge. Dog No. 1 has been shut up with the bitch for three days.

October 25th.—All vaginal discharge ceased; the mucous membrane has assumed its normal appearance.

November 1st.—Œdema of the vulva; serous discharge from the vagina. Dog No. 2 has been shut up with a bitch since the 30th October.

November 2nd.—At 11 A.M., the bitch suddenly fell down on back, the hind limbs moving convulsively; got up in five minutes but moved with difficulty, the hind quarters being partially paralysed; loss of appetite; whines as if in pain at intervals.

November 3rd.—At mid-day great difficulty in breathing; hind quarters paralysed; œdema of vulva; vaginal mucous membrane much injected and covered with mucus. Trypanosoma in blood and vaginal discharge.

November 4th.—Died in the night.

Post Mortem.—Eight hours after death. Muscles pale, inguinal ganglia tumefied; liver and spleen are enlarged and engorged with blood. Mucous membrane of vagina and uterus much congested, that of the uterus softened and thickened, with flakes of mucus adhering to it; no parasites found in blood.

Cases Nos.—

Dog No. 1.—About four years old, shut up with bitch from 3rd to 6th October. They were seen to have connection.

October 15.—Slight enlargement of extremity prepuce, balanitis, parasites numerous.

October 19th.—Great engorgement of prepuce; balanitis; parasites numerous.

October 24th.—Œdema of scrotum.

October 26th.—Destroyed.

Dog No. 2.—Three years old ; shut up with bitch from the 30th October to 3rd November. There is enlargement of prepuce six days after, and parasites discovered six days after connection.

November 20th.—Destroyed.

Sanitary measures.—The occurrence of this disease in India is very serious and unfortunate, as it adds another to the many drawbacks which attend the operations of horse breeding, being a source of actual loss by death, and providing another cause for sterility of mares and stallions, of which there are already so great a number. It is obvious then that every effort should be made to stamp it out effectively, and as a Government Department provides the stallions, this should not be a very difficult matter, if properly qualified men in sufficient number be forthcoming.

As the disease is only transmitted by copulation, we should first make a very careful examination of the whole of the stallions, and institute enquiries regarding the occurrence of the disease amongst the mares.

It is absolutely necessary to prevent diseased animals from being employed for breeding purposes.

In Austria, where the contagion has prevailed somewhat extensively for many years, the following regulations are in force :—

(1) Even when there is nothing to lead to the supposition that the disease exists, every mare which is to be put to the horse shall be carefully inspected, and a rigorous refusal shall be given to all which are too old, in a weakly condition, or which have a discharge from, or a swollen vulva in any way differing from that observed in mares during œstrum. We would also suggest that no mare with an œdematous swelling on any part of the body should be served.

(2) The penis of the stallion shall be carefully examined from time to time, and if it offers any lesion, no matter of what description, even if it has nothing in common with these of the disease in question, the animal must be excluded from use until perfectly cured.

(3) There is every reason to make known to the breeders, by the most practical means, the characters of this disease, so that they may be able to recognise it at its commencement.

(4) If a breeding stallion be suspected, immediate information must be given, when the case will be enquired into and necessary measures taken.

(5) In order to prevent extension of the disease to other districts the sale of breeding animals should be stopped in the infected district during the prevalence of the disease.

(6) If the malady has spread in a district the employment of all stallions for breeding purposes, whether belonging to individuals or to the State, shall be suspended. The stallions recognised as diseased, if they belong to private persons, shall be sequestered, and kept by the Police under treatment.

(7) Horses affected with the disease shall be separated from the healthy, and attended by persons specially kept for the purpose ; the necessary utensils shall not be used with other animals. If the diseased are not deemed incurable they will be submitted to treatment.

(8) All horses attacked by the disease shall be castrated, as well as those which, notwithstanding their apparent good health, have transmitted it to mares they have served ; also those which have been put to mares affected with the malady, when they were served.

(9) The mares affected in any degree with the malady shall not be allowed even in the following year, to be served, until they have been inspected and declared healthy by a Veterinary Surgeon. It is better, however, if possible to exclude such mares from breeding altogether, and to brand them as having been attacked.

It has been ascertained by observation in Algeria that it is the last coverings of the season that are the most dangerous, and that when stallions become

affected it is generally at that time, and this is accounted for by the fact that the mares which have not held to the jack or stallion are brought to the Government Remount Stallions, in the month of May, when it is seen that the cover has been barren.

Another most important measure would be the careful veterinary inspection of all jacks used for mule breeding, none being allowed to cover without a certificate, as it is certain that the jack, although showing greater power of resistance to the disease himself, and exhibiting no marked symptoms of disease, really contaminates the mares, which if they prove barren, as is very probable, are put to the horse, which in turn becomes diseased.

Illustrative cases by Schneider and Buffard.

Spontaneous Dourine by Coitus.

Stallion Hezyl covered a mare for the last time on June the 20th:—

On the 4th August a large number of patches were noticed all over the body, especially on the quarters and sides. These patches were circular, slightly œdematous, and the hair over them was standing on end.

August 5th.—The prepuce, scrotum, and lower part of the abdomen were swollen and œdematous.

The horse arrived at Oran, at the Bacteriological Laboratory, on the 18th August, and at this time there were 20 typical patches seen on the body; and in blood taken from the centre of these the *Trypanosoma* was detected. There was at this time no engorgement of the generative organs. The internal temperature was 102.1° and the body weight 740 lbs.

From this date there were constant eruptions of patches, which were always preceded by a slight eruption on the skin. Sometimes instead of the patches forming, or in co-existence with them, there was simply slight derangement of the hair. Sometime the patches were not clearly defined, and a little exercise, even for a few minutes, was sufficient to make them disappear.

August 28th.—There are several visible patches, and in blood taken from them the parasites were more plentiful than on the first examination. The temperature was 100.7° F. in the morning and 101.8° F. in the evening.

August 29th.—Patches have disappeared. Temperature 100.7° to 101.5° F.

August 30th.—Numerous typical patches, in the blood from which the *Trypanosoma* was found. In blood examined, taken $\frac{1}{4}$ inch away from the patch, no parasites were found. The patches, at this stage were ill defined, appearing one day and disappearing on the next, some, however, remaining visible longer than others.

September 1st.—A large patch on the left flank. Temperature 100.6° to 102.9°.

September 2nd and 3rd.—Numerous patches. Temperature 101.8° to 102.7°.

September 4th.—Only the large patch which appeared on September the 1st remains. In the evening an eruption appeared on the skin. Temperature 101.6° to 102.5°.

September 5th and 6th.—Numerous patches on the quarters and sides. The large patch above mentioned has disappeared. Temperature 101.6°.

7th Morning.—A large œdematous patch on left side. Evening, numerous patches on quarters and sides. Temperature as usual.

September 5th.—No patches. There was an eruption of pimples containing parasites of small size. Temperature up to 101.9°.

September 10th.—The same blood taken from several places without showing any parasites. Temperature, evening, 101.8°.

September 12th to 16th. - No patches.

September 18th.—A great eruption of pimples and patches; parasites present in blood taken from them. Temperature up to 102·1° F.

September 19th.—No patches.

September 20th to 21st.—Two large patches on each side of chest.

September 22nd.—The large patches have disappeared, but there is an eruption of numerous small ones, in which the *Trypanosoma* is present. There is circumscribed œdema on the right side of the sheath. Temperature 102·1° to 102·6°.

September 24th.—Numerous patches. Temperature 100·7° to 102·1°.

September 25th.—Patches disappeared.

September 26th.—Numerous patches, parasites not plentiful, very little serum in the swelling except when newly formed. Temperature 101·8° to 101° F.

September 27th, morning.—No patch. Evening, vesicular eruption. From this date the horse was treated with 5 grammes, about a drachm, of quinine daily, but later this was discontinued in order to demonstrate the presence of the *Trypanosoma* in blood taken from the patches to M. Nocard. The horse appears healthy and in good spirits, and since last weighed has lost 20 lbs. in weight.

September 29th.—Skin healthy. Temperature 101·8°.

September 30th.—Numerous pimples and two patches, both badly defined. Temperature 100·4°.

October 1st.—Two patches the size of a rupee. Temperature 101·6°.

October 2nd.—The muscles of the back and loins are gradually wasting. In the evening the hair is noticed to be standing on end in several places. Temperature 100·8°.

October 3rd.—Skin healthy. Temperature 101·8°.

October 5th.—On all parts of the body where patches have appeared, the hair is standing on end. Temperature 101·1° to 102·1°.

October 6th.—Skin healthy. Temperature 100·2° to 102·1°.

October 10th.—Pimples on skin. Temperature 99° to 100·2°.

October 11th.—Badly defined patches have appeared; body weight 722 lbs. The quinine appears to have stopped the emaciation, and lowered the temperature.

October 14th.—Skin healthy. Temperature 101°.

October 19th.—Several slight elevations of hair.

October 20th.—Three well defined circular patches of the size of a rupee.

October 30th.—The horse has lost 24 lbs. weight in a week; the quinine is given for ten days and left off for eight, and then recommenced. Temperature 100·8° to

November 3rd.—Pimples, and hair standing up in irregular patches. Temperature 99° to 101·6°.

November 6th.—The horse is rapidly losing condition.

