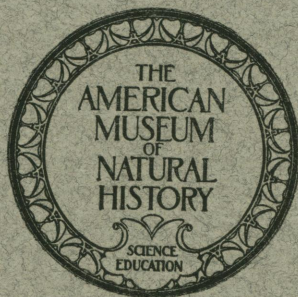


ANTHROPOLOGICAL PAPERS
OF
THE AMERICAN MUSEUM OF NATURAL HISTORY

VOLUME XXXIII, PART III

THE PHYSICAL CHARACTERISTICS OF THE ONTONG
JAVANESE: A CONTRIBUTION TO THE STUDY
OF THE NON-MELANESIAN ELEMENTS
IN MELANESIA

By H. L. SHAPIRO



By ORDER OF THE TRUSTEES
OF
THE AMERICAN MUSEUM OF NATURAL HISTORY
NEW YORK CITY
1933

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INTRODUCTION

Deriving its name from a physical attribute of its population, Melanesia is generally supposed to harbor only black-skinned, frizzly-haired natives. But concentrated along its eastern margin are a number of islands which contain a population visibly distinct from the types ordinarily conjured up by the name Melanesian. Lighter in skin color, with hair that is straight or wavy, and with narrower noses, these people obviously are what they appear to be, an intrusive element. One group of these islands, comprising Nukumanu (Tasman), Nuguria, Tauku (Tauu, Mortlock) and Ontong Java (Liueniua), is found fringing the northeastern Solomons. To the northeast of the New Hebrides lies Tikopia, another of the islands containing a non-Melanesian population. Rennell Island, southwest of the Solomons, and Sikiana to the east, likewise falls within this category. This catalogue of islands within Melanesia bearing a foreign population is not intended to be an exhaustive one; it is ample, however, to illustrate that this element occupies a definite, although perhaps a minor place in Melanesia.

For the most part scholars concerned with study of the culture of these islands have regarded them as Polynesian outliers. Firth¹ who has recently completed an investigation of Tikopia links it with Polynesia. Both Hogbin² and Firth³ have described the culture of Rennell as Polynesian. In fact, Firth has signalized this island as the last stronghold of Polynesian culture. But this association with Polynesia has not been limited to the islands mentioned above. In the New Hebrides as well, Humphreys⁴ and Parkinson,⁵ have traced elements of Polynesian influence in the coastal populations and have noted modifications in the physical type which they attribute to the same source. The theoretical significance of this connection with Polynesia is considerable. To the student of Melanesia these islands, far from the present center of Polynesian occupation, may appear atypical and of slight consequence to the definition and to the comprehension of true Melanesian culture. But for the specialist in Polynesian culture and race they have more than passing interest. I shall not try to trace out all the ramifications into which this association with Polynesia might lead us, but I shall adumbrate some of the consequences which might logically result from the definite establishment of a bond between Polynesia and this

¹Firth, 1930.

²Hogbin, 1931c.

³Firth, 1931.

⁴Humphreys, 1926.

⁵Parkinson, 1907.

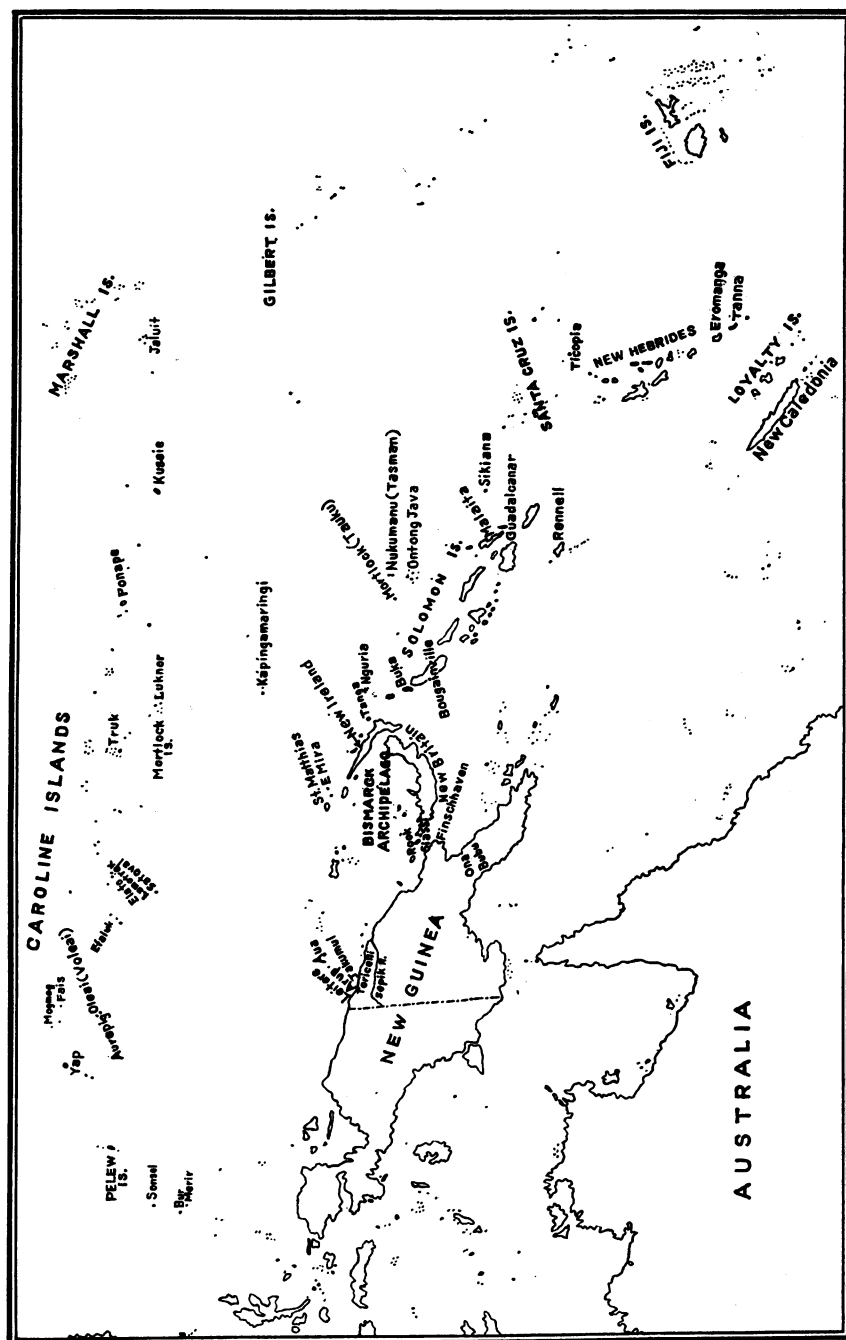


Fig. 1. Map showing Groups mentioned in the Text.

intrusive element in Melanesia. I do this in order to emphasize the importance of the problem and by implication to draw attention to the need for a basic and thoroughgoing revaluation of the foundations upon which this association with Polynesia rests.

