

# THE SILK INDUSTRY

.. OF

# ASSAM

BY

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## APPENDIX I.

Statement showing diseases in specimens of silkworms examined in the laboratory of the Imperial Entomologist and by Babu S. C. Saraswati, Temporary Sericulturist Assistant of the Agricultural Department.

N.B.—(1) The specimens which were examined by Babu S. C. Saraswati alone are marked with asterisks.

(2) P denotes pebrine, F flacherie, G grasserie, H healthy. For example, 1F means one specimen affected with flacherie, 3G means 3 specimens affected with grasserie.

Lot No.	Sub-division whence obtained.	Description.	Diseases found.	Remarks.
1	2	3	4	5
		I.—Muga silkworms.		
1	Gauhati ...	1 worm from unhealthy brood	1F.	
2	Ditto ...	1 moth from unhealthy brood	1F.	
3	Ditto ...	1 unhealthy cocoon	1F.	
4	Ditto ...	Ditto ...	1F.	
5	Ditto ...	1 worm from a cocoon	1F.	
6	Golaghat ...	1 worm	1F.	
7	Gauhati ...	23 moths and worms from inside of cocoons (from a lot kept for breeding).	2P, 4F, 16H.	Result of examination of one of the 23 specimens is not known.
8	Jorhat ...	91 cocoons from healthy brood	10F, 5G, 76H.	
9	Mangaldai ...	32 cocoons from unhealthy brood.	21F, 9G.	Two specimens were not reported on.
10	Ditto ...	10 cocoons from unhealthy brood.	3F, 7G.	
11	Ditto ...	14 cocoons from unhealthy brood.	2F.	12 specimens were not reported on.
12	Jorhat ...	6 worms from unhealthy brood.	3F, 1G, 1F+G, 1H.	One was a <i>bali photukia</i> and another a <i>hiti photukia</i> worm. Both showed flacherie.
13	Ditto ...	1 worm from unhealthy brood	1F.	
14	Dibrugarh ...	2 worms from unhealthy brood.	2F.	
15	Jorhat ...	6 worms from unhealthy brood.	5F.	One specimen was spoiled for examination.
16	Ditto ...	22 worms from unhealthy brood.	12F, 2G.	Eight specimens were spoiled for examination.
17	Ditto ...	5 worms from unhealthy brood.	4F, 1G.	
18	Ditto ...	6 worms from an unsuccessful rearing.	5F, 1G.	
19	Sibsagar ...	4 moths	1P, 3F.	These were received from Babu Srish Kumar Sen, Sub-Deputy Collector, Sibsaagar.
20	Ditto ...	1 unhealthy worm	1F.	
21	Ditto ...	Ditto	1F.	
22	Nowgong ...	1 worm from unhealthy brood	1G.	
23	Ditto ...	7 worms from same	5F, 2G.	
24	Ditto ...	3 ditto	3F.	
25	Gauhati ...	2 worms from unhealthy brood.	2F.	
*26	Sibsagar ...	23 worms from unhealthy brood.	23F.	
27	Nowgong ...	3 unhealthy worms	3F.	Remaining two specimens of Lot 29 showed muscardine. The three lots 27, 28 and 29 were examined by Mr. M. N. De, during his visit to Assam.
28	Ditto ...	5 ditto	3P, 1F, 1H.	
29	Ditto ...	6 dead chrysalids	2F, 1P + F, 1G.	