November 13th.—There is œdema of the abdomen and extremity of the sheath. *Trypanosoma* discovered in blood from three different parts. Temperature normal.

November 20th.—Losing weight and condition; as the quinine does not appear to be producing any beneficial result, it is discontinued. Temperature 100° to 101·6°.

November 27th.—Still rapidly losing weight. œdema of the abdomen still present, but it has slightly diminished. Temperature 100° to 102·1°.

December 5th.—Still losing weight, only 668 lbs. now. Temperature 99° to 101°.

December 6th.—Pimples, and elevation of hair. Temperature 99·4° to 102°. The stallion was tried with a mare; there was erection but impossibility of mounting. Nothing abnormal to be seen on penis. Œdema under the jaw and groin.

December 8th.—Engorgement of the extremity of the sheath, with parasites present.

December 10th.—The engorgement is still present. The horse has great difficulty in getting on his legs in the morning, but once risen he walks easily; at the trot he stumbles and knuckles over on the hind pastern. Temperature 100·2° to 101·4°.

December 11th.—Œdema has disappeared; a few pimples on the back and sides. Temperature 101·1° to 102·4°.

December 17th.—Rapidly losing condition. Œdema of the extremity of the sheath. Temperature 101·1° to 102·1°.

December 19th.—Weight 620 lbs. Engorgement of the sheath and œdema of abdomen, hair standing up in numerous patches on the back and loins. At a trot the horse stumbles badly behind, and knuckles over with the right hind fetlock. There are no parasites in the engorgement of the prepuce, although they are numerous in the swelling under the abdomen.

December 22nd.—Engorgement of the sheath and abdomen still present; weight 610 lbs. Temperature 102°. Destroyed.

Post Mortem.—Excessive emaciation; small gelatinous patches on the inside of the thigh; muscles greatly wasted but normal in colour; penis and urethra normal, except that the mucous membrane at the meatus is everted; testicles small and soft. Superficial inguinal glands much enlarged. Bronchial and submaxillary glands enlarged. Liver and spleen normal. Spinal cord softened for 4 inches in lumbar region.

Notes on Experimental Horse No. 3.

Schneider and Buffard.

Horse, aged 15 years, inoculated on the 28th September 1899, with blood taken from the point of inoculation of a donkey, which had been inoculated with the blood of a dog. The dog had been infected with 10 c. c. of the blood from the jugular vein of a stallion suffering from Dourine. The donkey's blood showed no mature parasites though several specimens both stained and fresh were examined.

October 5th.—Œdema at the seat of inoculation. Temperature 100·5° to 101·5° F. There was no rise in temperature after inoculation.

October 6th.—Œdema has assumed a circular shape. Temperature 100·8°.

October 9th.—The œdema has increased, and contains numerous parasites. Temperature 100·8°.

October 12th.—Œdema decreasing.

October 16th and 17th.—At the site of inoculation there is a large irregular patch with hair standing on end and the skin thickened; there is but a small quantity of serum in it but numerous parasites. The Trypanosoma can only be detected in blood from this patch. Temperature 100·2° F.

October 18th.—The œdematous patch has assumed a clearly circular shape, it contains numerous parasites; it has all the characteristics of a Dourine patch, the skin is thickened but non-adherent and the hair is standing on end. Temperature 100·6°.

October 19th.—Same condition in the morning but in the evening a patch, the size of half a crown, is present on the right flank, with a few pimples. Temperature $100^{\circ}8'$.

October 20th.—A dozen patches scattered over the sides, flank and thighs; near hind leg œdematous. Blood contains but few parasites, but numerous granular bodies. The large patch is still visible, and although it contained numerous parasites yesterday none can be found now. Temperature 101° F.

October 22nd.—The number of patches increased, the large primary patch less clearly defined, no lesions visible in the generative organs. The patches vary in size, the skin is thickened and the hair standing up. Temperature $100^{\circ}4'$ to $100^{\circ}7'$.

October 23rd.—Swelling of scrotum.

October 24th.—Swelling of scrotum increasing, and the extremity of penis enlarged. Fresh patches appear on abdomen and legs. Temperature up to $101^{\circ}8'$ F.

October 26th.—In the evening the horse covered a mare, the semen contained a great number of parasites that lost their mobility long before the spermatozoa; no lesions on the penis. The excitement threw the horse into a profuse perspiration except on the skin covering the patches, which remained dry. Temperature 100° F. to $101^{\circ}1'$.

October 27th.—The horse again covered the same mare. The semen examined a quarter of an hour after, contained numerous spermatozoa which were motile, also Trypanosoma which were not. Nearly, all were united to others in groups of three or four, there were a few single ones which had the usual characteristics.

From this date the progress of illness was very rapid. The patches increased in number, the temperature remaining nearly normal. The outline of the patches showed up very distinctly, giving the sensation to the touch of a metallic disc under the skin. The emaciation is very marked.

November 13th.—Extensive œdema of sheath and scrotum, which causes the animal to keep his hind legs straddled apart. The œdema extends down the inside of the thighs, and forward under the abdomen to the chest. The serum and blood from these swellings contain the parasites. The corneæ are clouded and the conjunctiva secretes a muco-purulent discharge. Temperature $101^{\circ}3'$ to $102^{\circ}1'$. There is weakness of the hind quarters and the toes are dragged; there is knuckling over of the fetlocks.

November 15th.—The horse fell down this morning and when an attempt was made to get him on to his legs, he appeared unable to help himself. The œdematous swellings have greatly diminished. Temperature $100^{\circ}6'$ to $101^{\circ}3'$ F.

November 16th.—Swelling still persistent in the region of the generative organs. Large patches developed during the night. Temperature $100^{\circ}6'$ to $102^{\circ}1'$.

November 19th.—Very great dropsical swellings of the hind limbs; eversion of the urethral mucous membrane. Temperature $101^{\circ}4'$ to $102^{\circ}1'$.

November 20th.—Hind quarters semi-paralysed. Temperature 100° to 102° F.

November 21st.—The swellings and patches have disappeared, and the horse remains down.

November 22nd.—All limbs paralysed; dyspnoea and bronchitis. Temperature 100° to 102° F. Parasites present in the general circulation.

November 23rd.—Same condition, parasites present in the blood.

November 24th.—Almost the whole surfaces of the body is œdematous; vesicles exist on thighs, back, scrotum and penis; parasites found in blood from the ear.

November 25th.—During the night nearly the whole of the œdema has disappeared, except that on the chest. The horse was helped up and remained standing, and was able to move a little as if the paralysis were getting less.

He made violent attempts to urinate, but it was done with difficulty. The urine passed was very dark in color, but did not contain any blood. The patient stood but with difficulty through the day; appetite remains good, and even when down the horse continues to eat. Temperature 100.5° to 101.6° .

November 26th.—The horse was found down on the right side helpless, hocks enormously enlarged. In the evening was seized with colonic spasms which continued, at intervals, of two minutes; appetite remains good. Temperature 100.8° F. to 101.8° F.

November 27th.—Animal was raised up and stands with limbs wide apart and hind quarters crouched down, hocks flexed; appetite voracious. Temperature 100° to 102.1° F.

November 29th.—The animal is dying; very emaciated. There is dropsical effusion in all the limbs, chest and abdomen, and especially in front of the sheath. He can only move two or three paces with difficulty, the right hind leg being completely paralysed. The parasite is present in the blood. Destroyed.

Post Mortem.—Gelatinous infiltration into the subcutaneous tissue of limbs and abdomen, especially around scrotum and sheath. Bilateral hydrarthrosis of the knees. Muscular atrophy, especially noticeable in sacro lumbur region. Marked engorgement of the superficial inguinal glands. Collapse of a portion of the left lung, with thrombosis of the pulmonary vein on that side. Heart pale and anæmic. Liver slightly hypertrophied. Slight hæmorrhage on to, and atrophy of, the spinal cord.

DOURINE TRANSMITTED TO THE MARE BY COITUS.

A mare, aged 14 years, was covered on the 27th and 28th October 1899, by a horse suffering from Dourine. The semen of this horse was at once examined, and found to contain *Trypanosoma*. This horse had been inoculated in the neck with blood from a donkey. The donkey had been inoculated with blood from a dog, which had received 10 c. c. of blood from a stallion that had developed Dourine spontaneously by Coitus.

On November the 6th, or the 9th day after covering, the vulva was tumefied on both sides. The mucous membrane of the vagina appeared to be infiltrated. The clitoris was enlarged and in a state of semi-erection; and the whole surface of the mucous membrane was covered by a white, sticky mucus, which contained epithelial cells, leucocytes, granular bodies and a few parasites. The mare was horsing.

November 7th, 8th and 9th.—The tumefaction of the vulva is still considerable, but the discharge has decreased in quantity. There is no fever, *Trypanosoma* detected in blood taken from the vulva.

November 10th.—Œdema of the clitoris, which, when punctured, emitted serum tinged with dark blood. The *Trypanosoma* is less plentiful than on the previous evening.

November 14th.—Swelling of vulva decreased.

November 15th.—During the night the œdema of the vulva has greatly increased. The vaginal mucous membrane is very congested, and shows hæmorrhagic points over a spot the size of a shilling. The clitoris is enlarged. The discharge has decreased, but the *Trypanosoma* has been detected in it.

