

Tasting of P. T. C. among the Anglo-Indians of India

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Introduction

Many European stocks are represented among the Anglo-Indians of India, including English, French, German, Dutch and Portuguese, while on the Indian side too, several Asian stocks are represented. The number of Ceylonese, Burmese, Burghers (Ceylonese and Dutch) or Armenians is not negligible. The term Anglo-Indian, thus, it will be seen, is something of a misnomer, and it is more so for ethnographic considerations. That the distribution of ethnic qualities does not necessarily conform to the political boundaries, is well experienced in the world ethnology. It might be safer, therefore, to assume that "Indian" or "Anglo" may not restrict only to the countries meant by the terms.

The latest Census report (1951) which gave a separate figure for the Anglo-Indians, counted them as 111,637 within the territory of India. Of the total figure, the highest concentration is observed in the states of W. Bengal, Maharastra, Uttar Pradesh and Mysore.

Mixed populations had always been subjected to special study, mainly focused on the question of Mendelian ratios of various genetically known and unknown characters. Studies on the Anglo-Indians of India, likewise, had also been attempted earlier (Mahalanobis, P. C. 1922 (a); 1931(b); 1940(c); Greval, et. al. 1940; Sarkar, S. S. et. al. 1953). So far they were mainly reported from Calcutta, which as such failed to account for a fairly large part of the mixture that had taken place in other coasts of India. The earlier studies revealed a distinct blending of the parental racial traits, as observed among the Anglo-Indians, though in varying degrees.

No work so far appeared on the Anglo-Indians from other parts of India, neither has there been any study on the frequency of Tasting of P. T. C. on them. It is with this view in end that an attempt has been made to investigate the frequency of this genetic trait on the Anglo-Indians drawn from various parts of India.

Material

One hundred and sixty adult Anglo-Indians (90 males and 70 females) have been tested for the Taste blindness of P.T.C. The sample has been drawn from Lucknow, Kanpur, Delhi, Bombay and Poona. It represents Anglo-Indians with varying degrees of European ancestry, as it could be traced from the antecedents recalled by

the subjects. There is no subject representing a first cross (F_1) in the present data. The total sample is divided into the following groups, according to the degree of European mixture traced by them up to both paternal and maternal grand-parents (cf. appendix).

Group 1: Equal European and Indian parentage- EE.II

Group 2: Less European and more Indian parentage- E.II

Group 3: More European and less Indian parentage- EE.I

(The abbreviations are made on the line of Herskovits classification for the American Negroes; cf. The Anthropometry of the American Negro. Melville J. Herskovits. Columbia Univ. Press. 1930).

Method

0.13 per cent solution of P.T.C. crystals were prepared in distilled water. Persons tasting a drop of this solution at the tip of the tongue have been recorded as Tasters, while others as Non-tasters. Threshold of tasting could not be determined due to the time involved in the operation and other unavoidable difficulties of the field. The analysis of the Age-threshold variation of Tasting P.T.C., as such, has not been attempted.

Tab. 1. Frequency of the P.T.C. « Tasters » and « Non-tasters » among the Anglo-Indians of India

Group abbr.	Sex	Total no.	Taster		Non-taster	
			No.	Per cent	No.	Per cent
1 EE. II	♂	43	28	65.2	15	34.8
	♀	34	27	79.5	7	20.5
Total		77	55	71.5	22	28.5
2 E. II	♂	22	15	68.2	7	31.8
	♀	17	14	82.4	3	17.6
Total		39	29	74.4	10	25.6
3 EE. I	♂	25	16	64.0	9	36.0
	♀	19	15	79.0	4	21.0
Total		44	31	70.5	13	29.5
Total Anglo Indians		160	115	71.87	45	28.12

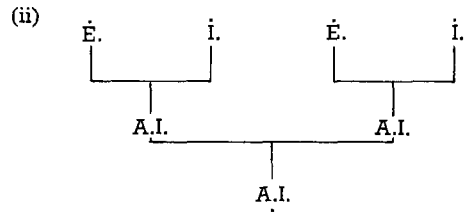
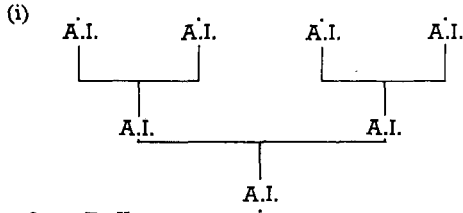
The frequencies of the dominant and recessive genes are:

$$T = 0.470; t = 0.530$$

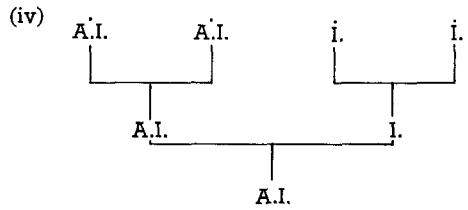
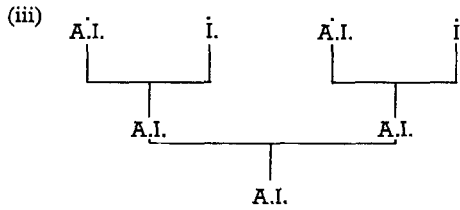
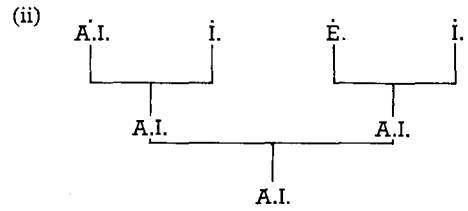
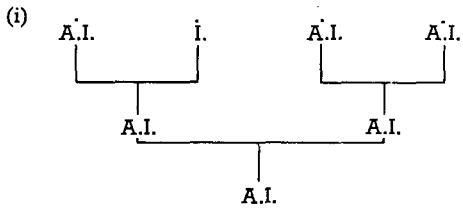
$$\chi^2 = 2.4160. \text{ Probability for 1 d. f. } > 0.20.$$

APPENDIX

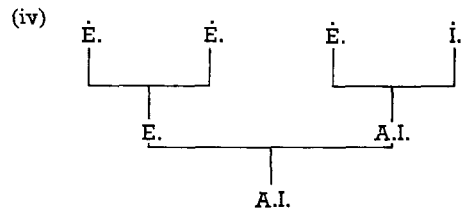
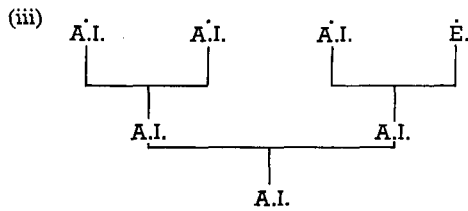
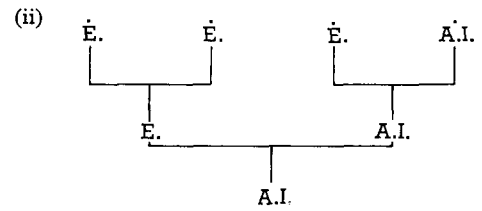
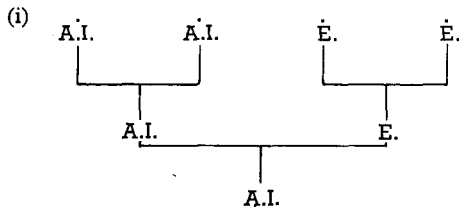
Group 1 or EE. II.



Group 2 or E. II.



Group 3 or EE. I.



Legend

A.I. = Anglo-Indian

E. = European

I. = Indian

The frequency of the non-tasters of 0.13 per cent of P.T.C. solution is given in Table 1 for the three groups of Anglo-Indians. It will be observed that "Equal European and Indian parentage" group, i.e. group 1, has 28.5 per cent non-tasters in all. Males of the same group have 34.8 per cent non-tasters, which is quite higher than the female non-taster frequency of 20.5 per cent.

"Less European and More Indian parentage" group, i.e. Group 2, shows a lesser percent of non-tasters than Group 1. The frequency of non-tasters in this group is 25.6 per cent in all, while the male and female frequencies are 31.8 per cent and 17.6 per cent, respectively. The male frequency exceeds that of females in this group like in the earlier one.

"More European and less Indian parentage" group, i.e. group 3, shows 29.5 percent of non-tasters in all. This is the highest frequency of non-tasters observed in the three groups. As earlier the males have a higher percentage of non-tasters than the females, the frequencies of non-tasters among males and females of this group being 36.0 percent and 21.0 percent respectively.

Tab. 2. Frequency of P.T.C. «Tasters» and «Non-tasters» and of the 'T' and 't' genes in various populations

Population	T. no.	Phenotypic percentage		Genotyp. per.		Investigator
		Taster	Non-taster	T	t	
Caucasoid (U.S.)	3643	70	30	0.47	0.53	Snyder ¹
Caucasoid (U.S.)	439	69	31	0.44	0.56	Parr ¹
Northern Jews (Palestine)	245	68	32	0.44	0.56	Yunovitch ¹
Southern Jews (Palestine)	175	72	28	0.47	0.53	Yunovitch ¹
Scottish	60	72	28	0.47	0.53	Riddell & Wyber
Irish	398	72	28	0.47	0.53	Boyd & Boyd
English	441	69	31	0.44	0.56	Harris & Kalmus
Welsh	237	59	41	0.36	0.64	Boyd & Boyd
Danes	314	68	32	0.44	0.56	Mohr.
Anglo-Indians of India	160	72	28	0.47	0.53	Present Study
Marathas	195	56	44	0.34	0.66	Sanghvi et al.
Tamils	50	73	27	0.48	0.52	Lugg et al.
Gujratis	1196	55	45	0.33	0.67	Vyas et al.
U. P.	344	65	35	0.41	0.59	Srivastava,
Rahri Brahmins of W. Bengal	489	68	32	0.44	0.56	Das
Bagdi (Bengal)	114	70	30	0.47	0.53	Ghosh
Padamraj (Bengal)	136	71	29	0.48	0.52	Ghosh
Panyans	204	89	11	0.67	0.33	Das et al.
Kumaunis	201	88	12	0.65	0.35	Seth
Punjabis	322	68	32	0.44	0.56	Sharma

