VI. A NOTE ON THE IMMUNITY OF BOMBAY RATS TO THE SUBCUTANEOUS INJECTION OF PLAGUE CULTURES.

We have previously referred to the fact that a certain number of Bombay rats were immune both to subcutaneous and to cutaneous inoculations of virulent plague bacilli. In paper V, p. 505 above, we were able to record that 59 °/₀ of rats in Bombay could withstand the rubbing on scarified surfaces of emulsions of spleens of rats which had died of acute plague. The fact that a large number of rats in India, where plague had occurred, were more or less immune has been noted by Simond and Walton.

In the present note we propose to tabulate two series of observations, for the purpose of comparison, in which different amounts of virulent plague cultures were injected subcutaneously into the ordinary rat of Bombay. In both series no distinction was made between *Mus rattus* and *Mus decumanus*. The cultures used were in all cases virulent, being one, or at the most two, removes from the animal body.

The first series (Table I) was made between March and June, 1904, in the Plague Research Laboratory by Assistant-Surgeon Kapadia, under the direction of Lt.-Colonel Bannerman and Captain Liston, in connection with experiments carried out to determine the immunity or otherwise to plague of the common domestic animals of India. In this series the growths used were for the most part broth cultures, and the amount injected varied from 0·2 to 1 c.c. It will be seen from Table I that 7·2 per cent. of the rats which were observed throughout withstood the inoculation.

In the second series (Table II), which was made during the end of 1905 and beginning of 1906, we can divide the rats into three groups, namely (1) those which received 1/5—1/10 of an agar tube; (2) those which received 1/15—1/20 of an agar tube, and (3) those which received 1/100—1/250 of an agar tube. We can compare these three groups by

Table I.

Total no. of rats inoculated	Total no. of rats dead of other causes	Total no. of rats on which calculation is based	Deaths from plague, 2nd day		Deaths from plague, 3rd day		Deaths from plague, 4th day		Deaths from plague, 5th day		Deaths from plague, 6th day and after		Total deaths from plague	
			Total	P.c.	Total	P.c.	Total	P.c.	Total	P.c.	Total	P.c.	Total	P.c.
124	13	111	53	47·7	42	37·8	5	4·5	1	0·9	2	1·8	103	92·8

Table II.

	575	142	433	220	50·8	152	35·1	36	8·3	8	1·8	1	0·2	417	96·3
	78	10	68	19	27·9	35	51·5	6	8·8	3	4·4	2	2·9	65	95·6
0	114	38	76	16	21·0	33	43·4	13	17·1	3	4	3	4	68	89·5
ıl	767	190	577	255	44·2	220	38·1	55	9·5	14	2·4	6	1·0	550	95·3

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calculating for each group, first the percentage of rats which died of plague on each day after the injection, and, secondly, the percentage which did not develop the disease.

When we examine the figures set forth in the table we see, first, that more rats are immune to the smaller doses of culture than to the larger ones, and, secondly, that death takes place earlier after the larger doses than after the smaller ones. Thus the greatest percentage of deaths on the second day is among those which received 1/5—1/10 of an agar tube, on the third day among those which received 1/15—1/20 of an agar tube and on the fourth day among those which received 1/100—1/250 of an agar tube.

When we compare the summary on this table with Table I, the figures are seen to be very similar and to point to the conclusion that the Bombay rat is evidently not more immune to plague now than two years ago.