November 16th.—Two typical patches appear on the skin on the internal surface of the thighs. Œdema of the vulva greatly increased, also the vaginal discharge, which contains the parasite, as does also blood from the patches and the general circulation.

November 17th and 18th.—Numerous typical patches on sides, quarters and neck. Œdema of the vulva, ulcer at lower commissure, *Trypanosoma* present in blood from patches; more numerous in these newly formed than in those which have been in existence for sometime. If the patches are incised, when

first formed, they contain a considerable amount of serum, but it disappears in 48 hours, when the surface appears dried up, and the parasite is then rarely found.

November 18th to 22nd.—New patches developed.

November 23rd.—Only one patch remains on the abdomen, the parasite is abundant in the blood taken from it, but very few can be found in the general circulation.

November 25th.—New patches developed.

November 26th.—More patches formed; a freshly formed patch was punctured and the parasite detected.

December 1st.—The animal is becoming emaciated; 25 to 30 patches have developed in various parts of the body. There is considerable swelling of the vulva and the vaginal mucous membrane is injected. There is also œdema under the belly. Temperature $101^{\circ}1'$.

December 3rd.—The patches that developed on the first are now only visible on the right side.

December 5th.—Considerable vaginal discharge.

December 6th.—The last formed patches have disappeared. The vaginal discharge is diminished.

December 8th.—The œdema under belly has disappeared, and the vaginal discharge ceased.

December 9th.—The mare was shown to stallion Hezyl, but he was unable to cover. She was in season, and in the mucus from the vagina a number of parasites were noticed.

December 10th.—Marked lameness in the off hind limb.

December 13th.—The mare has now lost condition greatly, and when moved, great weakness of the hind limbs is noticed.

December 14th.—Mare rises with difficulty; swelling is apparent on right side of vulva only; hæmorrhagic spots on floor of vagina. There is marked vaginitis. œdema of the inside of the right thigh has appeared. There is difficulty in moving, the hind legs being kept wide apart. Weakness of the hind quarters is also noticed. The appetite remains good.

December 17th.—Patch has appeared on the inside of the right thigh; the animal is rapidly losing condition.

December 28th.—Mare unable to rise, owing to complete paralysis. There is œdema of the vulva extending to the anus. Appetite remains good. The mare died during the night.

Post Mortem.—Gelatinous patches over inner side of thighs. Liver and spleen normal. Uterus deeply injected; vaginal mucous membranes are thickened and softened, and in certain parts nearly black. The inflammatory lesions extended to the bladder and uterus. No fluid present in the spinal cord.

Donkey inoculated with Dourine blood.—A healthy donkey, four years of age, was inoculated on the 24th July, in right flank, with blood containing the *Trypanosoma*, taken from a dog which had been infected from a stallion. The injection was made under unfavorable conditions, the animal struggling violently.

July 29th.—Large abscess at point of inoculation. Temperature $100^{\circ}8'$ to $101^{\circ}2'$.

August 2nd.—Fearing that the first inoculation was abortive, a second was made, with a pipette, with the blood of the same dog, in prepuce.

August 3rd.—Abscess healing. Temperature $100^{\circ}8'$ to $101^{\circ}6'$.

August 4th.—Swelling in left flank. Temperature $99^{\circ}4'$ to $100^{\circ}4'$.

August 5th.—Swelling increased. Blood from this region contains the *Trypanosoma*. Temperature, evening, $101^{\circ}4'$.

August 8th to 10th.—Swelling decreased. Temperature $99^{\circ}1'$ F. to $102^{\circ}1'$. Point of inoculation hot and tender.

August 11th to 15th.—Swelling stationary; the organism is to be found only in the blood from its neighbourhood.

August 17th to 27th.—Only a small swelling, of the size of a hazel nut, remains.

August 27th.—Swelling of the neighbourhood of the point of inoculation of the size of the fist. Parasite found in the blood from the locality.

August 29th.—Enlargement increased; also number of parasites in the blood. Temperature $102^{\circ}5$.

September 4th.—Swelling increased. Inguinal glands in right side enlarged. Temperature $100^{\circ}6$ to $101^{\circ}4$.

September 7th.—Swelling disappeared. Temperature $99^{\circ}8$ to 101° F.

September 9th.—Swelling re-appeared, parasites very numerous. Temperature $100^{\circ}2$ to $101^{\circ}5$ F.

September 11th.—Swelling disappeared; no parasites. Temperature $103^{\circ}3$ to $100^{\circ}9$ F.

September 14th.—Swelling returned; parasites in blood. Temperature $100^{\circ}7$ to $102^{\circ}1$ F.

September 20th.—Swelling disappeared; no parasites. Temperature $101^{\circ}5$ to $100^{\circ}8$.

September 25th.—Swelling re-appeared; parasites numerous.

September 26th to 28th.—Edema of abdomen as far forward as the umbilicus, consisting of colored serum.

September 30th.—Superficial inguinal glands, swelling as large as hen's egg, hot and tender, but no pus.

October 3rd.—Swelling totally disappeared.

October 8th.—Swelling of sheath and scrotum; no parasite found in blood from this region, but found in glands in the vicinity of the anus.

October 10th.—Numerous parasites obtained by taking blood from swelling of sheath.

October 14th.—Swelling of scrotum and sheath much increased.

October 17th.—Fresh swelling at site of primary inoculation; diminution of that of the sheath and scrotum. Parasites in blood obtained from the seat of inoculation.

October 18th.—All swellings disappeared.

October 24th.—A hard swelling, about the size of a hen's egg, remains at the seat of inoculation; blood from this region contains a large number of parasites and motile granules. None found in blood from the general circulation.

October 26th.—Swelling has disappeared.

October 26th to November 14th.—Blood taken from the seat of inoculation contains numerous parasites, in various stages of development, but in that taken from the general circulation they are scarce.

December 19th.—Blood cyst formed at the point of inoculation, containing well developed Trypanosoma.

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APPENDIX B.

**Further Note on Dourine by Veterinary-Major H. T. Pease,
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Further investigation has brought forcibly before me the fact that the existence of this insidious contagious disease amongst the stallions and mares, is an extremely serious menace to the Horse Breeding Industry of India. Since the true nature of the malady has been demonstrated, information regarding its prevalence shows that it is by no means a recent disease in the country, and that it is widespread, having been seen practically in every province in which horse breeding has been carried on. Thus there have been cases in Bombay, Sindh, Baluchistan, Punjab and the United Provinces. More stallions than are shown have been destroyed for it, because being old, they have been returned as old and worn out. Taking into consideration the fact that these stallions have gone on covering whilst suffering from the disease, some of them for two or more years, and have during this time infected a considerable number of mares, it will be seen that it is probably much more widely disseminated than was suspected. In view of the fact that the Government of India are now re-organising the Horse Breeding Department and making every endeavour to improve it, I consider it my duty to impress upon them, as forcibly as it is proper or possible for me to do, the urgent necessity which exists for the adoption of such measures as will ensure the disease being stamped out, or at least its ravages being limited.

The opportunities which have so far been given me to make a further study of the disease have resulted in my obtaining a good deal of information and experience on the subject. More could of course have been accomplished, but for the fact that it has only been possible to work in spare time snatched at intervals between teaching and other duties, so that the investigations are necessarily as yet very incomplete. Certain points which are of interest have, however, been brought to light.

In the first place it has been experimentally proved that the disease with which we are dealing is "Dourine" and that it is capable of being transmitted from stallion to mare by coitus. Kilgarth, a T. B. E. stallion covered experimental mare No. I with the result that she became infected, and experimental mare No. II was infected from her by smearing the vaginal mucous membrane with the vaginal discharge containing the organism, as will be seen from the records of these cases.

Schneider and Buffard's opinion as to the cause of the disease being a trypanosoma has so far received confirmation that in all cases in which the characteristic patches have been found on the skin a trypanosoma has been found in the blood taken from them. In experimental mares Nos. I and II a similar trypanosoma was detected in the vaginal discharge and also in blood taken from a characteristic patch on the skin. The blood taken from patches on the skin of Kilgarth, also showed the trypanosoma.

Another point which is worthy of consideration is the fact that of three mares which have been covered by Kilgarth since he was first noticed to be diseased, two have become infected. This is the only case in which we so far have any definite reliable information and it would tend to confirm the statement of Nocard and Leclainche which is to the effect that numerous observed facts show that a stallion suffering from Dourine transmits the disease to the majority of mares covered by him and during the whole covering season. He considers that we may estimate that $\frac{2}{3}$ rds or $\frac{3}{4}$ ths of mares exposed to the contagion by coitus are contaminated. Hence it is a very fortunate thing that Kilgarth was removed from the 18th B. L. Stud before he had time to do any more damage, and it points out the necessity for very careful periodical inspection of the mares he has covered during the year.

