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L. 36

ANNUAL REPORT

OF

The Imperial Bacteriological Laboratory, Muktesar

FOR THE YEAR ENDING THE 31st MARCH, 1920.

L. 36



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ANNUAL REPORT
OF
The Imperial Bacteriological Laboratory,
Muktesar

FOR THE YEAR ENDING 31st MARCH, 1920.

(W. A. POOL, M.R.C.V.S.)

I. ADMINISTRATION.

Staff. Mr. A. Leslie Sheather, B. Sc., M.R.C.V.S., remained in charge of the office of Director and First Bacteriologist throughout the year.

Mr. Shilston remained in charge of the office of Second Bacteriologist up to the 17th June, 1919. His sad death from glanders on 6th July, 1919, deprived the Veterinary Service in India and the Muktesar staff of a most capable and valuable officer.

I took over charge of the duties of Second Bacteriologist on the 30th July, 1919.

The post of Physiological Chemist has been abolished and in its place a new appointment has been created to be filled by an officer of the Indian Civil Veterinary Department.

Both the Pathologist's and the Veterinary Officer's appointments remained vacant during the year under report.

The post of a Second Assistant Bacteriologist, with two Veterinary Inspectors, four Dressers and two Peons, has been added to the staff of this laboratory in connection with the scheme for the development of cattle-breeding and dairying in India.

Mr. W. Pryde Watson was appointed Engineer and assumed charge of the post on the 14th June, 1919.

During the year under report the three Laboratory Assistants (Upper grade), the Farm Manager, and four Veterinary Deputy Superintendents were admitted to gazetted

rank. The veterinary staff was strengthened by the sanction of two Inspectors and the office by two additional posts of clerks.

The appointment of an Assistant Surgeon in place of the Sub-Assistant Surgeon was sanctioned and a Civil Assistant Surgeon assumed charge of the dispensary at Muktesar during December 1919.

Tours. Towards the end of May 1919, Mr. Sheather attended a Surra Conference in Delhi and in July had to go to Naini Tal to see Mr. Shilston in the hospital. During the last week in October he visited Bareilly and thence proceeded to Simla *via* Kasauli. Between the 28th November and 10th December, 1919, he went to Pusa to attend the meeting of the Board of Agriculture and also visited Bettiah Raj to test cases of John's disease.

Between 7th and 12th January, 1920, I visited Bareilly and supervised the serum preparation work at the Branch Laboratory.

Training. Major D. Bolton, R.A.V.C., visited Muktesar to study the method of simultaneous inoculation against rinderpest from 20th December, 1919, to 3rd January, 1920.

Mr. K. Raghebendra Rao, Veterinary Assistant, Madras, underwent a course of training from 1st November, 1919, to 27th January, 1920.

Fodder and grain. The arrangements for obtaining grain were satisfactory but difficulty was often experienced in obtaining transport.

Hay, however, could not be obtained in sufficient quantity. The shortage mentioned under this heading in last year's Annual Report made itself felt acutely from August to October 1919.

When the supply was exhausted, labour could not be obtained to bring in green grass and oak leaves in sufficient quantity at the seasons when they are used to augment the hay supply when necessary. In consequence, serum making had practically to be stopped during September and October.

To meet the excessive demands for serum which involved the upkeep of more serum-making animals, 50,000 maunds of hay were found to be necessary and a contract was made for that amount last autumn.

Owing to the paucity of labour, high wages demanded and the increased amount required, it was found absolutely necessary to raise the price from 13 annas to R. 1-4-0 per maund for hay. Only 35,000 maunds were delivered by the 31st March, 1919, and it is doubtful if more than another 2,000 maunds will be supplied before the date of termination of the contract.

Forests. Great difficulty was experienced during the past year in extracting and transporting the produce to the laboratory on account of shortage of labour. The administration of the forests was as usual carried on satisfactorily and the supply of wood in the forests was in excess of our requirements.

Water supply. The installation of the new pumps, which was completed during the year, shewed that the generating plant is not quite sufficient to meet the full requirements of the station when the water in the upper spring gets low and it is necessary to pump daily from the lower source. This occurs from March till the rains start. Plans and estimates are therefore being made to increase the generating plant by the installation of high speed generating sets in addition to the existing Hornsby engine.