Lot No.	Subdivision whence obtained.	Description.	Diseases found.	Remarks.
1	2	3	4	5
		<i>II.—Eri silkworms.</i>		
1	Mangaldai ...	2 worms from unhealthy brood.	2F.	
2	Nowgong ...	20 mother moths from healthy brood.	1P, 5F, 14H.	
3	Jorhat ...	16 living worms from a fairly healthy brood.	4F, 12H.	
		44 dead worms of 3rd stage from same.	19F, 1G, 2F + G, 9H.	12 dead worms were spoiled for examination.
4	Ditto ...	75 living worms of 3rd, 4th and 5th stages from a fairly healthy brood.	32F, 2G, 4F + G, 32H.	5 specimens were spoiled for examination.
5	Ditto ...	35 living worms of 3rd stage from apparently healthy brood.	14F, 21H.	
6	Sibsagar ...	39 living worms of 3rd stage from healthy brood.	39H.	All were sound.
7	Mangaldai ...	5 dead chrysalids from a lot of seed cocoons.	3F, 1G, 1F + P.	
8	Nowgong ...	5 chrysalids from seed cocoons which failed to eclose.	3F, 1P.	One chrysalis of lot 8 died from attack of fly. Lots 7, 8, 9 and 10 were examined by Mr. M. N. De during his visit to Assam.
9	Ditto ...	5 weak worms of 5th stage from a healthy brood.	3F, 1G, 1H.	
10	Ditto ...	5 worms from healthy brood...	4F, 1G.	
		<i>III.—Pat silkworms.</i>		
1	Nowgong ...	12 pupae from apparently healthy brood.	10P.	Two contained fly maggots; others fly pupae.
2	Ditto ...	1 worm ...	1G.	
3	Golaghat ...	20 moths and 5 cocoons that failed to eclose.	8F, 17H.	
4	Nowgong ...	17 mother moths from a lot of 50 cocoons (apparently healthy brood).	16P, 1F, 1H.	Out of 17 mother moths only 3 had laid good eggs; 5 had laid 50 or 60 each; rest failed to lay altogether.
5	Jorhat ...	7 mother moths from 20 seed cocoons; healthy brood.	1P, 6H.	
6	Nowgong ...	52 moths from same stock as Lot 4.	24P, 13F, 1G, 14P + F.	
7	Golaghat ...	18 moths and 5 pupae from cocoons that failed to eclose (same brood as Lot 3).	2P, 13F, 7H.	One specimen was not reported on by I. E.
8	Jorhat ...	164 worms of 1st stage mostly dead.	3P, 107F, 54H.	
9	Nowgong ...	5 weakly worms of 3rd stage	5F.	Examined by Mr. M. N. De.

*N.B.*—(1) All specimens of *pat-polu* were of the *horu polu* variety.

(2) In dead worms, flacherie germs are produced by natural putrefaction of the contents of the stomach. The results of examination of dead *muga*, *eri* and *pat* worms, so far as flacherie is concerned, must not be accepted as a true index to disease. In most cases, specimens of living worms were taken and placed at once in a preserving fluid which prevented putrefaction.

## APPENDIX II(a).

*Exports of silk by rail and river from Assam.*

N.B.—The exports were almost exclusively from the Brahmaputra Valley; small quantities were exported in some years from the Surma Valley and are noted in column of remarks.