Diagnosis.—The diagnosis of this disease in the stallion in all but cases in the eruptive stage appears to be extremely difficult; of course when we have the newly formed typical plaques or patches on the skin in blood from which the trypanosoma can be demonstrated, given a certain amount of skill and patience and plenty of time it is easy. But an experienced man would be justified in condemning an animal simply from the clinical symptoms alone in such a case, or at least would stop covering and send in for diagnosis. But the case is very

different when we have to deal with horses in which the patches do not exist at all, and more especially is this the case with the mare. It has been suggested by Schneider and Buffard that blood from a diseased animal be injected subcutaneously into another experimental one, preferably a horse or a dog. My own experiments in this direction are however negative, and the results obtained distinctly unsatisfactory. No doubt if blood containing numerous trypanosomata, such as is occasionally obtained from newly forming patches in severe cases be used, results will be positive, but in such cases the necessity for inoculation will be dispensed with if a microscopical examination of the blood be made. It has been stated by Schneider and Buffard that the severity of the inoculated disease depends upon the *number* of parasites contained in the medium used, and this seems to be borne out by our experiments, for blood from the general circulation of Kilngarth, although he had patches on the skin, showing that the trypanosoma was present in the general circulation, failed to reproduce the disease in a dog which received 10 c. c. of it subcutaneously. In old cases, in which the trypanosoma cannot be readily demonstrated, the case is at present particularly hopeless, excepting from a clinical point of view. In the case of Cato II, although the disease was progressing 20 c. c. of blood from the general circulation, failed to produce any reaction when injected hypodermically into the skin of the abdomen of a dog. In such cases if the organism be present in the blood of the general circulation, it is in very few numbers, so that when the blood is injected, the phagocytes destroy the trypanosoma *in situ*, and no infection results.

Experiments go to show that in the mare the examination of the vaginal discharge when mixed with a little blood, taken by scraping often reveals the organism, but whether this be so in old cases has not yet been ascertained.

Another very alarming fact has been brought to light in regard to this matter and that is the possibility of a mare becoming infective before she has shown any marked clinical sign of having been herself infected. In the mare experimentally infected no symptoms whatever beyond the fact of her coming into season again early and showing some venereal excitement were noticed. Careful daily inspection of the vulva and vagina showed that there was no swelling of any kind on the one and no symptom of congestion or inflammation of the other, and no appreciable discharge. In fact it was extremely doubtful until the disease had passed through its first stage to the second whether she had become infected at all, and it was not until a patch had appeared on the skin and a microscopical examination of the blood taken from it had revealed the trypanosoma, that we were made aware of it. Doubtless the œstrum shown on the seventh day after covering was the sign of the commencement of the disease in mare I, and had the vaginal discharge been carefully examined the organisms would have been found as in mare II. An examination of a small amount of mucus taken from the vagina by scraping at the 27th day of the disease, however, showed the trypanosoma in great numbers, and there can be no doubt whatever that she had been actively infective for a considerable time. This has been borne out by later experiment. To the ordinary observer at the present time this mare looks quite healthy. Her coat looks bright, temperature normal, appetite good, in fact with the exception of a small elevation on the skin, of about the size of a five-shilling piece, she has no marked symptoms.

Taking all the above facts into consideration it will appear evident that the diagnosis of this disease is in all but the simplest cases extremely difficult, and indeed, in many cases impossible, and that no one but an experienced Veterinary Surgeon can be trusted to deal with it.

I have on several occasions been asked whether there was any danger in keeping an affected mare with others. In reply to this question I can only say that such a course is inadvisable. Although infection in any other ordinary way than by coitus is extremely rare, still cases have been reported, and the discharge, especially from the vagina is dangerous, and the disease is capable in some cases of being transmitted by the direct introduction of such discharge on to the vaginal mucous membrane by means of jharans, sponges, etc., used in sponging out dock and perineum. Cases have been

reported in geldings, and in mares which have never been covered. In this connection see case of experimental Mare II.

When an animal becomes diseased, when may it be considered cured should it survive?

It is impossible in the present state of our knowledge to give an answer to this question. Some cases appear to be very slight and cause but little disturbance, but at the same time may remain infective for years. The cases of Quadratic Arab and Harden T. B. E. stallion already reported are cases in point. It seems to be the general opinion that a horse or a mare infected remains dangerous for a very long time and should not again be used for breeding purposes, even if the horse be capable of covering.

Prophylaxy.—What should be done to combat Dourine? This is a question which it is not easy to answer as regards India, owing to the very great difficulties which have to be overcome. I, however, may be perhaps permitted to indicate some measures which may be of use in protecting the Government Stud animals from the malady. The first thing to be done is to stop any stallion which may have the slightest œdema of the sheath or penis from covering and to make a careful examination of all mares covered by him during the year. Experiments go to show that a microscopical examination of the discharge from the vagina taken by scraping is necessary. The horse should be kept under observation for a sufficient time to ascertain whether the disease be Dourine or not.

All mares brought to a stand and showing any swellings of limbs or body, traces of old patches of the skin, in poor condition, very old, or lame in the hind limbs, should be refused the stallion.

The penis of the stallion should be carefully washed with a 1 per mille solution of perchloride of mercury solution or permanganate of potash solution after covering.

Any animal, horse or mare, once found suffering from Dourine should be permanently removed from the stud. Stallions may be treated and castrated; then if they recover sold by auction or preferably destroyed. Mares should be either destroyed or branded with a distinguishing mark and refused further covering by any Government horse, donkey, or District Board horse or donkey unless they be certified clean two years afterwards.

Mares known to have been covered by a horse or ass affected with Dourine should not be again covered by any Government horse or ass until it is certain that they are free from disease. In Algeria all affected mares are slaughtered and compensation paid to the owner.

Another very important point in my opinion is that no mare intended for horse breeding should be covered by a donkey stallion, and no District Board horse should cover a mare which has been covered but has not held to a donkey, for as in Surra, we have to look for a vehicle for the conservation of the trypanosoma, which we find to be the camel and ox, so in Dourine it is the donkey which preserves the parasite. It has already been stated in a former note that the donkey shows but few, if any, marked symptoms of the disease, but may be capable of transmitting it to the mares he covers. When it has been found that these mares have not held, they may be put to the District Board horse, and so contaminate him whilst he, in his turn, may pass on the disease to a branded mare he may have covered, and so at last infect a Government stallion. With the increased establishment which will be at their disposal, no doubt the Remount Department will be able to carry out such measures as will eradicate the disease amongst the breeding stock. If this can be done, more satisfactory results from the coverings may be looked for.

The Parasite.—The cause of Dourine is a parasite belonging to the genus Trypanosoma, the species being Trypanosoma Rougeti, so named after its discoverer. It closely resembles the Trypanosoma Evansi which is the cause of Surra, a very common and widespread disease in this country. It is not, so

far as I am aware, possible to find any difference between them on microscopical examination. They are of the same size and shape, both have the posterior extremity rounded and sometimes truncated. Neither of them so markedly or so frequently show the chromatin granules of *Trypanosoma Brucei*. They both multiply by longitudinal segmentation. The centrosome first dividing, then the nucleus and finally the body longitudinally. It is only in the symptoms which they produce that any marked difference exists. The *Trypanosoma Rougeti* is extremely active, often swimming right across the field of the microscope quickly. It possesses a marked centrosome and granular nucleus and has been proved to differ from the *Trypanosoma Brucei* which is the cause of Nagana or Tsetse fly disease. An experiment by Nocard proves this. He reports in the *Comptes rendus de la societe de byologie*, 1901, page 464, that he inoculated two dogs which had been rendered immune from Dourine, with the trypanosoma of Tsetse fly disease, and that both succumbed on the 11th day whilst the control animal only died on the 14th day. This proves a total absence of immunity from Nagana and clearly shows that the diseases are distinct. I think, indeed, that we may safely consider that the trypanosoma of Dourine differs from any of the others and deserves to be classed as a separate species the "*Trypanosoma Rougeti*."

Clinical examination of the parasite.—The blood or vaginal discharge may be examined in the stained or the unstained condition as in Surra. In naturally acquired cases in the horse as has before been said, the blood from the patches is the most suitable for the purpose. It should be taken as a rule from the freshly forming patches. The number of parasites to be found will depend greatly upon the severity of the case, and the stage at which it has arrived. It is well always to take two or three fresh specimens and also a few smears. The centre of the patch is punctured with the point of a sharp scalpel, so that a droplet of blood and serum exudes. This may be taken up with a cover glass, and then placed on a slide, so that the droplet of blood spreads out into a thin layer between the two glasses. The preparation may then be examined with a No. 4 eyepiece DD. objective Zeiss when the parasite, if present, will be seen as a flagellated fusiform body in very active movement. In inoculated cases blood from the seat of inoculation generally contains the parasite for a long time, and whilst any thickening remains it generally contains the organism. In mares naturally infected vaginal discharge taken by scraping, so that it contains some blood, is suitable for examination; when the discharge is thick and more or less abundant, it is not so likely to contain organisms which can easily be seen as when it is thin, serous and coming from a highly congested membrane. Experiments seem to show that the parasites remain and multiply in the vaginal mucous membrane for a considerable time. For purposes of comparison or in order that a detailed study of its construction may be made it is necessary to prepare stained specimens of the parasite, and for this purpose the best form of preparation is the smear, similar to that generally used for the study of the malarial parasite. These smears are prepared on the ordinary glass slips previously well cleansed with alcohol, and then heated for a time in a flame. This gives them a good surface for the reception of the smear. With a cigarette paper folded flat to a third its width we now pick up a drop of blood upon the under flat surface, so that the blood will form a fairly thin layer between the paper and the slide. The paper is then drawn along the surface of the slide lengthwise and leaves a beautifully even film of blood upon it. This is fixed by rapidly drying and placing in absolute alcohol for ten or fifteen minutes. The specimen of blood should not be very thin. We may then stain by Laveran and Mesnil's or Romanowsky, Ziemann's or Chenzinsky's methods, or with Leishmann's stain, this last being the quickest and easiest.