If we accept these intrusive populations as Polynesian, then the eccentricity of their distribution, separated from the Polynesian area by Fiji, raises the question of how they became detached from the main body of their relatives. To some, this dotting of Polynesian groups along the fringes of Melanesian archipelagoes is like footprints which mark the route by which the migratory Polynesians reached their present home. And, indeed, if we recall the cartography of the Pacific, the easiest and most enticing way from the Asiatic land mass seems to be via the large and accessible Indonesian islands, then along the close-set Melanesian islands, and finally, into central Polynesia. It is entirely credible that the Polynesian wayfarers and navigators, forever restless and seeking new islands, might pass through Melanesia quickly, leaving only here and there a trace of their passage in the form of isolated colonies, like bits of wreckage which mark the course of a flood. The peculiarity of the distribution of these Polynesian outliers within Melanesia is their fringing and coastal position. This may be taken to bolster up the contention that the Polynesians passing through a settled island world merely alighted on the edges, reluctant to contend for the larger prizes, or perhaps indifferently rested on unoccupied islands before taking flight once again. But still another interpretation may be read from the same distribution. A secondary invasion into Melanesia from centers such as Samoa and Tonga might find only isolated and fringing islands still unoccupied. There is, in fact, some evidence that certain islands were populated by just such secondary migrations. But whether or not the presence of Polynesian colonies in Melanesia is indicative of the migration route of the Polynesians or merely represents offshoots from a population already established in Polynesia, these colonies, should they be Polynesian in origin, retaining the ancestral culture, can throw a strong beam of light on the functioning of Polynesian culture which has largely vanished in Polynesia itself. But of more immediate concern to this paper, they may reveal data on the physical type which has become seriously diluted in Polynesia.

With the possibilities of such repercussions on our knowledge of Polynesia, it is, of course, essential that these foreign fragments be intensively studied to determine the nature of their culture and physical type. Obviously a hasty identification or a too glib generalization for all

these foreign groups might lead to erroneous deduction. On the racial side, at least, it has been all too readily accepted that all these non-Melanesian groups are Polynesian. And yet the evidence is of the most tenuous nature. One reads in the literature that because the skin of such natives is lighter than that of their Melanesian neighbors or that their hair is straighter and their noses less platyrrhine, they consequently show clear signs of Polynesian influences. Such judgments may be true, but presented in that form they are not completely convincing.

This paper is particularly concerned with Ontong Java which is one of the islands usually designated as Polynesian outliers. On the ethnological side there is some justification for this opinion. Furthermore, a linguistic resemblance with Polynesian dialects is also apparent. But from the able investigation of Hogbin¹ it is evident that there are in addition a number of non-Polynesian traits in the culture complex, the significance of which may be of vastly greater import than the indication of Polynesian affinities. At any rate, to regard as Polynesian an island which may have derived a large part of its culture from other sources and its Polynesian similarities second-hand is a serious speculative hazard. On the other hand, it is equally possible that the culture with which it was originally endowed may have remained intact while the physical type may have been modified by other contacts. It is the purpose of this paper merely to attempt to define the racial status of the Ontong Javanese, as we know them.

I wish to thank Doctor H. Ian Hogbin to whom I am deeply indebted for the opportunity to study and report on a valuable sample from Ontong Java which he has turned over to me for analysis. The exigencies of field-work frequently make it difficult for the ethnologist to gather data bearing on physical anthropology. All the more, then, is Doctor Hogbin to be congratulated on having not only completed an exhaustive social study of the Ontong Javanese, but also on assiduously making a physical record of these highly interesting people.

BRIEF DESCRIPTION OF ONTONG JAVA²

Ontong Java consists essentially of a series of small islets surrounding a lagoon roughly forty by twenty miles. Lying northeast of the Solomons it is about one hundred and fifty miles distant from Ysabel, the nearest of the Solomon Islands. The commonest of the usual alternative names of Ontong Java are Lord Howe Island and Luaniua, or varia-

¹Hogbin, 1930b, 1931a, 1931b.

²This description of Ontong Java is taken from Hogbin, 1931b, 399-425.

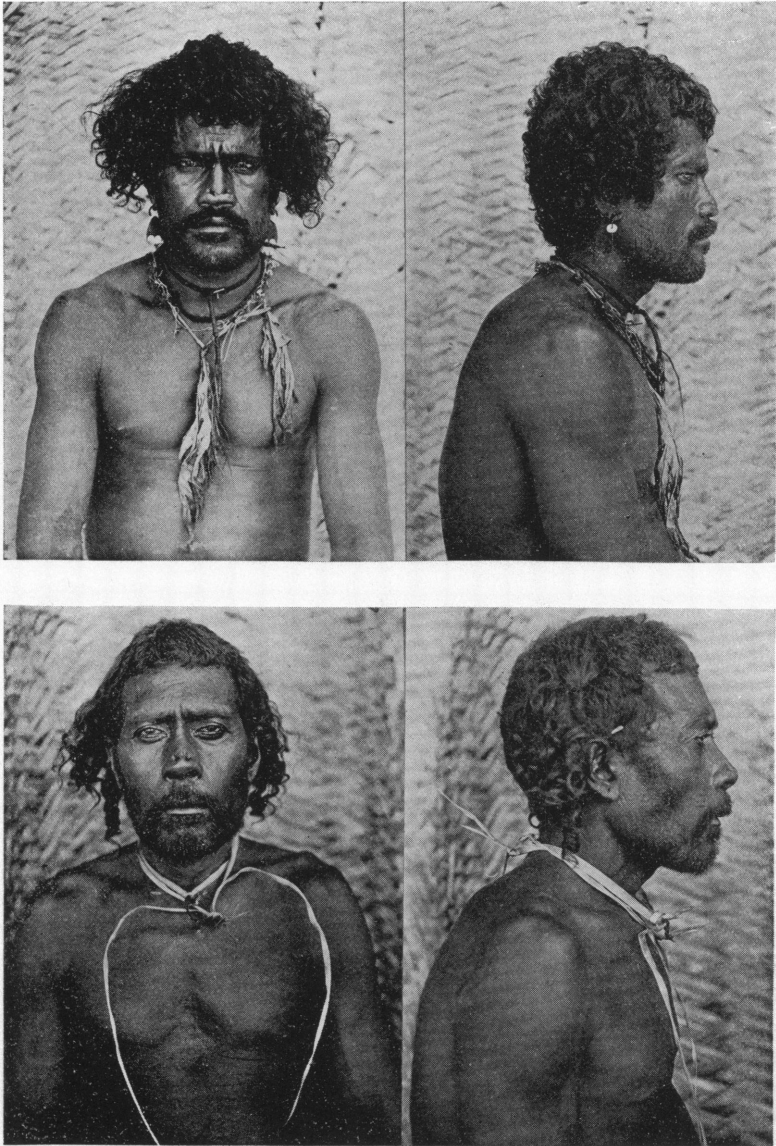


Fig. 2. Ontong Javanese Types.