Year.	Raw.		Manufactured.		Cocoons included in raw silk.		Remarks.
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
1	2	3	4	5	6	7	8
	Mds.	Rs.	Mds.	Rs.	Mds.	Rs.	
1881 ...	538	1,18,300	...	8,900			
1882 ...	648	2,24,000	...	1,500			
1883 ...	614	...	...	...			Not registered before 1886.
1884 ...	532	86,910	...	...			
1885 ...	728	1,20,100	...	...			
1886 ...	1,548	1,54,300	...	...	1,290	80,200	
1887 ...	948	2,25,840	18	24,000	69	4,340	
1888 ...	2,102	2,76,760	143	85,900	1,488	1,04,980	Included 1 Mds. cocoons from Surma Valley.
1889 ...	4,302	4,37,728	281	1,04,947	3,044	2,49,020	Included 22 Mds. raw from Surma Valley.
1890 ...	2,897	4,33,671	219	1,51,400	980	64,400	
1891 ...	1,404	1,71,810	323	1,39,500	1,180	78,400	
1892 ...	1,790	2,03,805	155	98,000	1,349	93,940	Included 3 Mds. raw from Surma Valley.
1893 ...	1,576	5,25,444	107	69,893	409	43,210	Included 13 Mds. raw and 6 Mds. manufactured from Surma Valley.
1894 ...	1,351	3,16,134	140	84,000	196	13,720	Included 9 Mds. raw from Surma Valley.
1895 ...	1,201	3,52,210	61	39,478	278	19,460	Included 5 Mds. raw and 3 Mds. manufactured from Surma Valley.
1896 ...	580	1,27,780	308	1,53,000	53	3,410	
1897 ...	116	19,720	681	4,61,544	31	1,670	Included 4 Mds. manufactured from Surma Valley.
1898 ...	448	1,12,000	6	3,114	NH	NH	
1899 ...	7	1,230	244	2,35,144	6	280	
1900 ...	NH	NH	285	2,71,238	NH	NH	
1901 ...	5	1,230	218	95,128	NH	NH	
1902 ...	384	94,000	468	2,15,200	NH	NH	
1903 ...	659	1,30,760	491	2,30,770	NH	NH	
1904 ...	791	1,97,760	193	90,710	870	40,400	
1905 ...	789	1,97,280	179	84,000	NH	NH	
1906-07 ...	643		NH	NH	8	560	
1907-08 ...	644		NH	NH	NH	NH	
1908-09 ...	483		NH	NH	NH	NH	
1909-10 ...	439		NH	NH	NH	NH	Included 11 Mds. raw from Surma Valley.
1910-11 ...	963		NH	NH	4824	Value not known	Included 4 Mds. raw from Surma Valley.
1911-12 ...	915	2,69,608	1	1,540	323	10,238	Value rate for cocoons evidently wrong having been taken as same for Bengal mulberry cocoons which are much cheaper than etc.
1912-13 ...	1,080(a)	2,94,076	NH	NH	1,081(b)	68,110	Included 7 Mds. raw from Surma Valley. (a) Ought to be larger than (b); evidently there is a mistake.



APPENDIX II(c).

*Exports of silk, raw and manufactured, to Bhutan and other trans-frontier countries.*

Year.	Raw.						Manufactured.						Remarks.
	Bhutan.		Other countries.		Total.		Bhutan.		Other countries.		Total.		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Mds.	Rs.	Mds.	Rs.	Mds.	Rs.	Mds.	Rs.	Mds.	Rs.	Mds.	Rs.	
1893-94	90	15,290	14	3,583	104	18,878	59	11,685	78	16,990	197	28,675	Other trans-frontier countries include Towang, Aka and Dafia, and Abor and Mishmi Hills; also Manipur and Hill Tippera, trade with which last two countries ceased to be registered from 1909.
1894-95	104	18,160	...	...	104	18,160	48	11,481	23	11,102	78	22,583	
1895-96	862	60,305	...	...	862	60,305	36	13,846	154	40,624	190	56,470	
1896-97	41	7,321	4	1,159	45	8,980	18	5,545	53	20,535	71	26,080	
1897-98	29	5,424	...	...	29	5,424	16	3,518	49	21,087	95	24,605	
1898-99	35	6,221	...	...	35	6,221	42	10,472	195	51,932	238	62,404	
1899-00	83	13,267	...	...	83	13,267	55	12,678	66	20,505	121	33,183	
1900-01	75	13,213	...	...	75	13,213	36	9,464	73	14,604	109	24,068	
1901-02	581	93,391	3	563	584	93,956	61	14,721	20	5,383	81	20,104	
1902-03	314	23,468	...	...	314	23,468	111	20,693	39	9,602	150	30,295	
1903-04	94	17,385	...	...	94	17,385	97	22,713	69	16,716	166	39,429	
1904-05	103	15,403	...	...	103	15,403	56	15,674	77	20,053	133	35,727	
1905-06	42	7,450	...	...	42	7,450	36	8,633	25	5,336	61	13,969	
1906-07	65	14,022	...	...	65	14,022	158	25,459	30	6,160	189	31,619	
1907-08	54	11,319	...	...	54	11,319	108	30,231	9	2,065	117	32,296	
1908-09	88	17,519	...	...	88	17,519	144	38,952	7	3,603	151	40,555	
1909-10	68	9,266	...	...	68	9,266	61	11,762	7	2,616	68	14,378	
1910-11	34	7,560	...	...	34	7,560	51	8,433	44	9,777	95	18,210	
1911-12	4,186	8,36,901	...	...	4,186	8,36,901	3,103	2,43,588	25	3,409	3,128	2,46,997	
1912-13	1,096	2,09,021	...	...	1,096	2,09,021	1,017	2,77,679	13	2,488	1,030	2,80,167	