Laveran and Mesnil's method is as follows:—

The following solutions are prepared ready:

- (a) Methylene blue with silver oxide which may be prepared as follows:—Into a phial of about 150 c.c. are placed a few crystals of nitrate of silver and 50 to 60 c.c. of distilled water; when the crystals are dissolved, the phial is filled up with a solution of

soda, and the whole is shaken. There is formed a black precipitate of oxide of silver which is repeatedly washed in distilled water so as to remove the nitrate of soda and the excess of soda. Upon the oxide of silver thus obtained is now poured a saturated aqueous solution of methylene blue prepared with Höchst medicinal methylene blue. These are left in contact for about two weeks and shaken repeatedly. This forms Borrel's blue.

(b) A one per cent. aqueous solution of Eosin.

(c) A five per cent. solution of tannin.

When wanted for use we prepare our staining material as follows:—

* 1 per cent. eosin solution	...	...	4 Cubic centimeters.
Distilled water	...	...	6 " "
Borrel blue	...	...	1 " centimeter.

The slide upon which the blood has been smeared and fixed is immersed in the above blue eosin solution which has been poured into a suitable vessel, a Petris dish generally, and left for from 20 to 30 minutes. It is then removed and washed very freely with water, then with distilled water, and then either dried and examined or placed in the 5 per cent. solution of Tannin for 10 or 15 minutes, then again freely washed with water, then distilled water and finally dried, when it will be ready for examination.

Sometimes a precipitate forms on the smear which hinders a proper examination, and when such is the case, we may wash the preparation in oil of cloves, then in Xylol, and pass a soft linen cloth soaked in Xylol over the smear. These preparations keep better dry than in Balsam. They rapidly lose their colour in cedar oil. It is best therefore to keep them dry and only allow the cedar oil to remain on them when examining them, washing it off afterwards with Xylol. No cover glasses are required. When a specimen has been successfully stained by the above method the protoplasm or body of the parasite stains a clear blue and presents towards its posterior third a granular nucleus which may be rounded or ovoid and coloured a violet red; the flagellum appears in the form of an uniformly coloured line of violet red which continues all along the undulating membrane, and terminates not far from the posterior extremity in a rounded or elongated point, which stains an intense violet red, nearly black in fact. This is the centresome of the parasite. The undulating membrane remains uncoloured or takes on a very pale blue tint. The blood corpuscles are stained pink and the nuclei of the leucocytes deep violet. In this condition the parasite may be seen in various stages of division, some with two centresome, others with two nuclei and others still further advanced the body dividing.

2. *Ziemann's modification of Romanowsky's method.*— For this stain the following staining fluids are prepared in advance:—

(1) Methylene blue	...	...	...	1 Gramme.
Borax	...	...	...	2.5 Grammes.
Distilled water	...	...	...	1-10 "
(2) Eosin	...	...	...	1 Gramme.
Water	...	...	...	100 Grammes.

The fluids above are mixed in the proportion of one part of the methylene blue mixture and four parts of the eosin mixture. This stain colours in about 10 minutes, and in many cases gives a very nicely differentiated specimen, the protoplasm being blue, flagellum red and chromatin a different red. If one of the two colours is too intense, it is necessary to place the slip in the other colour for a short time. Then wash well and dry.

3. *Romanowsky's method.*—Romanowsky heats the dried preparation for thirty minutes at 105° F. to 110° F. and then lets them float for two or three hours in a stain consisting of—

Saturated solution of methylene blue	...	...	...	1
1 per cent. watery solution of eosin	...	...	...	2

This mixture is made immediately before use. The two solutions used for this purpose can be kept for a long time and indeed the solution of methylene blue stains best when the formation of the mould is noticed upon its surface. The solution of methylene blue must be filtered before mixing with the eosin. When the two stains are mixed a heavy precipitate occurs, the solution must be used with the precipitate and not filtered. Romanowsky assumes that in his mixture a third neutral colour develops, to which the nuclear chromatin of the hæmatozoon shows the greatest affinity. With this method the protoplasm is stained blue, the nuclear chromatin carmine violet, and the flagellum red.

4. *Leishmann's* modification of Romanowsky's method is an extremely handy one. The dye may be obtained ready made up, and to use it all that has to be done is to pour three or four drops of the dye on to the film or smear, and let it flow over the surface of it. After half a minute add to it six to eight drops of distilled water and let them mix. Allow the film to stain in this for five or ten minutes. Wash gently with distilled water and then allow it to dry without heat. This method is very easy, quick and reliable after very little practice.

Do affected animals really recover?—As has already been stated in regard to the horse and ass, animals which appear to be cured very frequently contain living and virulent organisms in their bodies, although these may be present in such few number that it is impossible at some periods of the disease to demonstrate them. In some of the cases observed here, animals affected for over two years have been observed, in which the disease did not appear to exist in an active form, but such animals frequently showed signs of active changes in the occurrence of œdemata in various parts of the body and occasional patches. It is, therefore, as a rule unsafe and generally incorrect to say that such horses are cured, as the disease may at any time show itself in an active form again. In certain horses, however, which show local lesions of the sheath and cord but no other symptoms, if the history of the cases sent to me are correct, and if they have really suffered from Dourine, there can be no doubt that recovery has taken place. For example, two stallions from Baluchistan, *vis.*, Moonstone Arab and Quadrant, although showing local lesions of cord, penis and scrotum cover well, are reported to cause no disease amongst the mares, and to get stock. Unfortunately this history of these cases leaves much to be desired, and we cannot place much reliance upon it. In fact, after careful observation here patches appeared on Moonstone and in blood from them the organism of Dourine was detected. At any rate, we can safely say that complete recovery is rare, and animals which may for a time appear well generally after periods of time varying from one to three or four years become ill and die in a short time.

Accessory symptoms.—In regard to what may be called accessory symptoms, one horse sent into hospital here, had in addition to other symptoms a discharge from the nose, cough and broncho pneumonia from which he eventually died.

Another horse, "Qui Vive" Arab, a photograph of which accompanies this report, had inflammatory swelling of the hock joint, and the synovial sheaths of the extensor tendons. There was ulceration of the astragalus and a large amount of new tissue formation about the hock.

Naturally acquired Dourine—"Kilngarth," a T. B English Stallion, 14 years old, belonging to the Civil Veterinary Department, North Punjab, by St. Honorat-Lady Radiant, was sent to the Punjab Veterinary College, by Mr. Trydell, Superintendent, Civil Veterinary Department, with the following history. He has been in charge of the 18th Bengal Lancers at Sialkote during 1899-1900, 1900-01, and 1901-02, up to the date of his despatch. In 1901-02, he stood at Dera Ismail Khan. The first two years he was with the 18th Bengal Lancers, he stood at Sialkote and this winter at their farm, six miles from Toba Tek Singh, in the Jhang District. During the above time he covered most of the mares of the 18th Bengal Lancers and several of the 15th Bengal Lancers, besides a fair number of zamindars' and breeders' mares.

Early in January 1903, a report was received from the Veterinary Assistant in the Jhang District, that the horse had been still suffering from a swollen

sheath which he pronounced to be due to Syphilis, though he does not mention any discharge or that there were any ulcers present. About a month after the swelling was noticed, the horse had fever for three days, the temperature rising to 105° F. The horse was treated for a time and reported cured, the swellings having disappeared. The Superintendent, however, determined to see the horse himself at the earliest opportunity which was on the 6th February, or just two months after he was reported ill. At the 18th Bengal Lancers farm he met an officer of that regiment who said he had observed that the horse was not serving his mares as well as he used to do, and asked him to watch his covering once. It was then noticed that the act appeared painful. The stallion had been carefully examined before he was brought up, but no abnormality of sheath or testicles could be detected. In fact the horse looked thoroughly well and in excellent condition, nor could anything abnormal be noticed when he drew his yard except that he took a considerable time to get ready, which was noteworthy, because, as a rule, he was a vigorous and eager coverer. On this occasion, however, he was distinctly slack, and although he served the mare he did not get a proper erection, and almost all the semen was lost just within the vagina and outside as he was leaving the mare. The horse was then sent to Rawalpindi to be placed under observation. Mr. Trydell examined him again a fortnight later, and was shown a flat circular shaped swelling, rather larger than a rupee, on the skin over the ribs. He was a bit tucked up, and there was apparent swelling of the sheath. He was feeding well and his coat looked bright enough. The horse has always been full of vigour and kept in good condition, and has been well exercised and looked after since he has been with the 18th Bengal Lancers, and had got excellent stock.

Mr. Trydell examined most of the mares at the farm, and with one exception, saw no indication of disease amongst them. The exception had a number of circular patches on her body, the hair of which showed a different shade to the rest. She had an inflammatory patch in the vagina, but this he considered might have been due to a bruise from having recently foaled.