Electric centrifuges. The six new centrifuges have been delivered at Muktesar and are in process of erection.

Supply of hill bulls and plains animals. Considerable difficulty was experienced during the earlier months of the year in obtaining supplies of hill bulls, and at one time animals under experiment had to be sacrificed for the provision of virus. Prices had to be increased again.

Branch Laboratory. For the preparation of anti-rinderpest serum and to maintain the rinderpest virus, the Branch Laboratory at Kurgaina (Bareilly) was opened early in October 1919. As in previous years a number of grass *chuppers* (sheds) were erected for the accommodation of animals.

To minimize the fodder difficulties at Muktesar, towards the end of December a large number of hill bulls were transferred to the Branch Laboratory.

The total output of rinderpest serum at Bareilly during the last winter was 1,124,816 doses as against 1,071,422 doses during 1918-19.

This output was of great assistance to meet the demands for serum which were very great. The provision of cool

storage accommodation at Kurgaina is one of urgent necessity and this question will be dealt with separately.

The question of establishing a second bacteriological laboratory in India for the manufacture of sera and vaccine for veterinary purposes was discussed by an informal committee which arrived at a definite conclusion that Bareilly is not suitable either for a manufacturing centre or for a research institute. The Government of India concurred in this conclusion and the project for the construction of a bacteriological laboratory at Bareilly, referred to in previous reports, was dropped.

The old laboratory at Kurgaina will, however, have to be kept on for some years at least, and sanction has been asked for the erection of a few more cattle sheds.

Financial aspect. The receipts from sale of the laboratory products during the year amounted to Rs. 3,84,396-4-11* to which a sum of Rs. 1,43,355-2-0† may be added for supplies to the Army Department.

The total revenue would thus amount to Rs. 5,27,751-6-11 against an expenditure of Rs. 5,00,509-10-0‡.

It was decided by Government that the cost of sera, etc., supplied to the overseas forces and for the North-West Frontier operations for the period 1st April, 1914, to 28th February, 1919, amounting to Rs. 2,21,930-11-9, will be debited to the Central War Controller.

General remarks. In the second week of January 1920, some cases of influenza occurred at Muktesar but the outbreak was of a mild type. Cases of relapsing fever also made their appearance when influenza was prevailing. Most rigid steps were taken for the prevention of both diseases which died out within $2\frac{1}{2}$ months' time.

As during the last year paucity of labour remained a source of anxiety. The labour we had was induced to remain by giving enhanced wages. Government was asked if assistance could be given by temporarily detailing men from a Labour Corps but this was not found possible.

* This amount includes the arrears of the previous year. Bills amounting to Rs. 17,076-2-0 are still awaiting payment.

† Of this amount Rs. 66,025 will be debited to the War Controller for products supplied during the year to the Army Department in excess of normal peace time requirements, leaving Rs. 77,330-2-0 for the value of supplies made free of charge.

‡ Includes an expenditure of Rs. 11,840-7-4 incurred in connection with the inoculations in military dairies.

The construction of the ropeway from Kathgodam will obviate to a great extent most of our difficulties connected with labour and supplies.

During the past year the demands for the products of this laboratory were very high and were complied with as early as possible. The arrears of demands for anti-rinderpest serum were at an average of 3.9 lakhs during October and reached in November 1919 an average of 4.4 lakhs of doses. But for the shortage of fodder already mentioned, at least another 5 or 6 lakhs of doses of rinderpest serum could have been prepared.

The routine of the serum making, apart from the scientific details involved in the different stages upon which the preparation of the different sera is based, has been very thoroughly overhauled and improved during this year.

The serum making is now on such a large scale that considerable organization is necessary so that the utmost value may be obtained from the expenditure involved.

To check accurately each stage of the serum making it was found necessary to introduce the upkeep of a good many statistics and returns, and on the clerical side card indexing has been introduced with a great saving of work and time of those employed.

The reorganization has been amply justified by the improvement in the serum making results. More serum is now obtained in proportion to the expenditure involved.

