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NOTES ON MALARIA IN MYSORE STATE.*

Part II.

THE ANOPHELINES OF MYSORE STATE.

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In Part I of this report a description was given of three stations chosen for intensive study of malaria as it exists in Mysore State. These three stations are as follows :—

1. The Nagenhalli area in Mysore District, three miles from Mysore City.
2. Mudigere Town area in Kadur District.
3. Hiriyur Town area in Chitaldrug District.

Work began in the first of these areas on 1st October, 1928, in the second in December, 1928, and in the third in January, 1929. Since those dates the following anophelines have been identified from each station. Only species identified as adults have been included in the list, and specimens have been deposited in the museum of the Malaria Survey of India.

1. Nagenhalli area.

†*A. aconitus* Dönitz, 1902.
A. barbirostris van der Wulp, 1884.
A. culicifacies Giles, 1901.
A. fuliginosus Giles, 1900.
A. hyrcanus var. *nigerrimus* Giles, 1900.
A. jeyporiensis Theobald, 1901.
A. jeyporiensis James, 1902.
A. listonii Liston, 1901.

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† The following changes in nomenclature have now been adopted by the Malaria Survey of India, in view of the recent researches of Christophers and Edwards:—

	Correct name.	Synonym.
(i)	*A. annularis* van der Wulp, 1884.	*A. fuliginosus* Giles, 1900.
(ii)	*A. splendidus* Koidzumi, 1920.	*A. maculipalpis* var. *indicusis* Theobald, 1903.
(iii)	*A. fluviatilis* James, 1902	*A. listonii* Liston, 1901

A. maculipalpis var. *indiensis* Theobald, 1903.
A. pallidus Theobald, 1901.
A. philippinensis Ludlow, 1902.
A. stephensi Liston, 1901.
A. subpictus Grassi, 1899.
A. tessellatus Theobald, 1901.
A. turkhudi Liston, 1901.
A. vagus Dönitz, 1902.

2. Mudigere area.

A. aconitus.
A. aitkenii James, 1903.
A. barbirostris.
A. culicifacies.
A. fuliginosus.
A. hyrcanus var. *nigerrimus.*
A. jamesii.
A. jeyporiensis.
A. karwari James, 1903.
A. leucosphyrus Dönitz, 1901.
A. listonii.
A. maculatus Theobald, 1901.
A. maculipalpis var. *indiensis.*
A. majidi Young and Majid, 1928.
A. minimus Theobald, 1901.
A. pallidus.
A. philippinensis.
A. subpictus.
A. tessellatus.
A. turkhudi.
A. vagus.
A. varuna Iyengar, 1924.

3. Hiriyur area.

A. aconitus.
A. barbirostris.
A. culicifacies.
A. fuliginosus.
A. hyrcanus var. *nigerrimus.*
A. jamesii.
A. jeyporiensis.
A. listonii.
A. maculipalpis var. *indiensis.*
A. minimus.
A. pallidus.
A. philippinensis.
A. stephensi.
A. subpictus.
A. tessellatus.
A. turkhudi.
A. vagus.
A. varuna.

Of the 22 species here noted, thirteen had been reported from various parts of the State previous to 1928. A larva identified as *A. insulae-florum* was caught in the Mudigere area but as it failed to develop further it was not included in the list. Since then, similar larvæ caught in the western part of the Hassan District developed into adults and were identified as *A. insulæ-florum*. This species might, consequently, be included in the report of the anophelines of Mysore.

SEASONAL OCCURRENCE OF ANOPHELINES.

From the catches of larval and adult anophelines in the three stations (during 1928 and 1929 in the Nagenhalli area, 1929 in the Mudigere area, and 1929 and 1930 in the Hiriyur area), it was possible to draw conclusions as to the seasonal occurrence of the anopheline species in Mysore. The same three groups of months as those used in Part I of this report were used for this purpose. Table I shows the maximum seasonal prevalence of the species caught

in the three stations, this season being determined on the basis of both adult and larval catches. Where blanks are left in the table, either the catches were too small to allow of any conclusions or the species was not caught.

TABLE I.