The stallion arrived in the hospital of the Punjab Veterinary College on the 20th February 1903, and was then in good condition. The sheath was noticed to be swollen, the end of the penis, œdematous, the meatus everted and red. There were no sores on the penis, nor was there any appreciable discharge from the urethra. The temperature was normal, appetite good and action free. There were no typical patches on the skin, but traces of recent patches could be seen on the quarters. It was ascertained from the horse's ticket he had stood at the following stands since 1900, *vis.*, Dera Ismail Khan, 26th October 1900; Mirpur, 30th July 1901; Dera Ismail Khan, 4th October 1901; Mirpur, 9th July 1902; 18th Bengal Lancers Stud, 2nd October 1902. As the horse had been under observation whilst at Mirpur for nearly three months, and no sign of œdema of sheath and penis, nor patches on the skin had been noticed during that time or previously, it appears pretty certain that if he were suffering from Dourine as Mr. Trydell suspected, he was infected after leaving that stand for the 18th Bengal Lancers Stud on the 2nd October 1902. The syce mentioned and described patches on the skin.

21st February 1903.—Three small patches appeared on right loin and left ribs, and one on the right thigh. Blood was examined, and two organisms were discovered.

23rd February 1903.—One patch on near arm, but the organism could not be discovered in blood taken from it.

24th February 1903.—Patch on left ribs has become typical in shape, and five inches in diameter.

26th February 1903.—Fresh patches on off shoulder and neck. Blood examined from those freshly formed revealed the trypanosoma, of which three specimens were found in one cover glass preparation. The other patches are disappearing. A seven months' old pariah bitch was inoculated with ten drops of blood from the patch on the off shoulder, a small pocket was made in the bitch's skin under the abdomen with a lancet and the blood placed therein. A small quantity (about 8 drops) of blood from the patch was smeared over the mucous membrane of the vagina. See Dog No. 3.

27th February 1903.—Patches on off shoulder and near ribs still present. There is œdema under the belly to-day. Blood taken from the general circulation does not reveal any organisms on microscopical examination. A young bitch (pariah) was inoculated subcutaneously in abdominal region with 10 c. c. of blood taken from the jugular vein. See Dog No. 2.

28th February 1903—Patches still present, œdema under belly increasing in amount, appetite good.

2nd March 1903—Patches have almost entirely disappeared, but œdema is extending.

4th March 1903.—A typical patch has appeared on the quarter and one on the neck; blood from both and also fluid from œdema examined, but no organisms detected.

15th March 1903.—All patches have disappeared.

19th March 1903.—Up till this date no further patches have appeared. It was decided that as we had an old mare in season to ascertain whether Kilngarth could transmit the disease to her by coitus, and, if so, whether he could be reinfected from her and a more severe type of the disease be thus induced. He covered the mare this morning freely and eagerly. Microscopical examination of the semen taken from the vagina showed very few spermatozoa, and none capable of movement, although the examination was made immediately after covering. The horse showed no distress of any kind, and did not sweat. Stained preparations of the semen showed very few spermatozoa. Semen taken from the vagina of the mare was injected into the vagina of three young bitches, and smeared freely over the penis of an adult dog. See experimental Mare No. 1.

20th March 1903.—A typical patch, as large as the palm of the hand, has now appeared on the near side of the ribs. Blood taken from it showed few organisms, only one trypanosoma being detected in four fresh cover glass preparations. The horse again covered Mare No. 1 freely and eagerly, and showed no signs of distress. The semen examined microscopically, showed exceedingly few spermatozoa, and none active. No Dourine organisms were detected in the semen.

23rd March 1903.—Two new typical patches have appeared, under the abdomen. The patch on the ribs is still present, and has extended somewhat. Few organisms discovered in blood taken from the new patches.

25th March 1903—No fresh patches have appeared, but the old ones are still present. The horse covered Mare No. 1 which has shown symptoms of œstrum again. He covered easily and eagerly, and showed no sign of distress. Although the mare shows no marked symptoms beyond sexual excitement, it is suspected that she may have become infected by the previous coitus.

27th March 1903.—No fresh patches. The horse again covered experimental Mare No. 1, which still shows signs of sexual excitement. He covered freely and easily, and showed no sign of distress. The mare shows no marked symptoms beyond sexual excitement.

29th March 1903.—This horse was despatched by order of the Inspector-General, Civil Veterinary Department, to the Imperial Bacteriological Laboratory at Bareilly.

18th Bengal Lancers Stud.—As it was suspected that Kilngarth had become infected with Dourine, either at the 18th Bengal Lancers Stud farm at Toba Tek Singh or shortly before going there, permission was given me by the Commanding Officer to visit the stud and inspect the mares. Every facility was given me to make a thorough examination of the mares, and I especially directed my attention to those which had been covered by Kilngarth since his arrival there on the 2nd October 1902. A list of the mares so covered is appended to this report, of these I found one, No. 1130, Stud No. 50, which I considered diseased. She showed the remains of numerous large old Dourine patches on the skin over the ribs and quarters as well as on the neck. The vaginal mucous membrane presented numerous patches of congestion and was thickened in

patches. This mare had been covered by Kilngarth on the 10th December 1902.

Another mare, No. 1655, Stud No. 36, black, which was covered on the 1st February 1903, also showed suspicious swelling of the vulva and perineum, and the vaginal membrane was somewhat 'redder' than normal. There were, however, no typical skin patches. I was also suspicious of a Chestnut Waler mare, No. 1440, she being in bad condition, and unhealthy looking.

I recommended the Officer Commanding to remove these animals from the stud as a precautionary measure, and to carefully watch all the mares covered by Kilngarth since his last arrival there. This is the more necessary now that it has been proved experimentally that the horse is infective, he having transmitted Dourine by coitus to the mare covered by him at the Punjab Veterinary College, and especially so as the symptoms shewn by

List of mares covered by thoroughbred stallion "Kilngarth."

No.	Name of stallion.	Date of covering.	Regiment or stud.	Number of book of covering.	Color of the mares covered.	Breed.	REMARKS.
1	Kilngarth, T. B. E.	15th October 1902	Regiment.	1691	45	Bay	
2	Ditto ...	16th October 1902		1923	52	Bay off fore coronet white.	Country bred.
			Stud No.				
3	Ditto ...	23rd October 1902		144	13	Bay star mark ...	Ditto.
4	Ditto ...	31st October 1902		66	14	Roan, four feet white	T. B. English.
5	Ditto ...	1st November 1902		124	15	Dark Bay ...	Ditto.
6	Ditto ...	4th November 1902		80	16	Roan, four feet white	Ditto.
			Regiment No.				
7	Ditto ...	7th November 1902		1735	48	Chest: white mouth	Davendra.
8	Ditto ...	17th November 1902		1135	32	Do. do. do.	Country bred.
9	Ditto ...	19th November 1902		1759	14	Bay Arab ...	T. B.
10	Ditto ...	30th November 1902		1706	23	Bay	Ditto.
11	Ditto ...	1st December 1902		1440	...	Chest star ...	Waler.
12	Ditto ...	10th December 1902		1130	50	Chest, three legs white	Country.
13	Ditto ...	1st February 1903		1655	36	Black, star ...	
14	Ditto ...	6th February 1903		1840	37	Bay, star ...	

this latter mare are so slight and likely to escape notice at least in the early stages. I consider it an extremely fortunate circumstance that Mr. Trydell should have so early removed the horse, and that only two mares had been covered after the first symptoms of Dourine had appeared in the horse. If this had not been done, there can be no doubt that considerable loss would have resulted to the regiment. I am hopeful that this may now be avoided, but would emphasise the necessity of periodical careful inspection of the stud until it is certain that no more mares are diseased.

Dourine transmitted by coitus.

Bay Waler mare, 18 years old, perfectly healthy, but useless on account of chronic lameness, was brought into season and covered by T. B. E. Stallion Kilngarth suffering from Dourine in the second stage on the morning and evening of the 19th March 1903.

20th March 1903.—Covered in the morning by Kilngarth.

25th March 1903.—Again shows signs of sexual excitement. Covered by Kilngarth.

26th March 1903.—Covered by Kilgarth.

27th March 1903.—Covered by Kilgarth.

15th April 1903.—Although a very careful watch has been kept on this mare, no sign of swelling of vulva or perineum, or noticeable discharge has been seen, the vaginal mucous membrane appears to be healthy, but to-day there is a slight mucous discharge, which, however, scarcely soils the external labia. The vaginal mucous membrane seems healthy, although perhaps slightly redder than normal. A small patch of about the size of a shilling is present over the upper third of the off side of the neck immediately over the jugular vein. Blood taken from this shows on microscopical examination, trypanosoma.

16th April 1903.—The patch on the skin has increased in size, and is now quite characteristic of Dourine. The discharge from the vagina is very slightly increased in quantity, and in it were found on microscopical examination numerous organisms. Some of the vaginal discharge was rubbed into the penis of Dog No. 1.

17th April 1903.—No further symptoms: patch on neck still remains, blood taken from it shows few organisms. A careful microscopical examination of the vaginal discharge shows no organisms present to-day which is curious, as they were numerous yesterday.