## APPENDIX III.

*Estimated number of mulberry silkworm rearers in each mauza of the Assam Valley.*

						Number of families rearing mulberry silk.
Sibsagar district—						
Jorhat subdivision—						
Mauza	Kotohagar	...	...	...	...	84
"	Parbatia	...	...	...	...	4
"	Khangia	...	...	...	...	15
"	Salmora	...	...	...	...	117
"	Simaloguri	...	...	...	...	62
"	Katonigaon	...	...	...	...	44
Total						326
Golaghat subdivision—						
Mauza	Dakhiuhengra	...	...	...	...	1
"	Kacharihat	...	...	...	...	2
"	Athgaon	...	...	...	...	59
"	Dhekial	...	...	...	...	53
"	Gurjugonia	...	...	...	...	54
"	Nahorani	...	...	...	...	54
"	Dergaon	...	...	...	...	2
"	Kumargaon	...	...	...	...	8
"	Misamara	...	...	...	...	13
Total						248
Sibsagar subdivision—						
Mauza	Jukaichuk	...	...	...	...	3
"	Morabazar	...	...	...	...	124
"	Solaguri	...	...	...	...	5
"	Bakota	...	...	...	...	36
"	Joktoli	...	...	...	...	26
"	Athkhel	...	...	...	...	3
Total						197
Total for Sibsagar district						769
Darrang district—						
Tezpur subdivision—						
Mauza	Behaguri	...	...	...	...	35
"	Borchula	...	...	...	...	6
"	Chatia	...	...	...	...	17
Total						58
Mangaldai subdivision—						
Mauza	Hindughopa	...	...	...	...	140
"	Lokrai	...	...	...	...	180
"	Sipajhar	...	...	...	...	64
"	Rangamati	...	...	...	...	32
"	Kalaigaon	...	...	...	...	11
Total						427
Total for Darrang district						485



Number of families rearing  
mulberry silk.

## Nowgong district—

Mauza Pubghoria	...	...	...	...	...	110
„ Bhelowguri	...	...	...	...	...	12
„ Khatowal	...	...	...	...	...	23
„ Singhiapaton	...	...	...	...	...	82
„ Juria ...	...	...	...	...	...	44
„ Borkondoli	...	...	...	...	...	72
„ Kampur	...	...	...	...	...	96
„ Garubat ...	...	...	...	...	...	32
„ Pakhimora	...	...	...	...	...	14
„ Kachomari	...	...	...	...	...	140
„ Hatichong	...	...	...	...	...	263
„ Jagial	...	...	...	...	...	140
„ Baropuja	...	...	...	...	...	704
„ Mikirbheta	...	...	...	...	...	175
„ Charaibahi	...	...	...	...	...	417
„ Dandua	...	...	...	...	...	181
„ Ghagua	...	...	...	...	...	72
„ Mayang	...	...	...	...	...	42
„ Uttarmesa	...	...	...	...	...	42
„ Sohori	...	...	...	...	...	86
						<hr/>
				Total...	...	2,752
				Total for Nowgong district	...	<hr/> 2,752 <hr/>

## Kamrup district—

## Gaubati subdivision—

Mauza Borbanghar	...	...	...	...	...	10
„ Karara	...	...	...	...	...	6
„ Pubkachari mahal ...	...	...	...	...	...	2
„ Pub Barigag	...	...	...	...	...	2
						<hr/>
				Total for Kamrup district	...	20
				Total for Assam Valley	...	<hr/> 4,026 <hr/>

N. B.—Mulberry silk is not grown at present in the districts of Goalpara and Lakhimpur, nor in the Barpeta sub-division of Kamrup.