A heavy strain was imposed upon all members of the staff throughout the year and they worked energetically and willingly.

As in the previous year, Mr. Keiller, First Laboratory Assistant (Upper grade), devoted most of his time in maintaining the staple food supplies of the station for the menial staff and so helped in dealing with the labour difficulty. The thanks of the staff are due to him.

II. PREPARATION OF SERA AND VACCINES.

Rinderpest serum. During the year 1919-20, 3,189,736 doses of anti-rinderpest serum were prepared as against 3,213,043 doses during the previous year; and 2,813,733 doses issued as against 3,259,616 doses in 1918-19.

Out of the above amount, 633,550 doses were issued to the Military Department against 450,700 supplied during the preceding year.

The results of inoculations in the field with anti-rinderpest serum are shown in the subjoined table.

Province	Number of outbreaks in which inoculation was undertaken	NUMBER OF ANIMALS WHICH DIED UNINOCULATED IN COURSE OF DISEASE			NUMBER OF ANIMALS INOCULATED			NUMBER OF ANIMALS WHICH DIED AFTER INOCULATION			Percentage of deaths in inoculated bovines
		Equines	Bovines	Others	Equines	Bovines	Others	Equines	Bovines	Others	
Punjab	782	...	10,941	...	...	202,215	...	...	137	...	
North-West Frontier Province and North Punjab	61	...	1,317	...	...	20,370	...	...	13	...	
United Provinces	536	...	9,325	...	...	49,569	573	...	127	...	
Bengal	498	...	5,946	...	...	78,978	...	...	403	...	
Assam	285	...	5,461	...	...	21,945	...	...	256	...	
Bihar and Orissa	325	...	2,707	...	...	37,456	...	...	211	...	
Central Provinces	900	...	8,931	...	...	79,857	...	...	218	...	
Bombay	206	...	3,946	...	...	25,294	...	...	199	...	
Madras	673	...	12,624	...	...	85,437	82	...	514	...	
Sind, Baluchistan and Rajputana	33	...	637	...	...	4,406	...	...	25	...	
Burma	456	...	4,822	...	...	55,628	...	...	363	...	
Bengal Veterinary College	33	...	3	...	...	926	...	...	...	...
Hissar Cattle Farm	1	...	2	...	...	35	...	...	...	...
Mysore State	92	...	1,079	...	...	18,222	...	...	2	...	
TOTAL	4,882	...	67,761	...	...	680,338	655	...	2,468	...	0.35

The laboratory staff at the request of the villagers surrounding Muktesar inoculated 61 cattle. The results were very satisfactory and the disease was stamped out immediately.

Anthrax serum. During the year under report 15,867 doses of this serum were prepared and 15,637 issued against 46,368 doses prepared and 36,552 issued during the year 1918-19. The following table shows the results of inoculations in the field with anti-anthrax serum.

Province	Number of outbreaks in which inoculation was undertaken	NUMBER OF ANIMALS WHICH DIED UNINOCULATED IN COURSE OF DISEASE			NUMBER OF ANIMALS INOCULATED			NUMBER OF ANIMALS WHICH DIED AFTER INOCULATION			Percentage of deaths in inoculated bovines
		Equines	Bovines	Others	Equines	Bovines	Others	Equines	Bovines	Others	
Bengal	3	...	35	...	...	733	...	...	2	...	
Assam	69	27	399	24	293	6,084	148	...	15	...	
Bihar and Orissa	6	...	8	...	...	658	...	...	...	...
Central Provinces	4	...	41	...	...	563	...	...	...	...
Bombay	3	...	21	...	...	332	...	...	2	...	
TOTAL	85	27	504	24	293	8,370	148	...	19	...	0.22

Hæmorrhagic Septicæmia serum and vaccine.

During the year 1919-20, 52,399 doses of hæmorrhagic septicæmia serum and 110,500 doses of hæmorrhagic septicæmia vaccine were prepared and 119,633 doses of serum and 110,500 doses of vaccine were issued against 155,135 doses of serum and 125,355 doses of vaccine prepared and 132,046 doses of serum and 125,355 doses of vaccine issued during the previous year.

The results obtained in the field from inoculations with hæmorrhagic septicæmia serum are shown in the subjoined table.