¹ Reported by Strandskov, H. H. (1941). "The distribution of human genes" Scientific monthly 55, 203-207, 1941.

The comparatively very low frequency of non-tasters among the females is conspicuous in all three groups. Less homogeneity of the females might be one of the causes.

An average of the percentages observed among the three groups has been obtained in order to get a ready figure for comparison. The average frequency of non-tasters among the Anglo-Indians of India is thus found to be 28.12 percent. Chi-square has been computed on the average frequency to see if three groups taken together might be in consistency with a Mendelian population. The probability, as it will be seen from the above table, is not statistically significant.

In table 2, the relevant European and non-tribal Indian populations have been listed with their corresponding values of 'Taster' and 'Non-taster' percentage of P.T.C., as well as the value of the genes T and t. It will be observed from the table that there is much variation observed both on the European and Indian populations. A scaler diagram (fig. 1) has been drawn below to evaluate exactly how are the Anglo-Indians placed with reference to the European and Indian range of Non-taster gene

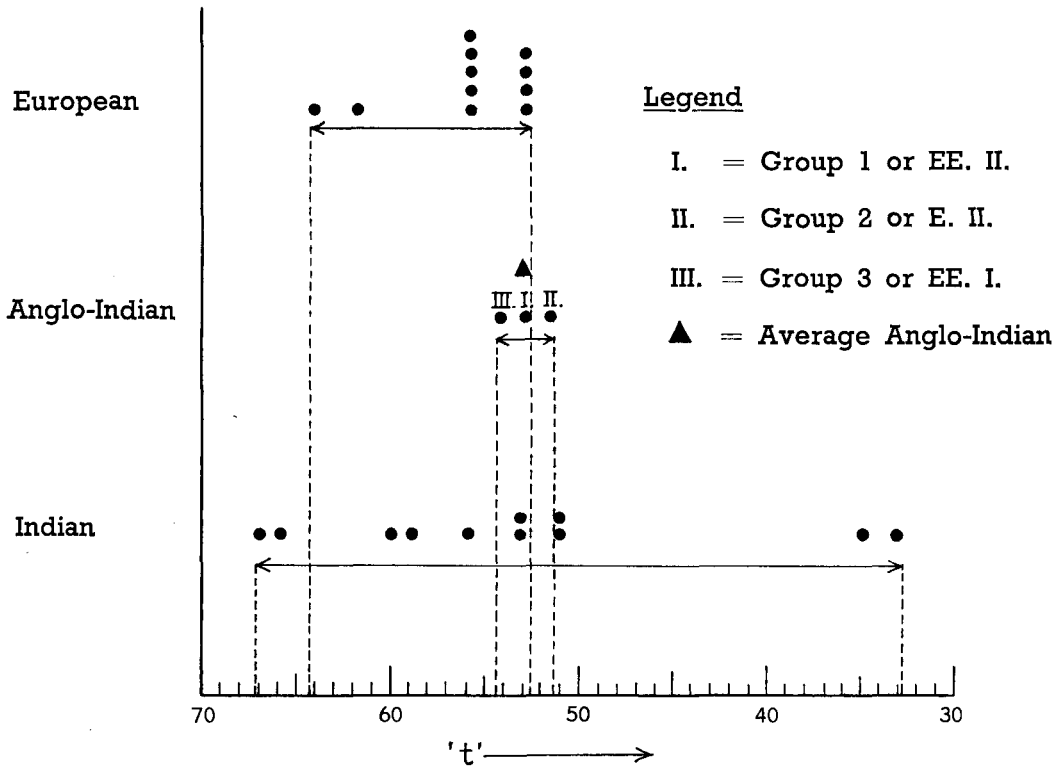


Fig. 1. Anglo-Indians plotted against Europeans and Indians

frequency. It will be seen that the Anglo-Indians, though intermediate in the value of t , as compared to the European or Indian values, correspond to the lowest value on the European range, while they are far from the same on the Indian one. Thus, the Anglo-Indians might be said to be more inclined towards the Indian population than the European. The same conclusion had earlier been drawn from other genetic studies of the group carried out by the author (Bhattacharya, 1963, a, b, c).