Maximum occurrence of anopheline species by the three groups of months in three study stations.*

Species of anophelines.	Nagenhalli area.	Mudigere area.	Hiriyur area.
aconitus	III	..	III
aitkenii	..	I	..
barbirostris	III	III	III
culicifacies	II	I	II and III
fuliginosus	I	I	II
hyrcanus	III	III	..
jamesii	III	II	II
jeyporiensis	III	I and II	I and III
karwari	..	II and III	..
leucosphyrus	..	I and II	..
listonii †	II and III	I	III
maculatus	..	I	..
maculipalpis var. *indiensis* ..	II	I	III
majidi	..	I	..
pallidus	I	I	I
philippinensis	II	II	..
stephensi	I	..	III
subpictus	I and II	I	I
tessellatus	II	III	II and III
turkhudi	I	..	I
vagus	II and III	I	I and II

* Group I. February, March, April, May.
Group II. June, July, August, September.
Group III. October, November, December, January.

† Under *listonii* are included *minimus* and *varuna*, as at the time of these collections the three species were not adequately distinguished.

With the exception of nine species, the seasonal occurrence of the species of anophelines was in agreement in the three stations. As far as could be determined from the data available, the differences were real in the case of *culicifacies, fuliginosus, jamesii, jeyporiensis, listonii* and *vagus*. *A. maculipalpis* var. *indiensis* was rarely caught in any station; *stephensi* was rare in Nagenhalli and absent in Mudigere; *tessellatus* was rarely caught in Nagenhalli and Mudigere. It is of special interest to note that both *culicifacies* and the *listonii* groups had their maximum occurrence in the Mudigere area in the months of group I, in contrast to their occurrence in the other two stations. The breeding habits of the species reported were not essentially different from those recorded in other parts of India, so they have not been discussed again.

RESULTS OF DISSECTIONS OF ANOPHELINES.

In each of the three study areas certain houses and cattle-sheds, and combinations of them, were selected as catching stations. These were visited twice a week and adult anophelines caught. Anophelines captured were preserved in lamp chimneys and all females were dissected, sometimes after 60 hours but more often after 72 hours. A report published in 1931 gave the results of the dissections done previous to 31st December, 1930 (Sweet and Rao, 1931). In that report dissections of 31,277 mosquitoes were listed, of which eleven specimens were found infected. Three of these were gut infections and eight were gland infections. The species found infected were *A. culicifacies,* the *listonii* group (*A. listonii, A. minimus* or *A. varuna*), and *A. stephensi.* Since January, 1931 dissections have been made at various times of the year in both epidemic and endemic areas. The report of these additional dissections will be deferred until the data are more complete, but it may be stated here that no other species of anophelines have been found infected. It seems fair to assume, under these circumstances, that the dangerous species of anophelines in Mysore State, as far as malaria is concerned, are *A. culicifacies, A. stephensi* and either one, two or all of the *listonii* group (*A. listonii, A. minimus* and *A. varuna*).

Of the eleven infected mosquitoes previously reported, six were found in the regular study areas and five during epidemics in various other parts of the State. Infected anophelines were reported from the Nagenhalli area in April (3) and August (1); from the Hiriyur area in September (2). Since that report, further infections have been found in the Nagenhalli area in March and April, the Mudigere area in May and the Hiriyur area in December. Infected mosquitoes reported from epidemic areas have been found in June, August, October and November.

OCCURRENCE OF DANGEROUS ANOPHELINES.

Before control work began, the catches of females of the dangerous anopheline species in the selected catching stations of the Nagenhalli area were 5,013; in the Mudigere area, 325; in the Hiriyur area (two full years), 18,712. The incidence of these catches by species, and by the three groups of months previously used, is given in Table II. In the Nagenhalli area just under half of the total catch of females of the dangerous species was in the months of group II, and just over a quarter in the months of group III. About 65 per cent of the total catch of females of these species in the Mudigere area was in the months of group I, while in the Hiriyur area 57 per cent of the catch was in the months of group III and one-third in the months of group II.

Of the catching stations selected in the three study areas, the great majority were combined dwellings and cattle-sheds, due to the living habits of the people of the State. It was not possible, in such stations, to separate the catches with any degree of assumed accuracy. However, a few of the stations selected could be classified as more or less pure dwellings, and a few more as

TABLE II.

Seasonal occurrence of catches of females of the dangerous species of anophelines.