## APPENDIX IV.

*Note on the Synthetic Dyes used at the Agricultural Research Institute, Pusa, for dyeing Eri silk.*

The synthetic dyes used at Pusa are acid dyes, basic dyes and alizarine. They are the following :—

1. Acid yellow G. R.
2. Cyprus Green B.
3. Water Blue.
4. Silk Black 4 B. F.
5. Brilliant Congo R. G.
6. Columbia Yellow.
7. Indocyanine B.
8. Micado Orange 4 R. O.
9. Salmon Red.
10. Sorbine Red G.
11. Thiazine Brown G. R.
12. Naphthol Red S. G.
13. Silk Blue B.
14. Rhodamine B.
15. Diamond Green G.
16. Janus Black D.
17. Brilliant Orange.
18. Alizarine 40 %.

Nos. 1 to 9 are manufactured and sold by the Berlin Aniline & Co. (1 Rampart Row, Bombay); Nos. 10 to 15 by the Badische Anilin Soda-Fabrik & Co. (3, Elphinstone Circle, Bombay) and Nos. 16 to 18 by Meister Lucius and Bruning, Ltd. (Post Box 127, Bombay). All except No. 18 are acid dyes; Nos. 2 and 15 may also be used as basic dyes.

The method of using each of the three classes of dyes is described below :—

*I. Acid dyes.*—Acid colours are generally used in a bath of boiled-off soap liquor. The quantity of liquor should be about  $\frac{1}{4}$ th or  $\frac{1}{5}$ th of the amount of water in the dye-bath, and the water should be 50 to 60 times the weight of the silk to be dyed. In the absence of boiled-off liquor, fresh solution of soap (4 or 5 % W. S.) or Glauber's salt (5 % W. S.) may be used.

Weigh the silk and soak it in cold water; take the required quantity of water and liquor. Dissolve the dye (1 to 7 % W. S. according to depth of shade required) in hot water and strain it; add acetic acid (2 % to 5 % W. S. according to desired shade). Warm up the bath until it is luke-warm, add the dye and acid solution to the bath, stir up well and put the silk in; work the silk about in the bath; warm up to 195°F. After one hour or as soon as the desired shade has been obtained, take out the silk, rinse well in cold water; then "scoop" or brighten with 4 % W. S. acetic acid or 2 % W. S. sulphuric acid added to 40 times W. S. of water.

*II. Basic dyes.*—Basic dyes are not quite fast. They are generally used for "topping" other dyes (acid or alizarine), that is, the silk may be first dyed with an acid or alizarine dye, and then dipped in a basic dye to brighten or change the colour.

Weigh the silk and wet it out; dissolve the required quantity of dye in hot water and then put the liquid in a vessel containing 50 to 60 times W. S. of water. If boiled-off liquor is used, add 7 to 8 % W. S. acetic acid. Stir the bath well, put the silk in; heat to 160°F and dye in the bath for 20 to 30 minutes. Take out the silk and wash it in cold water. For fixing the dye which makes the colour tolerably fast, the dyed silk is placed in 15 % W. S. tannic acid added to 40 to 50 times W. S. of water for 4 or 5 hours at a temperature of about 170°F.

Instead of tannic acid, extract of myrobolans, sumac, divi-divi, gall or chestnut or catechu may be used, taking for 10lbs. of tannic acid, 34lbs. of myrobolans, or 40lbs. of sumac leaves or 14lbs. of divi-divi, gall or chestnuts; crush the material, boil for 2 hours in sufficient water to prepare the extract and strain the liquid.

*III. Alizarine dyes.*—The use of alizarine dye of 40 % purity is recommended. It will give the following colours, the mordant being different in each case.

*Red.*—The yarn is mordanted with 6 % W. S. aluminium sulphate and 5 % W. S. cream of tartar. The mordanted yarn is dyed with 5 % W. S. alizarine and 4 % W. S. acetate of lime. To get brighter shades, add 1—4 % stannous chloride and as much more of cream of tartar.

*Orange.*—The mordant used is 5 % W. S. stannous chloride and 5 % W. S. cream of tartar. Mordant, and then dye with 5 % W. S. alizarine: To get redder orange, 4—5 % W. S. acetate of lime should be added to the bath.

*Brown.*—The mordant used is 3—4 % W. S. pot. bichromate and 1 % W. S. sulphuric acid. Dye with 5 % W. S. alizarine only.

*Brown.*—Another mordant for *brown* colour is 5 % W. S. chrome alum and 5 % W. S. cream of tartar. Dye with 5 % W. S. alizarine.