Province	Number of outbreaks in which inoculation was undertaken	NUMBER OF ANIMALS WHICH DIED UNINOCULATED IN COURSE OF DISEASE			NUMBER OF ANIMALS INOCULATED			NUMBER OF ANIMALS WHICH DIED AFTER INOCULATION			Percentage of deaths in inoculated bovines
		Equines	Bovines	Others	Equines	Bovines	Others	Equines	Bovines	Others	
Punjab	69	...	575	...	...	17,073	...	...	10	...	
North-West Frontier Province and North Punjab	18	...	5	...	...	6,366	...	...	1	...	
United Provinces	33	...	501	3	...	3,902	211	...	...	...
Bengal	37	...	276	...	...	7,017	...	...	11	...	
Bihar and Orissa	89	...	467	...	...	10,182	...	...	7	...	
Central Provinces	16	...	82	...	...	1,226	...	...	...	...
Bombay	46	...	421	...	...	5,449	...	...	12	...	
Madras	26	...	352	...	...	5,265	...	...	2	...	
Sind, Baluchistan and Rajputana	6	...	101	...	...	697	...	...	8	...	
Assam	28	...	251	...	1	3,596	...	...	13	...	
Mysore State	3	...	8	...	...	260	...	...	...	...
TOTAL	370	...	3,039	3	1	61,033	211	...	64	...	0.10

The results of inoculations in the field with hæmorrhagic septicæmia vaccine are shown in the table below :—

Province	Number of outbreaks in which inoculation was undertaken	NUMBER OF ANIMALS WHICH DIED UNINOCULATED IN COURSE OF DISEASE			NUMBER OF ANIMALS INOCULATED			NUMBER OF ANIMALS WHICH DIED AFTER INOCULATION			Percentage of deaths in inoculated bovines
		Equines	Bovines	Others	Equines	Bovines	Others	Equines	Bovines	Others	
Punjab	226	...	...	...	...	63,073	...	...	...	...
North-West Frontier Province and North Punjab	17	...	...	...	...	5,349	...	...	...	...
Bihar and Orissa	5	...	12	...	...	395	...	...	...	...
Bombay	...	...	...	...	...	315	...	...	...	...
Hissar Cattle Farm	...	...	...	...	...	178	...	...	...	...
TOTAL	248	...	12	...	...	69,510	...	...	...	...	nil

Black Quarter vaccine. Twentyone thousand five hundred doses of this vaccine were prepared and 20,136 doses issued during the year under report against 45,000 doses prepared and 19,176 doses issued during the year 1918-19.

The following table shows the results of inoculations in the field with black quarter vaccine.

Province	Number of outbreaks in which inoculation was undertaken	NUMBER OF ANIMALS WHICH DIED UNINOCULATED IN COURSE OF DISEASE			NUMBER OF ANIMALS INOCULATED			NUMBER OF ANIMALS WHICH DIED AFTER INOCULATION			Percentage of deaths in inoculated bovines
		Equines	Bovines	Others	Equines	Bovines	Others	Equines	Bovines	Others	
Punjab	30	...	...	...	...	2,912	...	...	4	...	
United Provinces	1	...	2	...	...	143	...	...	...	...
Assam	1	...	6	...	...	105	...	...	...	...
Bihar and Orissa	6	...	37	...	...	1,597	...	...	11	...	
Sind, Baluchistan and Rajputana . . . . .	...	...	...	...	...	100	...	...	...	...
Mysore State	3	...	41	...	...	687	...	...	...	...
Bombay . . . . .	...	...	...	...	...	101	...	...	...	...
Hissar Cattle Farm . . . . .	...	...	4	...	...	727	...	...	8	...	
TOTAL	41	...	90	...	...	6,372	...	...	23	...	0.36

Mallein. During the year 1919-20, 163,735 doses of mallein were prepared and 164,120 doses issued against 143,346 doses prepared and 160,091 issued during the preceding year.

Of the amount issued 159,280 doses were supplied to the Military Department.

Tuberculin. One thousand one hundred and twenty doses of tuberculin were prepared and issued during the year under report against 632 doses prepared and 1,420 issued in the previous year.