Fig. 1 will further show that group 2, is more shifted towards the Indian range in the frequency of 't' than group 3. In other words this implies that 'More European and less Indian...' group shows more shifting towards the European range of 't' frequency, while 'Less European and more Indian...' group shows the same towards the Indian range of it. The average Anglo-Indian frequency, on the other hand, falls concurrent with the 'Equal European and Indian...' group. Thus, what is expected from the Mendelian law of inheritance is established once again. The flatness of distribution of Indian data in Fig. 1, as it will be seen, can be explained as partially due to the extreme heterogeneity of the Indians, which is retained and established, due to a strict age-long practise of caste endogamy, on one hand; and, on the other hand, the skewness is more due to the inclusion of few semitribal populations from India.

To explain the cause of this gradual shift of the Anglo-Indians towards the base population and evaluating a rate for it, poses a problem, which calls for statistical consideration. The history of mixture² of the Anglo-Indians, as well as their present systems of mating pattern, is such that a successful evaluation is difficult. The probable cause that occurs to the present author is that the Anglo-Indians once formed by the hybridization of Europeans and Indians, later on continued practising inbreeding on the one hand, and on the other hand taking in Indians for their bride. The latter practise has nullified the European characteristics segregating out with repeated inbreeding and diluted them further.

Summary and Conclusion

The Anglo-Indians of India have been tested for the Tasting of P.T.C. The frequency of non-tasters in general shows that the population is intermediate between the European and Indian frequencies. They show a rise in the non-taster gene frequency with the rise in the dosage of European ancestry in their parentage.

The Mendelian law has further been established among the hybrid group as far as the frequency of non-taster gene frequency is concerned. In general the Anglo-Indians have 28.12 percent non-tasters of P.T.C., which shows a comparatively higher shifting towards the Indian range of values than towards the European one. It is explained to be due to the later practise of the Anglo-Indians to take in Indian brides, thus diluting the hybrids in favour of the base population.

² Stark, H. A. 1926, has dealt at length with the history of the formation of Anglo-Indians in India, in his historic book "Hostage to India" printed at Star Printing Works, 30 Shibnarain Das Lane, Calcutta.

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RIASSUNTO

Gli Anglo-Indiani dell'India sono stati sottoposti ad esami del gusto per la PTC. La frequenza dei non-gustatori in generale si presenta intermedia tra le frequenze degli Europei e quelle degli Indiani. Si riscontra un aumento della frequenza del gene non-gustatore proporzionale all'aumento dell'incidenza di antenati Europei nel parentado. Si è trovato, quindi, che la frequenza dei geni non-gustatori nel gruppo degli ibridi segue le leggi di Mendel. In genere, gli Anglo-Indiani presentano il 28,12% di non gustatori per la PTC, il che mostra una tendenza relativamente maggiore verso la scala di valori degli Indiani che non degli Europei. Ciò può essere dovuto al recente uso degli Anglo-Indiani di prendere mogli indiane, diminuendo, così, il numero degli ibridi in favore della popolazione base.

RÉSUMÉ

Les Anglo-Indiens de l'Inde ont été examinés pour le goût de la PTC. La fréquence des non-goûteurs, en général, se trouve entre les fréquences des Européens et celles des Indiens. Une augmentation de la fréquence du gène non-goûteur a été remarquée proportionnellement à une fréquence plus élevée d'ascendants Européens. La fréquence des gènes non-goûteurs, au sein du groupe des hybrides, est en accord avec les lois de Mendel. En général, les Anglo-Indiens présentent le 28,12% de non-goûteurs de PTC, ce qui montre une tendance relativement plus remarquable vers les valeurs des Indiens que vers celles des Européens. Ceci est peut-être dû au fait que, depuis quelques temps, les Anglo-Indiens ont l'habitude de marier des indiennes, ce qui fait diminuer le nombre d'hybrides en faveur de la population de base.

ZUSAMMENFASSUNG

Die Anglo-Indier Indiens wurden einem Geschmackstest für PTC unterworfen. Die Häufigkeit der Nicht-Schmecker im allgemeinen liegt zwischen der Frequenz der Europäer und der der Indier. Die Frequenz des Nicht-Schmeckergens verläuft proportionell zum Anstieg der europäischen Vorfahren in der Verwandtschaft. Man konnte also finden, dass die Frequenz der Nicht-Schmeckergene in der Mischlingsgruppe den

Mendel'schen Gesetzen folgt. Im allgemeinen beträgt der Teil der PTC nicht schmeckenden Anglo-Indier 28,12%, d.h. sie liegt den Werten der Indier näher als denen der Europäer. Das kann auf die neueste Tendenz der Anglo-Indier, indische Frauen zu heiraten, zurückzuführen sein, wodurch die Zahl der Mischlinge zugunsten der Grundbevölkerung herabgesetzt wird.