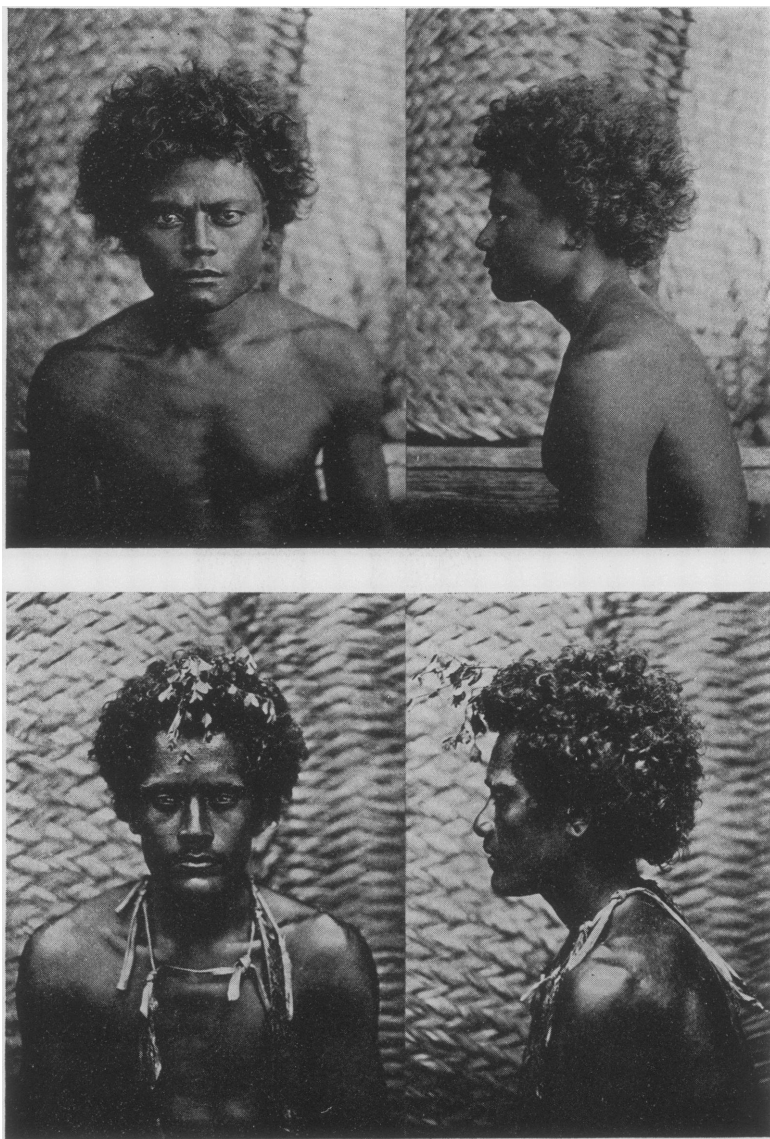


Fig. 3. Ontong Javanese Types.

tions of the latter. The islets of which Ontong Java is comprised are of coral origin and, as is usual with such islands, only slightly above the level of the sea. The fauna and flora are limited, and the climate is tropical but tempered by trade winds during the months from April to November. Ontong Java, which he named Candelaria because he saw it on Candlemas Eve, was discovered by Mendana in 1568. Le Maire and Schouten next identified the island in 1616. In 1643 Tasman named the island Onthong Jaua because of its supposed likeness to Java. It was again renamed Lord Howe by Captain Hunter in 1791. Although a number of ships sighted the island in the course of over three centuries from the time of its discovery by Mendana, no ship dropped anchor in the lagoon itself until 1875 with the arrival of the "James Birnie." The purpose of the visit was to locate a *bêche-de-mer* station, but a struggle with the natives ensued, and the crew of the "James Birnie" was destroyed. In 1893 Germany acquired the island. Contact with Europeans had, however, been established by the foundation several years earlier of two trading stations. In 1900 Ontong Java again changed hands and passed into the control of Great Britain. Since 1900 several abortive attempts were made to establish a mission. With the exceptions of the trading stations, which date from the end of the nineteenth century, and of the very occasional visits of the governmental representative, the intercourse with whites has been very slight. Because of these circumstances it is possible to gather a series of natives whose racial history has not been complicated by European admixture. Relations with other islands, however, have existed from time immemorial. The traditions of Nukumanu, a neighboring island, speak of natives of Ontong Java settling on the former island. Schlaginhaufen¹ assigns the legendary home of the ancestors of the Ontong Javanese to Kapin-gamarangi. At the time of Hogbin's survey he found living on Ontong Java one male from Tauku (Mortlock) and five males from Nukumanu (Tasman) who were married to Ontong Javanese women. In addition there were two Solomon Island males and a Sikiana man and woman. It is apparent from this and from tradition that contact while slight has been real between the natives of Ontong Java and other islands in the vicinity. It is doubtful that these intermittent and slight contacts have had a serious effect on the physical type of the islanders.

¹Schlaginhaufen, 1929.

POPULATION OF ONTONG JAVA

According to Hogbin¹ the depopulation of Ontong Java has been rather rapid in the last generation. He estimates that in 1907 there were about 5,000 natives living on Ontong Java. Twenty years later at the time of his visit the population was reduced to 693 of whom 352 were males and 341 were females. The following reproduces Hogbin's census arranged according to sex and age:—

Age	Male	Female
Under 12	117	119
12 to 21	88	74
21 and over	147	148
	<hr/>	<hr/>
Total	352	341

SAMPLE AND TECHNIQUE

The material which furnishes the data for this study was collected by Doctor H. Ian Hogbin during his sojourn on the island of Ontong Java from November 1927 to February 1928 and again from May 1928 until November 1928. The sample is drawn from Pelau and Luanua, the two principal villages, and is therefore representative of the whole population. It consists of 157 individuals, 104 males and 53 females. Only two males were rejected from the final series because they fell below the age of twenty years which had been set as one age limit for the male group. The females are all eighteen years or over.

Since the total number of males and females on Ontong Java over twenty-one years is 295, the present sample of 157 includes roughly half of the adult population.

The following measurements were taken:—

1. Stature
2. Acromion Height
3. Trochanter Height
4. Arm Length
5. Biacromion
6. Head Length
7. Head Width
8. Minimum Frontal Diameter
9. Bizygomatic Diameter
10. Bigonial Width
11. Face Height
12. Nose Height
13. Nose Width

¹Hogbin, 1930a.

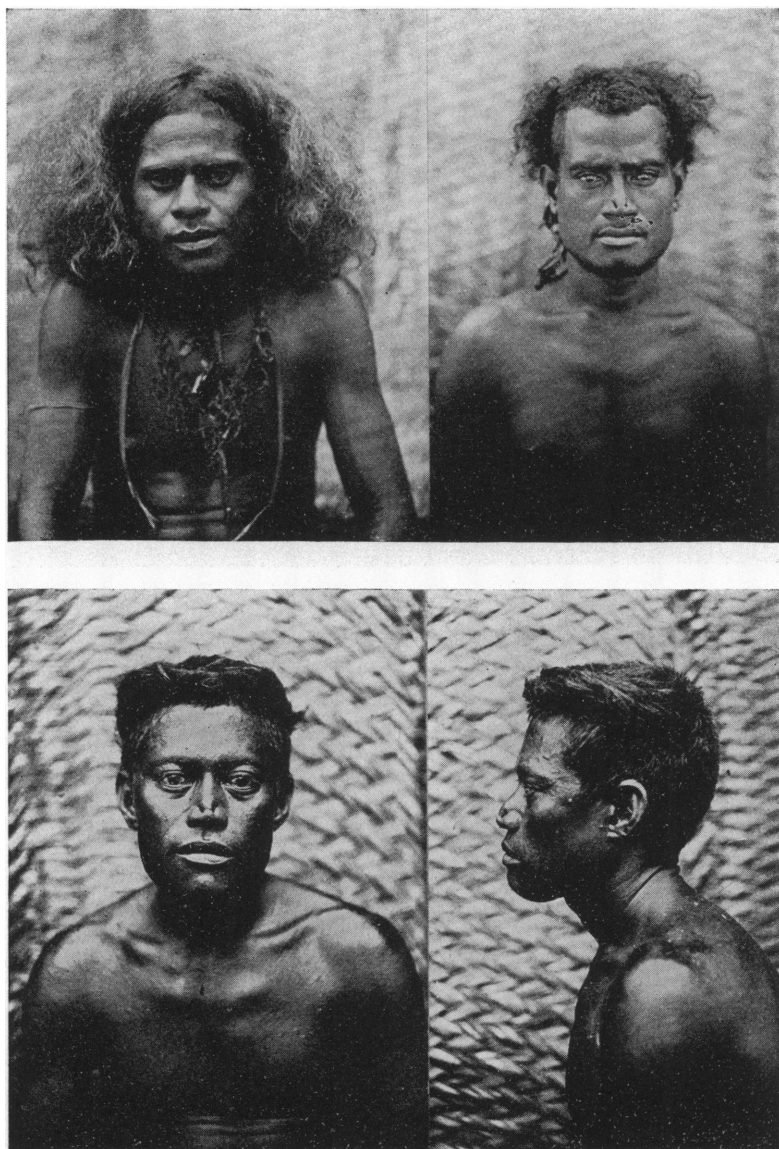


Fig. 4. Ontong Javanese Types.