Strangles serum and vaccine. During the past year, 7,341 doses of strangles serum were prepared and 4,447 issued against 13,395 doses prepared and 11,039 issued in the preceding year. In addition to the above, 4,432 doses of mixed (anti-streptococcic and staphylococcic) vaccine and 1,136 doses of anti-streptococcic vaccine were prepared and issued during the year against 7,527 doses of mixed and 135 doses

of anti-streptococcic vaccine prepared and issued in the year 1918-19. With the exception of a few hundred doses it was all issued to the Military Department.

Miscellaneous vaccines. Five hundred and fifty doses of autogenous vaccines were also prepared and issued during the year under report from the material received at the laboratory.

The amounts of the various products of the laboratory prepared and issued during the year 1919-20 have been compared with the average amounts of the preceding 5 years in the table below :—

Name of product	DOSES PREPARED		DOSES ISSUED	
	1919-20	Average of previous 5 years	1919-20	Average of previous 5 years
Rinderpest serum	3,189,736	1,835,648	2,813,733	1,818,061
Anthrax serum	15,867	32,416	15,637	30,913
Hæmorrhagic Septicæmia serum	52,399	139,860	119,633	127,166
Do. vaccine	110,500	122,772	110,500	122,772
Black Quarter vaccine	39,550	19,000	20,136	17,238
Mallein	163,735	85,423	164,120	88,192

III. EXAMINATION OF SPECIMENS AND INOCULATION WORK.

Specimens examined. During the past year only 63 specimens were received for examination and report as against 230 in the preceding year. In addition to these, 32 specimens were received for experimental work in the laboratory.

The following table shows the nature of the specimens:—

Nature of specimens	NUMBER OF SPECIMENS		
	Positive	Negative	Doubtful
Epizootic Lymphangitis	9	8	...
Piroplasmosis	1	1	1
Glanders	2	3	...
Black Quarter	4	2	...
Tuberculosis . . . . .	...	2	1
Anthrax . . . . .	...	1	...
Johne's Disease	2	1	...
Rabies . . . . .	...	1	...
Malignant Oedema	1	...	...
Miscellaneous	8	4	11
TOTAL	27	23	13

Serum tests for the diagnosis of surra and dourine. Owing to Mr. Shilston's sad death and the shortage of staff, the routine testing of samples of sera from suspected cases of dourine and surra could not be continued during the year under report.

Inoculations by the serum simultaneous method.

As in previous year, the inoculations of the stock at the military dairy farms were commenced towards the end of October 1919 by Mr. Vacha in the Northern and Mr. Phadke in the Southern Circle.

Owing to lack accommodation at Muktesar the Third Veterinary Deputy Superintendent's appointment sanctioned for this work could not be filled during the year under report.

The following table shows the number of animals treated by the simultaneous method during 1919-20 at the various farms :—

	Pure-bred imported stock	Cross-bred stock	Country stock	Buffaloes	Total	Deaths	REMARKS
<i>Northern Circle</i>							
Bagarjee*	nil	53	162	77	292	nil	
Ferozepur	"	1	63	37	101	"	
Sialkote	"	...	57	22	79	"	
Allahabad	1	30	30	15	76	"	
Sitapur	nil	30	14	25	69	"	
Karnal	1	26	100	141	268	5	
Lahore	nil	...	62	12	74	...	
TOTAL	2	140	488	329	959	5	
<i>Southern Circle</i>							
Mhow	nil	45	77	Nil	122	5	
Jubbulpore	"	15	26	40	81	2	
Bangalore	1	49	44	nil	94	nil	
Kirkee	1	64	73	38	176	1	
Belgaum	nil	2	104	10	116	4	
Coimbatore†	"	22	26	12	50	nil	
TOTAL	2	197	350	100	649	12	
Pusa	nil	30	86	nil	116	2	
GRAND TOTAL	4	367	924	429	1,724	19	

* This farm though included in the Southern Circle was taken in hand by Veterinary Deputy Superintendent in charge of the Northern Circle.

† Agriculture Farm. The method of serum simultaneous inoculation was demonstrated to four Deputy Superintendents of the Madras Civil Veterinary Department.