*Purple.*—The mordant used is 6 % W. S. ferrous sulphate and 6 % W. S. pot. bitartarate. Dye with 5 % W. S. alizarine and 5 % W. S. carbonate of lime.

*Red purple.*—Mordant with 6 % W. S. copper sulphate and 6 % W. S. pot. bitartarate. Dye with 5 % W. S. alizarine.

The process of mordanting is as follows:—Weigh the silk; take the exact quantities of mordants as given above, powder the chemicals carefully and dissolve them in hot water; and put them in 60 to 70 times W. S. of water. Wet out the silk, put it in the water, working it about all the time. Bring the bath to nearly boiling point, and leave all night to cool. In the morning take out the silk, wash smoothly in cold water, wring out and let it get nearly dry.

The mordanted silk is now dyed as follows:—Heat 60 to 70 times W. S. of water; add the required quantities of alizarine and any other “assistant” required, after dissolving these well in hot water; put in the wet mordanted silk in the bath at about 130°F.; stir and work about the silk; bring the bath to the boil and keep it boiling for one hour; take out the silk and wash in clean cold water.

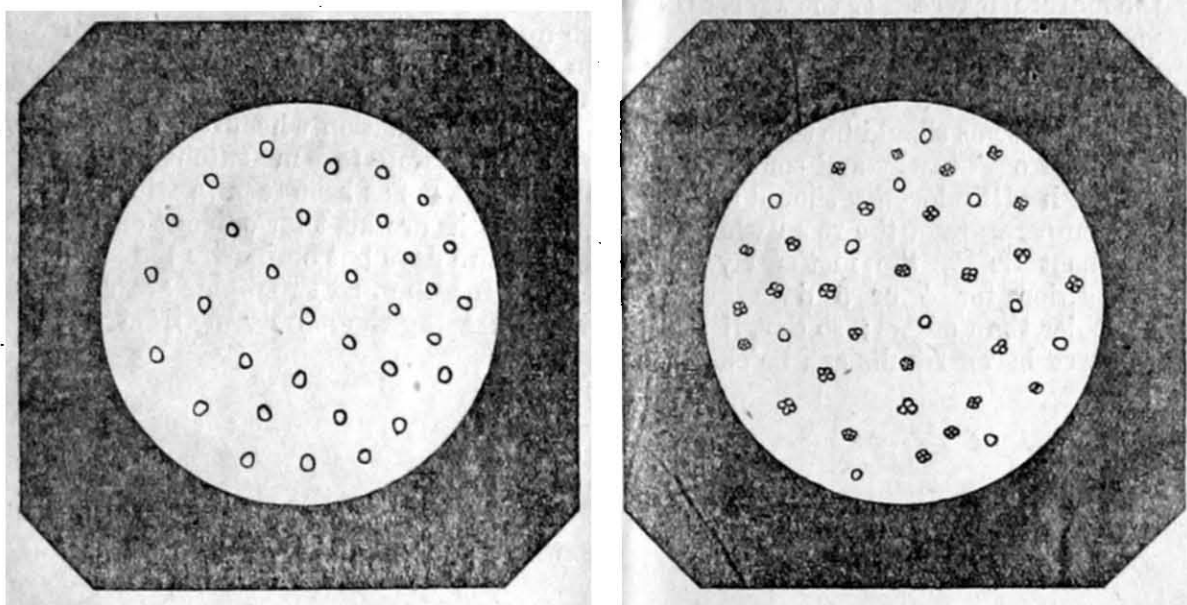
The dyed silk receives an after-treatment as follows:—Put the dyed silk in 5 % W. S. boiling soap solution, turning it round till well soaped; take out, wash 2 or 3 times in clean cold water, wring and dry in shade.