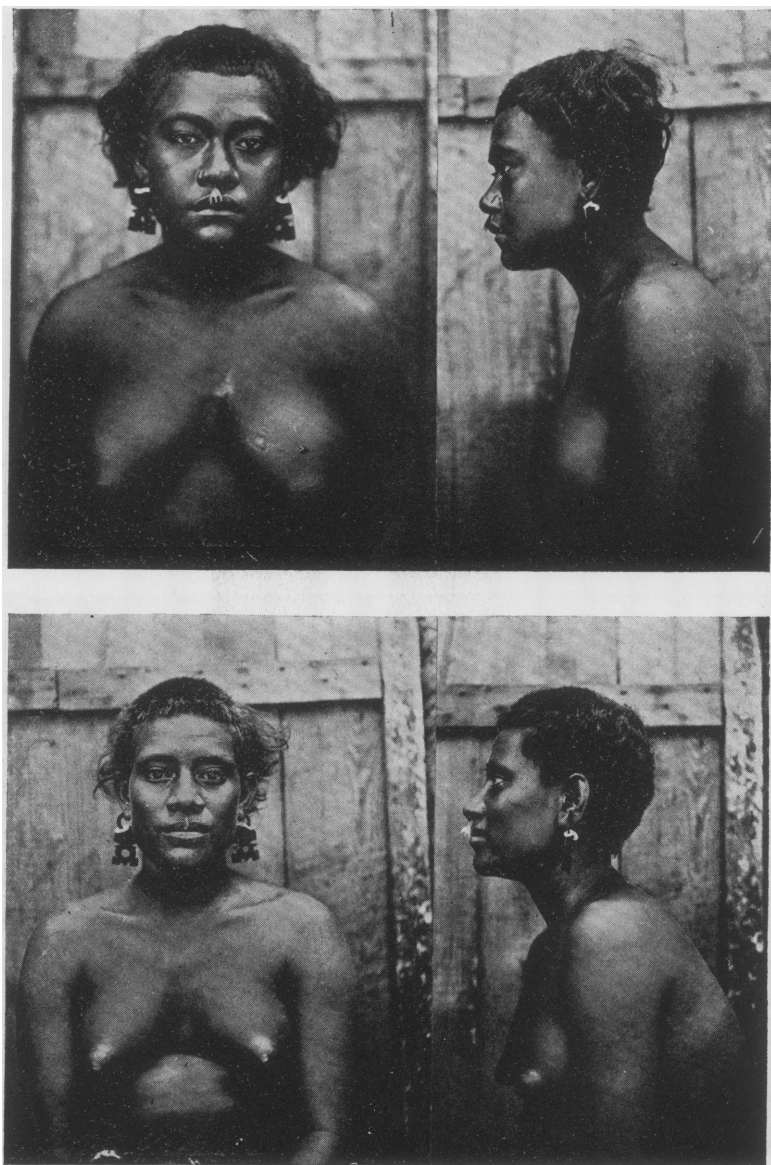


Fig. 5. Ontong Javanese Types.

Observations were made on skin color, hair form, hair color, quantity of facial and body hair, eye color, epicanthus, lip thickness, prognathism, height of nasal bridge, and axis of nostrils. Fifty hair samples were also collected.

Doctor Hogbin's description of his technique tallies with the standard method recommended by Martin. I am inclined to think, however, that the measurement of the minimum frontal diameter offered some difficulty and that the mean for this measurement should not be taken as final. The remainder of the measurements appear satisfactory and will be used with confidence.

DESCRIPTION OF THE ONTONG JAVANESE

In the accompanying tables of anthropometric means and percentages the physical type of the natives of Ontong Java is defined. It is unnecessary to linger over these data; their peculiarities and relationships to other groups will be made clear in the succeeding comparative sections. Briefly, we may characterize the Ontong Javanese as a people of moderate stature. Their heads are long and narrow giving a dolichocephalic index, and their faces moderately long and wide with a facial index which falls at the upper limit of mesoprosopy. The nasal index likewise reaches the upper limits of mesorrhiny.

Most of the unexposed male skin colors fall between numbers 13 and 16 of von Luschan's scale, while the females are largely found between numbers 13 and 15. The exposed skin color also is somewhat darker in the males, although the difference between the sexes is slightly greater for unexposed skin color. True frizzly hair appears to be absent. The males show a much greater tendency to deeply waved and curly hair than do the females whose hair is almost exclusively straight or slightly waved. Body and facial hair is only moderately developed among Ontong Javanese males. The hair color and eye color, which are not tabled here, were found to be black and dark brown, respectively. The epicanthic fold is almost entirely absent, being found to a slight degree in only a few individuals. Prognathism is not characteristic of Ontong Javanese. The nose bridge is moderately high in both sexes, but a much larger percentage of the males has high nasal bridges. The nostrils are directed in an oblique or transverse direction. Associated with the relatively lower bridged nose in females is a higher percentage of transversely directed nostrils.

VARIABILITY

I have tabled the standard deviations of a number of Melanesian and Polynesian samples for comparative purposes. In order to simplify the comparison I have averaged the constants for each group disregarding the units of measurement, and compared the resulting mean sigmas. Only corresponding standard deviations were used in order to insure strict comparability.

Among the Polynesian groups the average variabilities of the Hawaiians, Tongans, and Marquesans are the same as that for the Ontong Javanese. The Society Islanders and the Samoans are less variable. Compared with Melanesian groups the average sigma for the Ontong Javanese is decidedly smaller than the corresponding figure for