18th April 1903.—The patch still remains about the same size, and the blood from it shows organisms very numerous. The vaginal discharge has become thick, sticky and increased in amount, sticking about the vulva and falling to the ground. No organisms were found in it unless it contained blood, obtained by scraping Mare No. II, received some of the discharge from the vagina this morning. The hand was placed in the diseased mare's vagina and then into that of the Mare No. II. The mare shows no other signs of ill-health, is feeding well, coat is healthy, and temperature normal.

19th April 1903.—New patches on off side just forming, discharge from vagina continues, old patches still present and extended, being now as large as the palm of the hand, otherwise healthy in appearance, feeding well, and temperature normal. No trypanosomata in the vaginal discharge, numerous in the blood from the old patch.

20th April 1903.—There are six fresh patches on this mare this morning. The old patch gives exit to serum chiefly, but mixed with a very small quantity of blood. The organisms are very numerous in this serum, and many are in process of longitudinal division. The new patches are found over the sides and quarters, and contain very few organisms. None could be detected in the vaginal discharge which is about the same in amount. The temperature remains normal, and the appetite is good.

21st April 1903.—The old patch is fading out, but there are two or three new ones on the forearms and quarters. No organisms can now be detected in the blood from the old patch. The vaginal discharge remains about the same in quantities and quality. No organisms can be detected in it by microscopical examination. There is no congestion, redness or swelling of vagina or vulva. Temperature normal; appetite excellent.

22nd April 1903.—The old neck patch has entirely disappeared. There are present altogether eight patches on various parts of the body, containing numerous organisms. The vulva shows serous infiltration just inside the labia, and there is a small serous collection under the mucous membrane, which protrudes through the labia. The discharge is fairly profuse, and escapes at times from the vulva, the mare camping as in oestrus. It is of a dirty white colour, and no organisms can be detected in it. Beyond these symptoms the animal looks well and healthy. The appetite is good, and the temperature normal.

23rd April 1903.—All the patches excepting two on the near side have disappeared, there is, however, a new patch inside off thigh in the blood from which the organisms can be seen; there is some swelling of the perineum this morning, the discharge continues about the same, but the infiltration of vulva is less, redness not seen; discharge dirty, white in colour, no organisms can be detected in it on microscopical examination. There are no other symptoms. Temperature is normal, appetite good.

24th April 1903.—All the old patches have disappeared, and two new ones have appeared. The mare shows symptoms of sexual excitement, and passes a

fair amount of dirty white discharge in which the trypanosoma cannot be detected. There are few organisms in blood from patches. Temperature normal; appetite good.

25th April 1903.—Two patches remain, swelling of vulva less and discharge also. The organisms found either in blood or vaginal discharge. Temperature normal; appetite good.

28th April 1903.—No change.

30th April 1903.—No patches. No organisms. Swelling of vulva disappeared.

1st May 1903.—Still no patches or organisms there are however congested patches in vagina, discharge as usual. Covered this morning by "Quadrant." Showed no sign of pain. Vaginal discharge somewhat increased afterwards. Discharge examined five hours after covering, showed no organisms, but spermatozoa were active in it. Appetite good; temperature normal.

Dourine experimentally transmitted from Mare No. 1 infected by coitus.

18th April 1903.—A brown waler mare previously healthy received by smearing out the mucous membrane discharge from the vagina of mare No. 1, suffering from Dourine. The mare is in perfect health and is about 15 years old. Temperature is normal; skin healthy, condition excellent, appetite good.

21st April 1903.—There is some swelling of the vulva and a discharge from the vagina, but no organisms can be detected in blood or discharge, no other symptoms; temperature normal; appetite good.

22nd April 1903.—Swelling continues and discharge is fairly abundant; no other symptoms; no organisms found.

24th April 1903.—There is some swelling of the perineum this morning, and the vulva appears slightly more swollen. There are numerous congested patches on the floor of the vagina of a bright red colour and of the shape and size of a shilling. In a scraping of the wall, which contained blood, a trypanosoma was discovered.

25th April 1903.—No change.

27th April 1903.—No change; no organisms detected in either blood or discharge from vagina.

30th April 1903.—There is marked swelling of the vulva, clitoris enlarged, many petechiæ on vaginal mucous membrane in the discharge from which organisms are found.

1st May 1903.—No change. Organisms still present in vaginal discharge.

2nd May 1903.—No change, except slight urticaria. No organisms detected to-day.

4th May 1903.—The discharge has ceased and the swelling disappeared. No organisms found to-day.

Experimental Case No. 3.—Chestnut country-bred gelding, about 16 years old, in excellent condition, and free from disease, was inoculated on the 18th April 1903, by means of scarifying the nose and rubbing in a little blood, taken from a patch on Mare No. 1, suffering from Dourine. The trypanosoma was numerous in the blood used for inoculation purposes.

25th April 1903.—There is some swelling at the seat of inoculation, but it is not marked unless the skin be picked up when it is seen that there is a good deal of thickening present.

27th April 1903.—There is some œdema of the sheath and the nose swelling is marked. Blood taken from it contains the trypanosoma. Temperature normal; appetite good.

28th April 1903.—The nose swelling is larger and more painful. It is hard to the touch. Blood taken from over the seat of the scarifications contains

numerous organisms, but that taken from the nose outside the swellings contains none. The sheath is more markedly swollen to-day. Temperature is normal; appetite good.

29th April 1903.—The swelling on the nose is marked to-day. It is tense and painful, and blood from it contains numerous organisms. The swelling of the sheath is increased in size, and there is œdema under the belly. The temperature remains normal, and the appetite good.

30th April 1903.—The swelling at seat of inoculation still continues marked, that of sheath increased somewhat as has also œdema under the belly. In the blood from seat of inoculation numerous organisms are present.

1st May 1903.—The swelling at seat of inoculation is increased in size; contains numerous organisms, and is tense and painful. There is considerable discharge from the nose. œdema of sheath and under abdomen same as yesterday. Appetite good; temperature 101.2°.

Old cases of naturally acquired Dourine.

Imperial Stallion Cato II, Chest. T. B. E.—This is an old case of Dourine long past the eruptive stage, and in which it has not been found possible to demonstrate the trypanosoma. When admitted to hospital there was found considerable thickening of the scrotum and sheath and eversion of the end of the urethra. He was however in fairly good condition, and the skin looked beautifully healthy, soft and shining. The temperature is normal, and there is no appearance of paralysis. On the 10th February two patches, not at all typical, were noticed under the abdomen. A microscopical examination of the blood taken from these swellings failed to reveal the trypanosoma. Within a month there has been some loss of condition, but otherwise there does not appear to be any symptom of progressive disease.

This horse is known to have suffered from œdema so long ago as the winter of 1901-02, whilst standing at Hodul in the Gurgaon District. The horse stood there from 21st December 1899 until 21st September 1901, and must, I think, have become infected there. He has since stood at Palwal and Tikri. I think he became infected in 1899, as it will be seen that the results of that year's coverings were exceedingly bad, 32 mares empty out of 42 covered, and only 9 known foals got, which were, no doubt, from mares he had covered before becoming infected. As above stated, there are no symptoms of active disease at present, no patches and no organisms detectable in the blood from the general circulation. On the 6th February 1903, a dog was inoculated under the abdomen with 10 c.c. of blood from the general circulation of this horse, taken from the jugular vein. The result was negative, no swelling appearing at the seat of inoculation and no symptom of infection. The dog remains healthy. This horse is useless as a stallion, owing to the fact that there is considerable formation of new tissue in the cord and round the testicles which are atrophied. Major Ringe, Superintendent, Civil Veterinary Department, United Provinces of Arga and Oudh, states that "Cato II, T. B. E., appears to have suffered for some time from debility. He is apparently quite worn out, and I should consider him unfit for further service." The horse is only 10 years old, and cost in England £250.

10th March.—There is some œdema under the belly to-day and the horse is losing condition.

15th March.—œdema has disappeared. There is steady loss of condition and marked dragging of the hind legs at the trot.

I consider this an old case of Dourine, and the horse to be useless. I desire to keep him for a time for experiment.

Quebec Arab, 14-3, Grey, 12 years old, Civil Veterinary Department, Baluchistan.—This is an old case. The Superintendent reports that the horse arrived at Quetta from Hindubagh on the 12th December 1900, with swelling of the sheath, and suffered from dropsical swellings for which he has been treated for about two years, but has not recovered. The Superintendent reports that the stands in which this horse has been kept are inhabited by nomadic tribes, who are continually wandering about, and hence there is great difficulty in ascertaining even the results of coverings. The results given for the year show that out of 44 mares covered from 1st April 1901 to 31st March 1902, were foals 2, not held 21, result not known 21. It could not be ascertained whether

any mares died or became diseased in any way. No other stallions had previously become affected at the stands. This horse arrived in hospital at the Punjab Veterinary College on the 22nd February 1903, and was then found to have considerable enlargement of the scrotum and sheath, and extensive œdema under the abdomen. The meatus urinarius was red and everted. These symptoms continued until the 22nd March when the horse died from rupture of the stomach. *Post-mortem* examination showed yellow coloured effusion in skin under belly, from which a great quantity of serum escaped. The scrotum and sheath greatly thickened and indurated, the former being five inches thick. The external inguinal glands greatly enlarged. Tunica vaginalis greatly thickened, the seat of old inflammation, and closely adherent to the scrotum. It bore on its internal surface numerous hæmorrhages, some of the size of a rupee. The testicles smaller than normal, bearing on its surface patches of organised lymph and numerous hæmorrhages, especially marked on the lower part of the epididymus. The cord greatly thickened, and all the vessels gorged with blood. The lymphatics inflamed and standing out in relief, full of lymph. Tissue of the testicle lost, no sign of spermatozoa on microscopical examination of a scraping from its cut surface; spleen double normal size.