Species of *anopheles.*	Groups of months.	NAGENHALLI AREA.		MUDIGERE AREA.		HIRIYUR AREA.	
		No.	Per cent.	No.	Per cent.	No.	Per cent.
A. culicifacies ..	I	913	27·2±0·5	90	73·2±2·7	619	9·4±0·2
	II	1909	56·9±0·6	17	13·8±2·1	2641	40·1±0·4
	III	531	15·9±0·4	16	13·0±2·9	3319	50·5±0·4
listonii group. (*A. listonii*, *A. minimus* and *A. varuna*.)	I	249	16·4±0·6	123	66·9±2·3	883	11·1±0·2
	II	476	31·2±0·8	27	13·4±1·7	2114	26·4±0·3
	III	797	52·4±0·9	52	25·7±2·1	4980	62·5±0·4
A. stephensi ..	I	58	4·3±0·8	..	..	217	5·2±0·2
	II	34	2·5±0·5	..	..	1521	36·7±0·5
	III	43	3·1±0·7	..	..	2409	58·1±0·5
All dangerous anophelines.	I	1220	24·3±0·4	213	65·6±1·8	1719	9·2±0·1
	II	2119	42·2±0·5	44	13·5±1·3	6276	33·5±0·2
	III	1374	27·4±0·4	68	20·9±1·5	10717	57·3±0·2

pure cattle-sheds. All the catches made were accordingly classified as to type of source, combined house and cattle-shed, house, and cattle-shed. For the figures in the following discussion, the catches in combined house and cattle-shed stations were not considered. It was not found possible during this study to test for the source of the blood meal in the stomachs of mosquitoes caught. Since this was so, it was thought that the relative and absolute occurrence in house catches of females of the dangerous species, and of other species, might give some slight indications of habits which would possibly prove of interest. Although the many sources of error in such a consideration of data were recognized it was thought worth while to include some discussion of this aspect of the catches.

The figures for catches in pure houses and cattle-sheds were analysed to show the total numbers caught of females of dangerous species, and other species, as well as the percentages of these totals caught in houses. A second analysis was made of the total number of anophelines caught in pure houses, and the percentages of these totals which were of the dangerous species. Tables III, IV and V give these figures, for the three groups of months, in the Nagenhalli, Mudigere and the Hiriyur areas. It should be mentioned that the data used in the first of these two analyses were arranged in the form of fourfold tables and tested by chi-square. The parts of the tables were numbers of females of dangerous species caught in (*a*) houses and (*b*) cattle-sheds and the same figures for females of other species. Wherever the two corresponding percentages (those of catches of dangerous species and other species) of the first part of Tables III, IV and V are significantly different from each other,

the fourfold chi-square tests were also significant. The details of these tests have not been reproduced here in order to save space.

TABLE III.

Occurrence of female anophelines of dangerous species in houses of the Nagenhalli area.

	Months of group I.	Months of group II.	Months of group III.	All months.
Total catch of female anophelines of dangerous species in pure houses and cattle-sheds.	380	459	668	1,507
Percentage of this catch which were caught in houses.	2·9±0·6	3·7±0·6	5·7±0·6	4·4±0·3
Total catch of female anophelines of other species in pure houses and cattle-sheds.	328	321	784	1,433
Percentage of this catch which were caught in pure houses.	6·4±0·9	8·7±1·1	2·6±0·4	4·8±0·1
Total catch of female anophelines of all species in pure houses.	32	45	58	135
Percentage of this catch which were of dangerous species.	34·4±5·7	37·8±4·9	65·5±4·2	48·9±2·9

Of a total of 1,507 female anophelines of dangerous species caught in houses and cattle-sheds of the Nagenhalli area, 4·4 ± 0·3 per cent were caught in houses. The corresponding percentage for females of other species of anophelines was 4·8 ± 0·4. These percentages for all months were not significantly different. The two corresponding percentages for the months of group I were also not significantly different. In the months of group II, however, a significantly greater percentage of the total catch of females of other species was caught in houses than that of females of the dangerous species. This relationship was reversed in the months of group III, when a significantly higher percentage of the total catch of females of the dangerous species was caught in houses than was the case for females of other species. From the second part of the analysis, it was found that 65·5 ± 4·2 per cent of the total house catches during the months of group III were females of the so-called dangerous species, a percentage that was significantly higher than the corresponding percentages for the months of groups I and II. It was probable, then, that only in the months of group III in the Nagenhalli area did females of the dangerous species seem more likely to seek out houses than females of other species, and that in these months something over half of the house catches were of the dangerous species.

TABLE IV.

Occurrence of female anophelines of the dangerous species in houses of the Mudigere area.