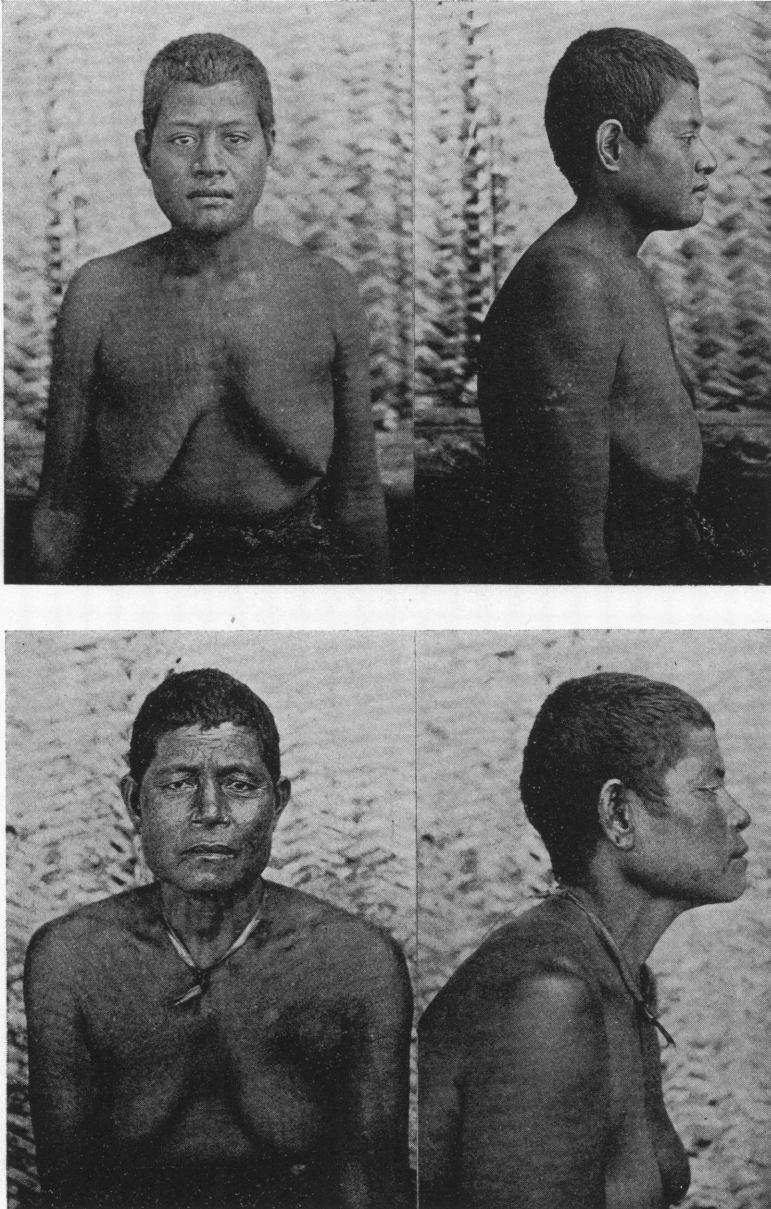


Fig. 6. Ontong Javanese Types.

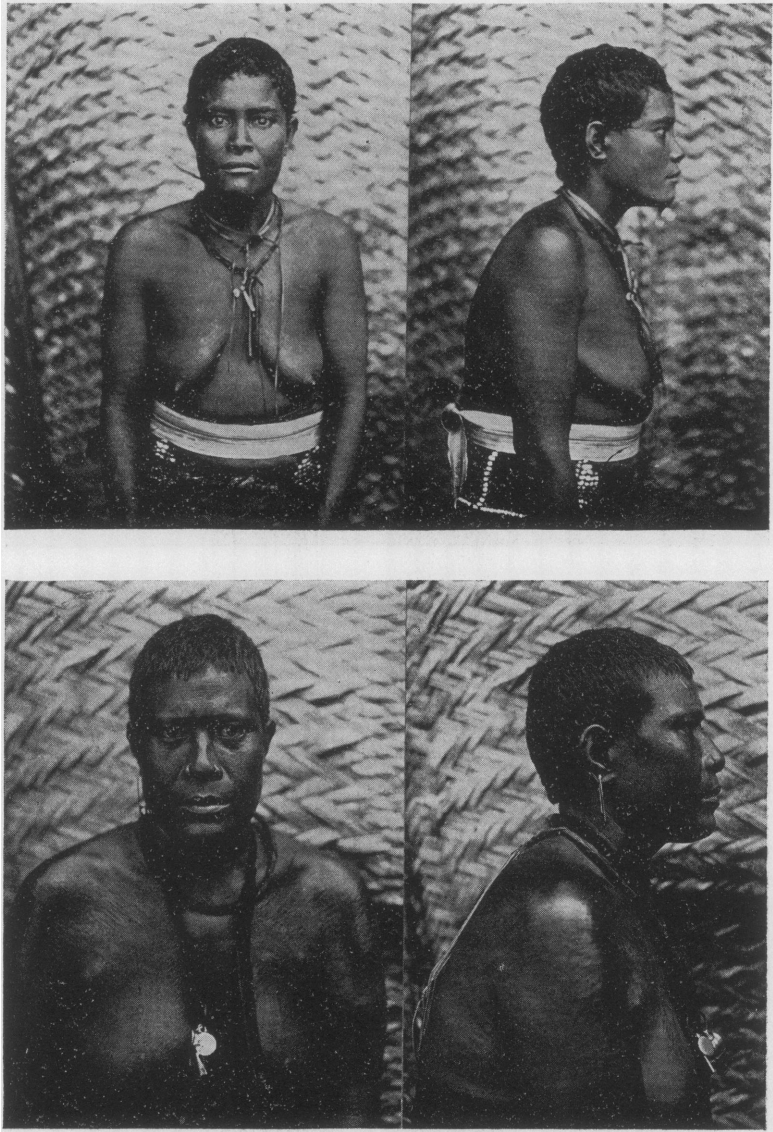


Fig. 7. Ontong Javanese Types.

the New Hebrideans from Tanna and Eromanga. The Solomon Islanders and Fijians have only slightly higher standard deviations than the Ontong Javanese. On the other hand, the Namatanai and Baining are less variable than the Ontong Javanese. The two groups from the Sepik River in New Guinea and from Aua Island also have smaller sigmas than the Ontong Javanese. Finally, the sample from Kapingamarangi has the smallest average standard deviation to be found in any of the comparative series. From this comparison the Ontong Javanese appear to be intermediate in their variability.

TABLE 1
STATISTICAL CONSTANTS OF 102 ONTONG JAVANESE MALES

	Mean	σ	V
Stature	163.69 \pm .40 cm.	5.96 \pm .28 cm.	3.64 \pm .17
Head Length	193.08 \pm .42 mm.	6.30 \pm .30 mm.	3.26 \pm .15
Head Width	143.05 \pm .33 mm.	4.89 \pm .23 mm.	3.42 \pm .16
Face Width	134.60 \pm .42 mm.	6.20 \pm .30 mm.	4.61 \pm .22
Bigonial	103.33 \pm .38 mm.	5.75 \pm .27 mm.	5.56 \pm .26
Face Height	117.36 \pm .47 mm.	7.08 \pm .33 mm.	6.03 \pm .28
Nose Height	48.46 \pm .23 mm.	3.50 \pm .17 mm.	7.22 \pm .34
Nose Width	40.30 \pm .18 mm.	2.72 \pm .13 mm.	6.75 \pm .32
Biacromion	36.50 \pm .14 cm.	2.08 \pm .10 cm.	5.70 \pm .27
Arm Length	71.24 \pm .22 cm.	3.33 \pm .16 cm.	4.67 \pm .22
Leg Length	92.97 \pm .30 cm.	4.46 \pm .21 cm.	4.80 \pm .23
Acromion Height	134.65 \pm .36 cm.	5.34 \pm .25 cm.	3.97 \pm .19
<i>Indices</i>			
Cephalic	74.11 \pm .19	2.82 \pm .13	3.81 \pm .18
Cephalo-Facial	94.00 \pm .31	4.50 \pm .22	4.79 \pm .23
Zygomatico-Gonial	76.72 \pm .30	4.39 \pm .21	5.72 \pm .27
Facial	87.37 \pm .38	5.70 \pm .27	6.52 \pm .31
Nasal	83.45 \pm .45	6.70 \pm .32	8.03 \pm .38