Qui Vive.—Arab stallion, aged 10 years, belonging to Civil Veterinary Department, South Punjab, was admitted to the Punjab Veterinary College Hospital on the 31st January 1903, suffering from old standing Dourine in the last stage. There is considerable enlargement of the sheath, œdema of the penis, eversion of the meatus urinarius. The cord is greatly thickened, and the testicles enveloped in fibrous tissue. There is great muscular wasting, especially at loins and quarters. The animal drags the hind legs at the walk and badly so at the trot. The external inguinal glands are greatly enlarged. There are no sores on penis or sheath, and no patches on the skin. The temperature is normal, and the appetite good.

20th February 1903.—The condition of this animal has been gradually getting worse. Weakness daily increasing, and œdema of the off hind leg is coming on, both hocks are full of fluid and tense. The animal cannot rise from the ground without assistance, and walks with difficulty.

27th February 1903.—Gradually getting worse. No patches on skin, and no organisms can be detected either in the blood or in œdematous fluid. Appetite good, œdema increasing.

10th March 1903.—Losing condition. Off hind leg much swollen and œdematous and very uncomfortable.

17th March 1903.—Gradually getting worse.

13th April 1903.—No improvement. I recommend that the horse be destroyed. Since destroyed.

Old case of naturally acquired Dourine.—On the 3rd April 1903, a white country bred mare, belonging to a Zamindar of the Jhang District, was brought to the free clinic of the Punjab Veterinary College for treatment of an œdematous swelling under the belly. The case was examined by Mr. Smith, and was found to be suffering from Dourine in an advanced stage. It appears from the Zamindar's statement that the mare had first become ill about seven months ago, and about a fortnight after having been covered by a stallion at Lyallpur. The first thing noticed being swellings of the perineum and the mammary gland, and a slight discharge from the vulva. Since that time she had eruptions on the skin, but these had now disappeared, leaving only gradual loss of condition and abscess formation about the mammary gland. On examination she was found to be in very poor condition, the loins and quarters much wasted. There was extensive œdema under the belly. The vulva is covered by a dirty sticky discharge. The vaginal mucous membrane showed patches of congestion and aphthous looking patches. The amount of discharge was small, and it contained whitish shreds. The owner had ridden the mare into Lahore for a wedding, and unfortunately we were unable to obtain it or prevent him removing it.

Moynstone.—Bay Arab Stallion, Civil Veterinary Department, Baluchistan. The Superintendent, Civil Veterinary Department, reports that this horse has had

enlargement of the sheath for nearly two years, but has continued to cover. He has not been on the sick list, but he never carries much condition. There is no history of any general symptoms, no disease has been traced amongst mares he covered, and he is reported to have got good stock. There is some swelling of the sheath. The horse appears healthy, and there are no symptoms of any general disease. From the above history, if correct, it would appear that this horse, if he has had Dourine, had a very slight attack. He is 13 years old and has lots of work in him, and I do not consider him infective at present but dangerous, and I do not think he should be used. Patches in blood from which the organism has been found have since appeared, and there is no doubt that the horse is actively infective.

Quadrant.—Bay Arab Stallion, Civil Veterinary Department, Baluchistan, sent to the Punjab Veterinary College for observation, with the following history.

Has had permanently enlarged genital organs for the past three years during which time he has continued to cover. The horse has never had any symptoms of bad health, and presumably no patches on the skin. No disease has been traced among any of the mares he covered. He has got good stock since the enlargements came. He is in excellent condition, indeed: he is very fat. He covers well. There are no symptoms whatever beyond old thickening of the sheath and penis. From the above history, if correct, it appears probable that the horse has had a slight attack of Dourine and that he is only slightly, if at all, infective, but this is doubtful.

He has, however, marked swelling of the sheath and penis, everted meatus which increase with rest, and I consider him dangerous, and that it would be unwise to use him as we are not at all certain that the disease is not latent and it may again become active.

Quadratic Arab.—10 years old, belonging to the Civil Veterinary Department, North Punjab, was sent to the Punjab Veterinary College, on the 13th November 1902, suffering from general anæmia. He had been standing at Futehjang, in the Rawalpindi District, since the 5th of April 1902, and the horse which had previously stood at this stand had become infected with Dourine. On careful examination it is found that the sheath is somewhat thickened and presents white spots on its surface. The meatus urinarius externus is everted and red. The horse is in very poor condition and an anæmic but the appetite is good. Temperature normal. It was decided to give a laxative and put the horse on arsenic and nux vomica, with a view to improve his condition, plenty of fattening food being allowed. Under this treatment some progress was made. The arsenic treatment was however discontinued on 10th January, and the horse looked fairly fit and well.

15th February 1903.—A typical well defined patch has appeared on the off rump, but no organisms could be discovered on microscopical examination of blood taken from it.

19th February 1903.—The patch has continued up to date, but no organisms have been found in it. It is now fading out.

20th February 1903.—The patch has almost entirely disappeared.

9th March 1903.—Patch appeared on the near side of neck, but no organism could be found in blood taken from it.

14th March 1903.—The patch is fading out, and I have been unable to discover any organism in it.

21st April 1903.—A characteristic patch on the off buttock and blood taken from it shows few organisms.

Kettledrum.—Bay Arab horse, 9 years old, admitted on the 11th March 1903, with the following history. This horse was inspected at Kaili by the Superintendent, Civil Veterinary Department, United Provinces of Agra and Oudh, on the 24th January 1903, and was ordered into hospital at depôt for treatment of enlarged sheath and scrotum, and also swelling of both hind legs.

He arrived in depôt on the 24th January, and was put on a course of liquor arsenicalis for a time; legs well hand-rubbed and bandaged and plenty of exercise given. This caused the swelling of the legs to reduce considerably, but no change in the scrotum or sheath. On the 10th of February the arsenic was discontinued, and a ball consisting of Ferri iodide and nux vomica given daily. The symptoms present are swelled hind legs, especially if the horse is not regularly exercised; enlarged sheath and scrotum and circular patches on the skin of the hind quarters and body which disappear at times and reappear. The animal otherwise looks healthy; temperature is normal and appetite good. Since the 1st March the horse has been receiving Liq. hydrarg. perchlor.: and Potass. iodide in a drench.

On admission there is typical enlargement of the scrotum and sheath, and severe œdema of the hind legs. No patches are visible on the body. The condition is good. Temperature normal and appetite excellent. It is evidently a fairly recent case as the horse was in depôt for a day on the 18th November 1902, and was sent out to Kaili on the 19th November 1902. The horse either, therefore, contracted the disease at Jellalabad or Kaili, probably the latter.

17th March 1903.—Urticarial eruption over whole body; gave aloes bbds: dr. 3. No trypanosoma detected.

19th March 1903.—The physic is acting, but the urticarial eruption is still present; there are no well marked patches. There is some œdema of the legs below the knees.

13th April 1903.—No further symptoms have appeared; the horse will be kept under observation.

15th April 1903.—A well defined characteristic patch has appeared on the near side of chest and in blood from it the organism is found. The swelling of the scrotum and sheath remains the same.

16th April 1903.—The patch is larger to-day, and few organisms can be found in blood taken from it.

18th April 1903.—The patch is gradually fading out.

There is considerable œdema under the belly and the hind legs are swollen. Appetite good. Temperature normal.

21st April 1903.—No further symptoms, case in same condition.

Dog No. 1.—Inoculated with 10 c. c. of blood from the general circulation of Qui Vive Arab on 6th February. The inoculation was made under the skin of abdomen. No symptoms have so far appeared at the seat of inoculation. On the 18th February 1903, the face was swollen, but no organisms were discovered in blood taken from it. The temperature became irregular from the 15th to the 23rd: but no other symptoms have showed themselves up to date.

16th April 1903.—Vaginal discharge from experimental Mare No. I was rubbed into vagina of this bitch. The mare is suffering from Dourine.

21st April 1903.—There are no symptoms in the bitch, although vaginal discharge from the Mare No. I which has been rubbed into the vagina of experimental Mare No. II has reproduced the disease.

28th April 1903.—No symptoms of disease so far.

Dog No. 2.—Inoculated with 10 c. c. blood from the jugular vein of Cato II on the 6th February 1903. Inoculated with 10 c. c. of blood from the general circulation of Kilgarth on 27th February. Showed no symptoms whatever up to date.

Dog No. 3.—Inoculated subcutaneously with 10 drops of blood taken from a patch on Kilgarth. The trypanosoma had been found in few numbers in blood from the patch 8 hours previously. The inoculation was made subcutaneously under the belly on the 26th February 1903. No symptoms have shown themselves up to date, although gelding No. 3, which was inoculated with blood from the same seat, taken at the same time, developed Dourine.