	Months of group I.	Months of group II.	Months of group III.	All months.
Total catch of female anophelines of dangerous species in pure houses and cattle-sheds.	213	46	70	329
Percentage of this catch which were caught in houses.	22·5±1·9	45·7±4·9	11·4±2·6	23·1±1·6
Total catch of female anophelines of other species in pure houses and cattle-sheds.	3,061	6,592	4,174	13,827
Percentage of this catch which were caught in pure houses.	12·6±0·4	10·7±0·3	7·8±0·3	10·3±0·2
Total catch of female anophelines of all species in pure houses.	134	729	332	1,495
Percentage of this catch which were of dangerous species.	11·1±1·0	2·9±0·4	2·4±0·6	5·1±0·4

In the Mudigere area, from the figures of Table IV, it was probable that in the months of groups I and II females of the dangerous species were more

TABLE V.

Occurrence of female anophelines of dangerous species in houses of the Hiriyur area.

	Months of group I.	Months of group II.	Months of group III.	All months.
Total catch of female anophelines of dangerous species in pure houses and cattle-sheds.	91	624	615	1,330
Percentage of this catch which were caught in houses.	26·4±3·1	18·1±1·0	22·4±1·1	20·7±0·7
Total catch of female anophelines of other species in pure houses and cattle-sheds.	424	287	198	909
Percentage of this catch which were caught in pure houses.	25·2±1·4	20·2±1·6	30·8±2·2	24·9±1·0
Total catch of female anophelines of all species in pure houses.	131	171	199	501
Percentage of this catch which were of dangerous species.	18·3±2·3	66·1±2·4	69·3±2·2	54·9±1·4

likely to be found in houses than were females of other species, and that the highest percentage of house catches of the dangerous species was in the months of group I. Even in these months this percentage was low due to the small total catch of females of the dangerous species.

Considering the figures for the Hiriyur area, given in Table V, there did not seem to be any difference in the choice of houses as resting places between females of the dangerous species and of other species. There was some indication, when the figures for all months were considered, that females of other species were slightly more likely to be found in houses. However, in the months of groups II and III well over half of the total house catches were females of the dangerous species.

RELATIONS OF ANOPHELINE CATCHES.

As has been stated, anophelines were caught at certain selected stations in each of the areas, the catches being on a time basis. For determining, if possible, any relations between these anopheline catches and other factors

TABLE VI.

Average catch of anophelines per catching station per month in three study areas.

November 1928 to December 1930 (inclusive).	NAGENHALLI AREA.		MUDIGERE AREA.		HIRIYUR AREA.	
	Average dangerous anophelines.	Average other anophelines.	Average dangerous anophelines.	Average other anophelines.	Average dangerous anophelines.	Average other anophelines.
November	40	30	..	..	..	..
December	43	24	0·6	30	..	..
January	31	13	1·0	25	11	5
February	31	16	1·0	32	26	44
March	12	21	0·8	23	7	43
April	13	37	3·0	21	6	45
May	19	32	3·0	32	6	40
June	14	13	1·0	25	7	16
July	30	22	0·3	57	31	9
August	61	71	0·1	93	101	52
September	36	58	0·0	60	73	33
October	24	26	0·0	33	34	37
November	44	33	0·1	60	78	27
December	41	20	0·6	30	72	7
January	32	24	1·6	18	15	11
February	..	..	..	..	9	26
March	..	..	..	..	6	18
April	..	..	..	..	4	13
May	..	..	..	..	4	9
June	..	..	..	..	13	11
July	..	..	..	..	27	5
August	..	..	..	..	26	14
September	..	..	..	..	29	18
October	..	..	..	..	21	36
November	..	..	..	..	128	49
December	..	..	..	..	74	16

studied, it was thought best to use the average catch per station per month. The figures for these average catches, for anophelines of the dangerous species and for anophelines of other species, are given in Table VI.

Under the section on 'Relations of Parasite Rates', in Part I of this report, certain remarks were made concerning the correlations set up on the data available. It was stated that those remarks apply also to the correlations of this part of the report, they will therefore not be repeated here. Table VII gives the coefficients of correlation for those correlations found to be of interest in connection with the anopheline data. As in Part I the probable errors of the coefficients were omitted, as they were of little value in judging significance due to the small number of pairs of observations.

TABLE VII.

Certain of the coefficients of correlation obtained with the data on average catch of anophelines per catching station per month.