TABLE 2
STATISTICAL CONSTANTS OF 53 ONTONG JAVANESE FEMALES

	Mean	σ	V
Stature	153.21 \pm .47 cm.	5.05 \pm .33 cm.	3.30 \pm .22
Head Length	181.42 \pm .58 mm.	6.25 \pm .41 mm.	3.45 \pm .23
Head Width	136.38 \pm .36 mm.	3.81 \pm .25 mm.	2.79 \pm .18
Face Width	123.02 \pm .52 mm.	5.53 \pm .37 mm.	4.50 \pm .30
Bigonial	97.64 \pm .48 mm.	5.16 \pm .34 mm.	5.28 \pm .35
Face Height	106.53 \pm .54 mm.	5.81 \pm .38 mm.	5.45 \pm .36
Nose Height	44.26 \pm .32 mm.	3.44 \pm .23 mm.	7.77 \pm .51
Nose Width	37.26 \pm .25 mm.	2.67 \pm .17 mm.	7.17 \pm .47
Biacromion	33.13 \pm .15 cm.	1.64 \pm .11 cm.	4.95 \pm .32
Arm Length	65.34 \pm .31 cm.	3.32 \pm .22 cm.	5.08 \pm .33
Leg Length	85.94 \pm .40 cm.	4.32 \pm .29 cm.	5.03 \pm .33
Acromion Height	125.79 \pm .47 cm.	5.09 \pm .33 cm.	4.05 \pm .27
<i>Indices</i>			
Cephalic	75.21 \pm .25	2.69 \pm .18	3.58 \pm .24
Cephalo-Facial	90.24 \pm .43	4.58 \pm .31	5.08 \pm .34
Zygomatico-Gonial	79.50 \pm .42	4.53 \pm .30	5.70 \pm .38
Facial	86.98 \pm .54	5.66 \pm .38	6.51 \pm .44
Nasal	84.70 \pm .81	8.76 \pm .57	10.34 \pm .68

TABLE 3
QUALITATIVE CHARACTERS OF THE ONTONG JAVANESE

Skin Color	Exposed Skin				Unexposed Skin			
	Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%
von Luschan Scale								
10							1	1.92
11							2	3.85
12					1	1.15		
13					13	14.94	20	38.46
14					12	13.79	10	19.23
15					19	21.84	12	23.08
16	1	1.08	4	7.69	24	27.59	2	3.85
17					5	5.75		
18	1	1.08			4	4.60	2	3.85
19								
20	1	1.08	2	3.85				
21	1	1.08			3	3.45		
22	3	3.23	9	17.31	3	3.45		
23	29	31.18	29	55.77	2	2.30		
24	20	21.51	1	1.92	1	1.15		
25	24	25.81	6	11.54				
26	10	10.75	1	1.92				
27	2	2.15						
28								
29	1	1.08						

TABLE 3—*Continued*
QUALITATIVE CHARACTERS OF THE ONTONG JAVANESE

	Male		Female	
	No.	%	No.	%
<i>Hair Form</i>				
Straight	18	18.37	24	45.28
Low Waves	38	38.78	25	47.17
Medium Waves	1	1.02	4	7.55
Deep Waves	31	31.63		
Curly	10	10.20		
<i>Hair Quantity</i>				
Cheek:				
absent	64	64.00		
slight	17	17.00		
medium	14	14.00		
marked	5	5.00		
Chin:				
absent	3	2.97		
slight	31	30.69		
medium	39	38.61		
marked	28	27.72		
Chest:				
absent	65	67.71		
slight	25	26.04		
medium	5	5.21		
marked	1	1.04		
Forearm:				
absent	40	40.82		
slight	41	41.84		
medium	13	13.27		
marked	4	4.08		
Leg:				
absent	4	4.00		
slight	28	28.00		
medium	41	41.00		
marked	27	27.00		
<i>Epicanthic Fold</i>				
absent	95	93.14	46	86.79
trace	5	4.90	1	1.89
medium	2	1.96	4	7.55
marked			2	3.77
<i>Prognathism</i>				
absent	89	88.12	49	94.23
slight	11	10.89	3	5.77
medium	1	.99		
<i>Nose Bridge</i>				
low	2	5.00	2	7.41
medium	22	55.00	22	81.48
high	16	40.00	3	11.11
<i>Direction of Nostrils</i>				
antero-posterior	3	2.94	1	1.89
oblique	48	47.06	18	33.96
transverse	51	50.00	34	64.15

TABLE 4
COMPARISON OF STANDARD DEVIATIONS
Males

	Ontong Java	Society Islands	Hawaii	Samoa	Tonga	Marquesas	Solomons	Fiji	Namataani	Baining	Kapingamarangi
<i>Measurements</i>											
Number	102	85	205	69	117	84	85	133	26	78	34
Stature	5.96	5.91	6.03	5.25	5.21	5.12	6.81	6.12	5.13	6.18	5.22
Head Length	6.30	6.54	6.78	5.69	6.89	7.00	6.51	7.29	6.20	5.33	5.70
Head Width	4.89	4.96	5.50	4.46	4.26	4.87	5.16	6.06	4.96	4.74	2.90
Face Width	6.20	5.13	6.10	5.23	5.94	4.88	5.50	5.05	5.25	5.50	3.40
Face Height	7.08	6.35	6.69	6.56	6.81	7.30	6.61	6.95	4.91	6.08	5.20
Nose Height	3.50	3.51	3.87	3.64	3.91	3.97	3.84	3.88	3.22	3.25	2.40
Nose Width	2.72	2.77	3.02	2.59	3.02	2.70	2.79	3.03	3.61	3.94	2.60
<i>Indices</i>											
Cephalic	2.82	3.84	3.66	3.53	3.14	3.52	3.93	4.68	3.02	2.95	2.60
Cephalo-Facial	4.50	2.65	3.07	2.84	4.68	3.13	3.84	3.48	3.05	3.56	2.20
Facial	5.70	4.48	4.69	4.87	4.43	6.17	4.36	5.04	4.35	4.85	3.90
Nasal	6.70	7.22	7.24	5.86	7.58	7.75	8.92	8.28	7.85	8.94	5.30
Average (Total)	5.12	4.85	5.15	4.59	5.08	5.13	5.30	5.44	4.69	5.03	3.77

TABLE 5
COMPARISON OF STANDARD DEVIATIONS
Males

<i>Measurements</i>	Ontong Java	Tanna	Eromanga
Number	102	187	59
Stature	5.96	6.06	4.80(48)
Head Length	6.30	6.84	6.39
Head Width	4.89	5.61	5.22
Face Width	6.20	5.72	5.85
Face Height	7.08	8.47	7.90
Nose Height	3.05	5.36	7.45
Nose Width	2.72	4.22	3.69
<i>Indices</i>			
Cephalic	2.82	3.60	3.66
Facial	5.70	5.52	5.56
Nasal	6.70	9.50	11.80
Average (Total)	5.19	6.09	6.23

TABLE 6
COMPARISON OF STANDARD DEVIATIONS
Males

<i>Measurements</i>	Ontong Java	Sepik	Aua Island
Number	102	44	30
Stature	5.96	4.31(19)	5.46(29)
Head Length	6.30	5.96	6.17
Head Width	4.89	4.37	3.92
Cephalic Index	2.82	2.76	2.74
Average (Total)	4.99	4.35	4.57

COMPARISON OF ONTONG JAVANESE WITH DIVERSE GROUPS FROM POLYNESIA, MELANESIA, AND MICRONESIA

ONTONG JAVANESE AND POLYNESIANS

Since Ontong Java has been commonly regarded as a Polynesian outlier and its people as conforming to the physical characteristics of a Polynesian stock, we may well begin by testing the validity of the assumption of a physical bond uniting the Ontong Javanese and Polynesians. There is an adequate corpus of data descriptive of Polynesians—a large part of which has been issued in a series of memoirs by the Bishop Museum. In addition I have in my possession a large quantity of material, still incompletely prepared for publication, which has been collected by various workers as well as by myself. It is, therefore, possible to state that the means given in Table 7 represent sufficiently well for our purpose the average characters of various living Polynesians¹. The unpublished data do not in any way alter the results of the following comparisons.