The results of the inoculations during the past year show that only 4 pure-bred imported animals were treated and no deaths occurred; 367 cross-bred stock were inoculated with 10 deaths (5 due to piroplasmosis and 5 to weakness and exposure to chill, etc.); 924 country-breds with 8 deaths (3 due to piroplasmosis, 3 to jaundice and 2 to gastroenteritis), and 429 buffaloes with one death only, due to weakness.

Amongst 1,724 inoculated animals, 19 deaths occurred, *i.e.*, 1.1 per cent., but no animal died of rinderpest.

In the majority of cases good reactions were obtained.

Forty animals showed piroplasmosis as a complication of the rinderpest reaction and were treated by injections of trypan-blue. Two of these were of pure breed and recovered after treatment. Out of 25 cross-breds, 5 died. Of 13 cases amongst country-breds 3 died, as they came under observation when the disease was far advanced and the treatment had no effect on them.

IV. RESEARCH.

As mentioned in the two previous years' Annual Reports, shortage of staff, enhanced demand for the products of this laboratory, increased routine and administrative duties and paucity of labour and fodder, etc., have immensely contributed to reducing the amount of time that could be devoted to research work.

Rinderpest and Hæmorrhagic Septicæmia. The same experiments which were in hand during the year 1918-19 regarding infectivity of hides of both of these diseases were continued during the year under report.

Johne's Disease. A herd infected with Johne's disease in Bettiah Raj in Bihar was subjected to a test with avian tuberculin. As it was impossible to obtain permission to kill any of the reacting animals, the value of the test could not be determined.

Tuberculosis. The experiments foreshadowed in last year's report have been completed and an account of them will be published shortly.

Bovine Lymphangitis. With material received from the Madras Presidency, experimental work has been carried out and the causal organism has been isolated. An account of this work is in preparation for publication.

Surra. An experiment was initiated on the recommendation of the Surra Committee to ascertain the effects on different animals of the inoculation of strains of the *Trypanosoma evansi* derived from other species.

Some experiments in curative drug treatment were carried out.

Publications. During the year under report the following papers were submitted for publication :—

- (1) *Syngamus laryngeus* in Cattle and Buffaloes in India, by A. Leslie Sheather and A. W. Shilston. (Agricultural Research Institute, Pusa, Bulletin No. 92.)
- (2) Virulence of Tubercle Bacilli isolated from Bovine lesions in India, by A. Leslie Sheather. (Memoirs of the Department of Agriculture in India, Veterinary Series, Vol. III, No. 2.) *In the press.*
- (3) Bovine Lymphangitis, by A. Leslie Sheather. (Memoirs of the Department of Agriculture in India, Veterinary Series, Vol. III, No. 3.) *In the press.*

Table showing the doses of different products issued from the Imperial

Products	QUANTITY OF SERA (IN DOSES)							
	Punjab	N.-W. F. P. and North Punjab	South Punjab	United Provinces	Bengal	Assam	Bihar and Orissa	Central Provinces
Rinderpest serum	358,850	106,500	116,000	231,309	140,000	107,000	112,000	195,000
Anthrax serum . . . . .	...	...	...	...	...	7,000	...	2,000
Hæmorrhagic Septicæmia serum	5,000	5,000	10,000	8,000	10,000	4,000	10,000	4,500
Hæmorrhagic Septicæmia vaccine	30,500	25,000	48,000	...	...	...	6,000	...
Black Quarter vaccine	536	784	1,000	...	...	300	3,000	...
Mallein	249	...	50	120	...	...	...	25
Tuberculin	48	2	5	...	...	...	...	...
Streptococcic serum	200	...	...	...	...	...	...	...
Streptococcic vaccine	136	...	...	...	...	...	...	...
Special vaccine . . . . .	...	...	...	...	...	...	...	...
Streptococcic and Staphylococcic (mixed) vaccine	...	...	...	...	...	...	...	...
TOTAL	395,819	137,286	175,055	239,420	150,000	118,000	131,000	201,525

NOTE.—The amounts of various products shown under each province include also the quantities
* Returned vaccine discarded.