Correlations between	Nagenhalli area.	Mudigere area.	Hiriyur area.
Average catch of dangerous anophelines and average catch of other anophelines.	+ 0·51	— 0·52	+ 0·36
Average catch of other anophelines and mean temperatures.	— 0·09	— 0·09 *	— 0·09
Average catch of dangerous anophelines and mean temperatures.	— 0·56	+ 0·58	— 0·57 *
Average catch of other anophelines and average 8 a.m. humidity (one month lag of average catch).	— 0·27	+ 0·75 *	+ 0·33
Average catch of dangerous anophelines and average 8 a.m. humidity (one month lag of average catch).	+ 0·62 †	— 0·56	+ 0·64 *
Average catch of other anophelines and parasite rates (one month lag of parasite rates).	— 0·11	— 0·35	— 0·09
Average catch of dangerous anophelines and parasite rates (one month lag of parasite rates).	— 0·60 *	+ 0·72 *	— 0·49 †
Average catch of *A. culicifacies* and parasite rates (one month lag of parasite rates).	— 0·08	+ 0·67 †	— 0·64 †
Average catch of anophelines of *listonii* group and parasite rates (one month lag of parasite rates).	— 0·59	+ 0·71 *	— 0·40
Average catch of *A. stephensi* and parasite rates (one month lag of parasite rates).	+ 0·05	.	— 0·41
Average catch of *A. culicifacies* and *listonii* group and parasite rates (one month lag of parasite rates).	— 0·67 †	..	..

* These coefficients were more than three times greater than the probable error resulting from letting $r = 0$. The probability of their arising by random sampling from uncorrelated data was in each case less than 0·01. They may be regarded as significant.

† These coefficients fulfilled the same tests, except that their probabilities were between 0·01 and 0·02. The remaining coefficients were not regarded as significant by these two tests.

The average catches of anophelines of dangerous and other species were not significantly correlated in any station. The coefficients were positive in sign in the Nagenhalli and Hiriyur areas but negative in the Mudigere area. In the former two areas the coefficients of the correlations, between average catches of dangerous and other anophelines and the monthly parasite rates, were all negative in sign, whereas in the Mudigere area one was positive and the other negative. Judged by these three sets of correlations, the signs of all the correlations of Table VII above, and of Table XVII of Part I, were correct with the exception of one of the Nagenhalli area correlations. The correlation coefficient in this area, between the average catch of other anophelines and the average 8 a.m. humidity, had a negative sign, whereas it should have been positive in sign to agree with the signs of the other correlations. No explanation was found for this discrepancy.

In the Mudigere area there was a definite negative association between the average catch per station per month of anophelines of the species not considered dangerous and the average monthly mean temperatures. With a one month lag of the average catches, there was a definite positive association of these catches with the average 8 a.m. relative humidities in that area. The same correlations did not yield significant coefficients in the other two areas. In no area were the correlations significant between the average catches of non-dangerous anophelines and the monthly parasite rates.

The average catch per station per month of anophelines, considered as possible malaria carriers, had a significant negative correlation with the mean temperature in the Hiriyur area, and a positive correlation with the average 8 a.m. humidity in the Nagenhalli and Hiriyur areas. Other correlations of the same kinds in the three areas were not significant.

There was no significant direct correlation between the catch of dangerous anophelines and the parasite rates in any area. When an attempt was made to allow for the incubation period of malaria, both in the mosquito and in man, by introducing a month's lag of the parasite rates in the correlations, the coefficients were all found to be significant. That is, the parasite rate of February was paired with the average catch of January, and so on through the monthly figures available. This significant correlation was positive in sign in the Mudigere area and negative in sign in the Nagenhalli and Hiriyur areas.

As was stated previously, the anophelines of the dangerous species were considered to be *A. culicifacies*, the *listonii* group (*listonii*, *minimus* and *varuna*), and *A. stephensi*. In the Nagenhalli figures there was a definite negative correlation between the parasite rates, with a lag of one month, and the average catch per station per month of *culicifacies* plus *listonii* group, but not between either set of catches alone, and the parasite rates. The average catch of *stephensi* did not correlate with the parasite rates and gave a positive coefficient. For the Mudigere area both the average catches of *culicifacies* and of the *listonii* group were significantly correlated with the parasite rates: *stephensi* was not caught in this area. The only significant correlation with the parasite

rates of the Hiriyur area was that with *culicifacies*, the coefficient being negative in sign.