It may be seen at once by an inspection of Table 7 that the means presented here give no foundation for joining the Ontong Javanese on to the Polynesian stock. Indeed, the Ontong Javanese differ in high degree from the Polynesians. Their moderate stature is contrasted with the elevated height of the Polynesian; their arm length also is shorter. Both in the vault of the skull and in the architecture of the face the Ontong Javanese again are distinct from the Polynesians. The former have a relatively long narrow head combined with a short face, which is also narrow, measured by Polynesian standards. The height as well as the width of the nose of the Ontong Javanese is less than that of any of the Polynesians except the Maori whose nasal width is similar. Comparing the indices, we observe that for cephalic and nasal index the Ontong Javanese are divergent from the Polynesians, yet in their cephalo-facial, zygomatico-gonial, and facial indices they fall within the range of Polynesian averages. But this appears to be adventitious. If we consider the pattern which the various means form there can be no doubt that the natives of Ontong Java show no phenotypical resemblance to Polynesians.

¹Shapiro, 1930; Wissler, 1927; Dunn, 1928; Sullivan, 1921, 1922, 1923; Buck, 1922-1923.

TABLE 7
COMPARISON OF THE NATIVES OF ONTONG JAVA WITH VARIOUS POLYNESIANS

<i>Measurements</i>	Males						
	Ontong Java	Society Islands	Hawaii	Hawaii (Dunn)	Samoa	Tonga	Marquesas Maori
Number	152	85	205	74	69	117	84
Stature	163.69 cm.	171.35 cm.	169.51 cm.	171.31 cm.	171.70 cm.	173.00 cm.	170.30 cm.
Acromion Height	134.65 cm.	143.32 cm.					141.60 cm.
Arm Length	71.24 cm.	79.90 cm.					79.60 cm.
Head Length	193.08 mm.	188.01 mm.	187.85 mm.	182.42 mm.	190.60 mm.	191.00 mm.	193.20 mm.
Head Width	143.05 mm.	159.58 mm.	157.67 mm.	152.03 mm.	154.80 mm.	154.80 mm.	153.20 mm.
Face Width	134.60 mm.	145.72 mm.	144.50 mm.	140.19 mm.	145.90 mm.	143.50 mm.	143.20 mm.
Face Height	117.36 mm.	124.78 mm.	125.43 mm.	122.72 mm.	131.10 mm.	128.20 mm.	124.10 mm.
Bigonial	103.33 mm.	107.76 mm.	111.18 mm.		104.60 mm.	104.80 mm.	109.50 mm.
Nose Height	48.46 mm.	54.21 mm.	55.60 mm.	53.59 mm.	59.80 mm.	57.50 mm.	53.10 mm.
Nose Width	40.30 mm.	43.40 mm.	43.53 mm.	44.22 mm.	43.80 mm.	44.40 mm.	43.20 mm.
<i>Indices</i>							
Cephalic	74.11	84.96	84.01	83.44	81.30	81.10	79.40
Cephalo-Facial	94.00	91.36	91.68		94.20	92.80	93.50
Zygomatiko-Gonial	76.72	74.01	77.06		71.70	73.20	76.80
Facial	87.37	85.73	86.74	87.67	89.90	89.20	87.00
Nasal	83.45	80.32	78.41	82.94	73.60	77.60	81.90
							85.10
							75.90

ONTONG JAVANESE AND FIJIANS

In Table 8 we have compared our Ontong Javanese with a series of Fijians¹. Howells has clearly shown the Polynesian affinities in the physical type of those Fijians among whom Polynesian cultural influences have long been recognized. He has definitely demonstrated, for the first time, I believe, a physical bond which bridges the gulf between "Melanesian" Fiji and Polynesia. The acceptance of this demonstration is in line with the conclusions of Fornander arrived at from quite another angle. Our immediate interest in Fiji may be briefly stated in this wise. We have shown that the Ontong Javanese cannot be joined to the Polynesians on the basis of their anthropometric characters. But, on the other hand, if the Ontong Javanese were once Polynesians who have become contaminated with Melanesian blood we should not be likely to find them agreeing exactly with the Polynesians in their mean traits. Although on the very face of the data such an explanation seems very remote, nevertheless we have considered this contingency. In the next section we shall see that the Ontong Javanese are not like the New Hebrideans who represent one type of Polynesian-Melanesian blend. In the Fijians we have the chance to compare the natives of Ontong Java with still another Polynesian-Melanesian group, with this difference: the Melanesian substratum of the Fijians is probably not the same as that of the New Hebrideans and also more Polynesian blood has been injected into the Fijian sample.

The reader is now referred to Table 8 where the contrast between the Ontong Javanese and the Fijians is strikingly demonstrated, the difference between the two groups being significant in each measured character. From this we may unhesitatingly conclude that here, too, there is no evidence for a Polynesian association with the Ontong Javanese. It may be noted in passing that were the Ontong Javanese Polynesian mixed with Melanesian we should expect more frizzly hair than we actually find. The New Hebrideans are characteristically frizzly haired, although some wavy hair is present among them. The Fijians, too, who approximate anthropometrically the wavy haired Polynesians still more closely than the New Hebrideans, also have a much greater proportion of frizzly hair than is recorded for the Ontong Javanese.

¹Howells, *in press*.

TABLE 8
COMPARISON OF ONTONG JAVANESE WITH FIJIANS
Males

Number	Ontong Java 102	Fiji 133
Stature	163.69 cm.	170.85 cm.
Head Length	193.08 mm.	188.82 mm.
Head Width	143.05 mm.	153.67 mm.
Face Width	134.60 mm.	144.05 mm.
Face Height	117.36 mm.	121.80 mm.
Nose Height	48.46 mm.	52.42 mm.
Nose Width	40.30 mm.	46.19 mm.
<i>Indices</i>		
Cephalic	74.11	81.54
Cephalo-Facial	94.00	93.74
Facial	87.37	84.70
Nasal	83.45	88.78

ONTONG JAVANESE AND NEW HEBRIDEANS, NEW CALEDONIANS, LOYALTY,
AND SANTA CRUZ ISLANDERS

For purposes of convenience I have grouped the comparative series from the New Hebrides,¹ New Caledonia,² Loyalty³ and Santa Cruz Islands⁴ in one table. The means of these diverse groups reveal rather significant differences. On the one hand, the Santa Cruz Islanders with their short stature, short head length, and low face height are reminiscent of the north coast New Guinea natives. Contrasted with the Santa Cruz Islanders, the Loyalty Islanders, and to a lesser extent, the New Caledonians, are distinguished by their greater stature, longer heads, and longer faces. The two groups from the New Hebrides, Eromanga and Tanna, diverge from other Melanesians most decisively in their great face height, nose height, and reduced nasal width. Of these two series, the one from Tanna is further characterized by an increased head width. In all these departures from the Melanesian type, the New Hebrideans approach the Polynesians. Both Humphreys⁵ and Speiser⁶ have declared a strong Polynesian influence in the coastal regions of New Hebrides.

We are now ready to see where the Ontong Javanese fit into this picture. If they are a Polynesian group, as has been suggested, it is rather difficult to reconcile their means with those of the coastal New

¹Humphreys, 1926.

²Sarasin, 1916-1922.

³Sarasin, 1916-1922.

⁴Speiser, 1923.

⁵Humphreys, 1926.

⁶Speiser, 1929.