## APPENDIX V.

## NOTE ON THE GRASSERIE DISEASE OF THE MUGA SILK WORM BY MR. M. N. DE.

*Grasserie in muga worms.*

Grasserie is a disease of silkworms causing great damage to rearers. Ordinarily the mortality of the *muga* worms from this disease is about 4 %, but when it rains for some days after a long drought the mortality is very great. The disease appears in all the stages of the caterpillars but specially in the fifth stage. The acutely-diseased worms die before spinning cocoons, but if mildly attacked they spin thin and flimsy cocoons, die in the pupa stage and can seldom change into moths. In Assam among the rearers, it is known as *foolá rog* (swelling disease); it corresponds to *Rasá* disease in mulberry silkworms. The disease appears most in May and June. The external symptoms of the disease when the worms are affected with it are the following:—The body of the worms swells up, and the skin becomes a little shiny; the worms cease to take food, crawl about and seem to be distressed, later on they remain motionless, hang with the head downwards and finally die; the bodies begin to decompose gradually and fall down to the earth with the slightest wind, the skin bursts into pieces and a deep black juice comes out.



The internal symptoms of the disease are the following:—

The blood of the diseased worm becomes cloudy: ordinarily the blood of the healthy worm is transparent; the shiny appearance of the skin is due to this. In this cloudy fluid (if examined under the microscope of 700 magnifications), there are visible innumerable oval shaped and slightly angular bodies (*vide* Fig. I) which should not be confused with fatty globules which are round and very shiny looking. Besides, the oval bodies can be crushed easily by placing a little of the juice on a slide and pressing with a cover glass by means of the thumb (*vide* Fig. II), whereas the fatty globules remain unchanged. These oval bodies are stained blue by osmic acid, whereas the fat bodies are stained black; fat bodies are dissolved by ether, absolute alcohol, caustic potash, etc., but the oval bodies remain unchanged. The grasserie bodies in *muga* worms are quite different from the grasserie bodies in *Bombyx mori*, *Antheraea yamamai* of Japan, *Antheraea pernyi* of China and *Attacus ricini* of Assam (*vide* my article on grasserie in silkworms, Agricultural journal of India, Volume VI, Part III, July 1911). The oval bodies peculiar to the disease are found not only in the blood, but also in the fatty tissues, tracheal membrane, muscles and cells. The disease is contagious but not hereditary.

The causes which produce grasserie in silkworms are not well-known. The following causes may generally be attributed:—

- (1) Rain after a long drought in the rearing season as the worms are compelled to eat very juicy leaves.
- (2) Continuous and persistent rain.
- (3) Tender leaves if eaten by grown-up worms.
- (4) Worms fed on mature leaf first and tender leaf afterwards.

- (5) Leaves eaten from a big and tall tree first and then from a small and dwarf tree (as the leaves from the latter contain more juice).
- (6) Leaves from wet and moist ground.
- (7) Leaves of shady place.
- (8) Damp air.
- (9) Sudden change from dry and hot temperature to cold and damp.

*Remedy and prevention.*—Some of the causes which give rise to the disease are beyond our control. I have noticed during my last tour in Assam that the rearers are ignorant of the causes which give rise to the disease. In most cases too many *khorikas* (straws on which *muga* moths have been allowed to deposit eggs) are tied on a single branch so that when the caterpillars hatch they are forced to eat mature leaves and when all the leaves in the branch are exhausted, they crawl to a new branch and begin to feed upon comparatively tender leaves and so get the disease. In Dibrugarh the rearers tie the *khorikas* on trees containing mature leaves with the notion that the worms will grow quickly on those leaves. Now the worms may thrive better on those leaves, if they survive, but many of them will die of flacherie or grasserie as the young worms can hardly digest the mature leaves. If the *khorikas* are distributed judiciously to all the branches of young trees containing tender leaves a large number of worms can be saved from this disease. The disease may be prevented to a great extent if the time of the rearing season is changed when the natural causes enumerated above do not exist. The diseased worms should be thrown away far from the plantation whenever they are seen. Worms from healthy and sound eggs can resist the disease to some extent so that eggs from a healthy locality should always be obtained. It has been seen in winter that if the temperature of the room where the mother moths are kept for oviposition is raised to about 80°F., the moths lay their eggs in two days but ordinarily they continue oviposition for 4 or 5 days. Now the eggs of the first two nights are better and healthier than others; so that if the practice of keeping the mother moths at 80°F. is followed better results can be obtained.