If these correlations express a true relationship, the higher parasite rates in the Nagenhalli and Hiriyur areas may be expected in the months with the lower humidities and higher mean temperatures and with the lower catches of dangerous anophelines. In the Nagenhalli area the relationship will be with catches of both *culicifacies* and mosquitoes of the *listonii* group, while in Hiriyur it will be with *culicifacies* only. In the Mudigere area the higher parasite rates will be in the months with the higher rainfalls, and with the higher catches of *culicifacies* and the *listonii* group.*

The average mean temperature for the Nagenhalli area, of the months of group I (February, March, April and May), was 80 and the humidity was 70 per cent while but 24 per cent of the total catch of *culicifacies* and *listonii* group were caught in these months. During the months of group III (October, November, December and January), the average mean temperature was 76°, the humidity 79 per cent (the highest of the three groups of months), and the per cent of the total catch was 27. It was, however, during the months of group III that females of the dangerous species were more likely to be caught in dwellings than females of other species, and in these months that over sixty per cent of the catches in dwellings were of the dangerous species. To date, all but one of the infected mosquitoes reported from this area were found in the months of group I. The summary of the data given in Part I stated that the evidence pointed to a malaria season in the months of group III. Most of the evidence from the data on the anophelines would seem to favour the months of group I. It was still not possible, however, to rule out the months of group III as not requiring control work.

In the Hiriyur area, the evidence from the correlations pointed to the months of group I as a malaria season, since these were the months of higher mean temperature, lower humidity and smaller catch of *culicifacies*. As against this there was no evidence that the dangerous anophelines favoured dwellings during these months, and the highest percentage of house catches were dangerous anophelines in the months of groups II and III. Also, reports of infected anophelines from this area were in the months of September and December. Considering the findings of Part I, the conclusion as to a malaria season for this area must be the same as for the Nagenhalli area.

As regards Mudigere, the months of group I yielded about 65 per cent of the total catch of dangerous anophelines and the months of group II had much the higher average rainfall. Females of the dangerous species were more likely to shelter in dwellings during the months of groups I and II than were other females, and the highest percentages of catches in dwellings were of the dangerous species during the months of group I. Infected mosquitoes were

* See Table XVII, Part I, for certain of the correlations upon which these statements are based.

reported in May. There seemed to be no question, in agreement with Part I, but that the malaria season in this area was within the first seven months of the year.

SUMMARY.

Part II of this report of a study of malaria in Mysore State, South India, deals with the anophelines. During the course of the study 22 species of anophelines were identified, of which 13 had been previously recorded. Based on catches of both larvæ and adults a table was given reporting the seasonal occurrence of these species.

A previous report had given the results of dissections of 31,277 mosquitoes, of which eleven were found to be infected. Since that report further dissections had been made but the report of the results of these additional dissections was deferred. To date infections had been reported in *A. culicifacies,* members of the *listonii* group (*A. listonii, A. minimus* or *A. varuna*), and *A. stephensi.* These were considered the dangerous anophelines in Mysore. Infected mosquitoes were reported in the months of March, April, May, June, August, September, October, November and December from various parts of the State under either endemic or epidemic conditions.

A table is given showing the percentage of dangerous anophelines caught during three groups of months in each station. The figures show a variation of the occurrence of these species between the Mudigere area and the other two areas. The catches were highest in February, March, April and May (group I) in the Mudigere area; in June, July, August and September (group II) in the Nagenhalli area; and in October, November, December and January (group III) in the Hiriyur area. In the Nagenhalli area females of the dangerous species of anophelines were more likely to be caught in pure dwelling houses than were females of other species, only in the months of group III. During these months over 60 per cent of the dwelling-house catches were of the dangerous species. The same data for the Mudigere area implicated the months of groups I and II. In the Hiriyur area there was no difference in the apparent fondness for houses between the dangerous and other species of anophelines, but well over 60 per cent of the house catches were of the dangerous species in the months of groups II and III.

Coefficients of correlation obtained from the data given in Parts I and II of this report indicated that the higher parasite rates of the Nagenhalli and Hiriyur area were likely to be in, or just after, the months with the lower humidities, higher mean temperatures and lower catches of dangerous anophelines. In the Mudigere area the higher parasite rates were associated with the higher rainfalls and the higher catches of anophelines of the dangerous species. The parasite rates were not associated with catches of anophelines of other than the dangerous species in any station.

REFERENCE.

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