Bacteriological Laboratory, Muktesar, during the year 1919-1920

ISSUED

Bombay	Madras	Sind, Baluchistan and Rajputana *	Burma	Coorg	Military Department	Native States	Foreign Countries	Imperial Bacteriological Laboratory	TOTAL
84,200	328,570	36,800	172,040	5,000	633,550	105,680	22,000	59,243	2,813,733
200	...	100	...	3,500	1,562	925	850	...	15,637
9,182	5,000	2,000	...	233	7,493	2,750	3,000	33,475	119,633
1,000	...	...	...	...	...	...	...	...	110,500
...	...	400	...	...	100	2,500	...	11,216	20,136
...	1,300	350	...	...	159,230	2,328	...	418	164,120
...	...	10	...	...	1,055	...	...	...	1,120
...	200	...	...	...	4,047	...	...	...	4,447
...	...	...	...	...	1,000	...	...	...	1,136
...	...	...	...	...	550	...	...	...	550
...	...	...	...	...	4,432	...	...	...	4,432
94,582	335,070	39,600	172,040	8,733	813,069	114,183	25,350	104,352	3,255,444

*applied to private bodies in the province.

Table showing main results of the working of the

QUANTITY IN DOSES OF SERA OR ANTI-TOXIN PREPARED AND ISSUED								INSTRUCTION IMPARTED				
	Name of sera or anti-toxin	Opening balance	Prepared during the year	Returned serum	TOTAL	Issued during the year	Stock in hand	Department or province	European officers attending class	Number passed	Indian veterinary graduates	Number passed
1	2	3	4	5	6	7	8	9	10	11	12	13
	Rinderpest serum (dose 5 c. c.)	187,437	3,189,736	5,300	3,882,473	2,813,733	563,740					
	Anthrax serum (dose 15 c. c.)	11,914	15,867	20	27,801	15,637	12,164					
	Hæmorrhagic Septicæmia serum (dose 15 c. c.)	67,234	52,399	...	119,633	119,633	...					
	Hæmorrhagic Septicæmia vaccine (dose 5 c. c.)	...	110,500	...	110,500	110,500	...					
	Black Quarter vaccine (dose 1 pill)	39,550	21,500	...	61,050	20,136	40,914	Royal Army V. C.				
	Mallein (dose 1 c. c.)	160	163,735	1,220	165,115	164,120	995		1	1		
	Ophthalmic Mallein (dose $\frac{1}{2}$ c. c.)	...	...	...	...	...	...	Madras	...	...	1	1
	Tuberculin (dose 2 c. c.)	12	1,120	...	1,132	1,120	12					
	Anti-Streptococcic serum (dose 15 c. c.)	3,455	7,341	...	10,796	4,447	6,349					
	Anti-Streptococcic vaccine (dose 5 c. c.)	...	1,136	...	1,136	1,136	...					
	Special vaccine (dose 1 c. c.)	...	550	...	550	550	...					
	Streptococcic and staphylococcic mixed vaccine (dose 1 c. c.)	...	4,432	...	4,432	4,432	...					
	Total	309,762	3,568,316	6,540	3,884,618	3,255,444	629,174		1	1	1	1

Imperial Bacteriological Laboratory, Muktesar, during the year 1919-20

FINANCIAL RESULTS

RECEIPTS					EXPENDITURE					
Sale of sera, vaccines and other products	Sale of animals	Sale of garden products and reserved forests	Other miscellaneous receipts	TOTAL	Salaries and travelling allowances of officers and staff	Feed and keep of animals	Cost of chemicals and apparatus	Other miscellaneous expenditure	Purchased of animals	TOTAL.
14	15	16	17	18	19	20	21	22	23	24
Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
3,84,396 4 11	330 0 0	1,369 0 6	1,735 14 8	3,87,831 4 1	1,16,907 13 9	2,40,099 13 3	21,584 4 6	63,103 14 0	58,813 12 6	5,00,509 19 0
3,84,396 4 11	330 0 0	1,369 0 6	1,735 14 8	3,87,831 4 1	1,16,907 13 9	2,40,099 13 3	21,584 4 6	63,103 14 0	58,813 12 6	5,00,509 19 0