Hebrideans. For those traits in which the New Hebrideans reveal most distinctly a Polynesian influence we find the Ontong Javanese not at all similar but rather Melanesian like by contrast. In face height the means of the New Hebrideans, 125.15 mm. and 124.95 mm., differ sharply with the average of 117.36 mm. for Ontong Java, which is of the same order as that of the Loyalty Islanders. Similarly a comparison of nose heights shows the Ontong Javanese on the side of the New Caledonia-Loyalty group. The face width of the Ontong Javanese is distinctive from most Melanesian groups in that it is absolutely much narrower. Thus we again find ourselves constrained to sever the generally accepted connection between the physical types of Polynesia and Ontong Java.

Although, curiously enough, we found that in several traits where the Ontong Javanese differed from the polynesianized New Hebrideans they approached the Melanesian, yet when we examine the whole galaxy of measurements as a pattern there is little to warrant grouping the Ontong Javanese with either the New Caledonians, Loyalty Islanders, or the natives of Santa Cruz. For the actual figures the reader may consult Table 9. Here one may see the clear division between Ontong Java and Santa Cruz. The Loyalty Islanders also present a pattern unlike that of the Ontong Javanese. The former are taller, have larger heads, wider faces, and wider noses, although in face height, nose height, and head width the discrepancy between these two groups is almost wiped out. Finally, we may note that although the New Caledonians seem appreciably more like the Ontong Javanese in head length than are the Loyalty Islanders, nevertheless they are more divergent in head width, face height, and nose width.

ONTONG JAVANESE AND SOLOMON ISLANDERS

The geographic proximity of Ontong Java to the Solomon Islands naturally suggests the existence of some physical interrelationship. Let us now examine this possibility. A prefatory word is necessary here with regard to the comparative data. With a few notable exceptions we are indebted for our material to ethnologists. For the most part no clue is given either on the technique, the process of sampling, or the experience of the observers. It would consequently be rash, if not impossible, to attempt to evaluate the reliability of the various series. Nor can one discard wholesale this work: we would be left with meager fare, indeed. It may appear ungrateful thus to scrutinize closely these gifts, but since a disturbing ambiguity arises from a comparison of the various series it is the better part of wisdom to exercise a modicum of critical reservation in

TABLE 9
COMPARISON OF THE NATIVES OF ONTONG JAVA WITH NATIVES OF THE NEW HEBRIDES, NEW CALEDONIA, LOYALTY, AND SANTA CRUZ ISLANDS

	Males					Santa Cruz Islands 34
	Ontong Java 102	Eromanga New Hebrides 59	Tanna New Hebrides 187	New Caledonia 185	Loyalty Islands 87	
Number						
Stature	163.69 cm.	166.0 cm.	164.5 cm.	166.4 cm.	167.7 cm.	160.3 cm.
Arm Length	71.24 cm.			76.3 cm.	75.4 cm.	
Head Length	193.08 mm.	191.55 mm.	191.22 mm.	192.5 mm.	199.7 mm.	188.0 mm.
Head Width	143.05 mm.	144.34 mm.	150.7 mm.	147.0 mm.	144.6 mm.	144.0 mm.
Face Width	134.60 mm.	141.32 mm.	144.0 mm.	143.1 mm.	142.5 mm.	141.0 mm.
Face Height	117.36 mm.	125.15 mm.	124.95 mm.	114.9 mm.	118.4 mm.	109.5 mm.
Nose Height	48.46 mm.	55.40 mm.	58.3 mm.	47.85 mm.	49.5 mm.	
Nose Width	40.30 mm.	42.28 mm.	42.78 mm.	47.34 mm.	45.0 mm.	46 mm.
<i>Indices</i>						
Cephalic	74.11	74.79	78.87	76.5	72.5	76.5
Facial	87.37	88.98	86.98	80.4	83.1	78.0
Nasal	83.45	77.50	74.10	99.3	91.5	

drawing conclusions from them. Where all the evidence, however, strongly runs in one direction we may place greater reliance on the data; but where there is a balanced conflict in the reading of several samplings, restraint in deduction seems indicated.

In the course of mulling over these figures, I have become loathe to regard as significant a similarity based on a limited number of criteria. Unfortunately, many of our comparative groups are defined only by stature, head length, and head width, sometimes with the addition of nose length and width, but only rarely by a more adequate array of measurements. Now, it may appear elementary to insist on distinguishing between a similarity deduced from resemblances in, let us say, six out of nine measurements and one which is based on approximations in three out of three. The probabilities greatly increase that one will find an apparent coincidence the fewer the characters compared. If we select, for example, stature alone, it would be possible to find a relatively large number of diverse groups which produce similar means. If to stature we add head length and head width, a somewhat smaller number would show agreement. Consequently, the more criteria we add to our battery of comparative measures the greater reliance we may place on a general agreement as indicating close relationship. On such a basis the reliability of the agreement does not maintain a constant ratio with the proportion of similar traits to the total number of characters used. In other words similarities in two characters out of three are not as good as six out of nine and still less than ten out of fifteen. Under certain circumstances I should hesitate to regard an agreement based on three characters alone as very significant. The point of this discussion will become apparent when the reader examines the following tables. In some instances the Ontong Javanese are compared with groups for which there are only a few measurements. Since I have nothing better, I propose to utilize them, yet I wish to forewarn the reader that where an agreement seems obvious, although founded on the comparison of a scanty series of traits, it is not to be accepted conclusively.

Proceeding, now, to Table 10 we find the Ontong Javanese compared with Solomon Islanders from Buka and Bougainville, measured by Chinnery.¹ In the latter island the villages are grouped into two tribal divisions, Siwai and Buin, and the tribal totals as well as the total for Buka are presented. There is considerable variation among the different villages within the tribe, but it is quite probable that this phenomenon is caused partly by the smallness of the various samplings. The totals

¹Chinnery, 1925?, 1929-1930?.

TABLE 10
COMPARISON OF THE NATIVES OF ONTONG JAVA WITH SOLOMON ISLANDERS MEASURED BY CHINNERY

Males

	No.	Stature	Head Length	Head Width	Nose Height	Nose Width	Cephalic Index	Nasal Index
Ontong Java	102	163.7 cm.	193.1 mm.	143.05 mm.	48.46 mm.	40.30 mm.	74.11	83.45
Buka								
Hitau	5		189.4 mm.	141.20 mm.			74.55	
Pororau	20		186.5 mm.	140.75 mm.			75.47	
Petats	18		187.6 mm.	140.60 mm.				
Yeta	9		189.0 mm.	140.80 mm.			75.00	
Total	52		187.6 mm.	140.75 mm.			75.21	
Siwai Tribe								
S. Bougainville								
Unanai Village	21	159.6 cm.	187.5 mm.	142.2 mm.	51.0 mm.	41.8 mm.	75.8	82.0
Hire Village	8	160.7 cm.	185.6 mm.	141.8 mm.	52.0 mm.	40.0 mm.	76.4	76.9
Koropo Village	7	161.0 cm.	187.6 mm.	143.9 mm.	50.7 mm.	42.6 mm.	76.7	83.9
Harikaku	10	159.0 cm.	185.3 mm.	138.2 mm.	48.5 mm.	40.4 mm.	74.6	83.3
Kaninu	33	159.9 cm.	188.9 mm.	141.6 mm.	48.0 mm.	42.3 mm.	75.0	88.1
Kunitua	10	158.8 cm.	190.3 mm.	140.2 mm.	48.7 mm.	41.1 mm.	73.7	84.4
Musimina	2	161.2 cm.	189.0 mm.	137.5 mm.	49.0 mm.	38.5 mm.	72.8	78.6
Total	91	159.8 cm.	187.9 mm.	141.3 mm.	49.4 mm.	41.6 mm.	75.2	84.2
Buin Tribe								
Telei District:								
Bougainville								
Lakoe	27	160.7 cm.	187.5 mm.	143.0 mm.	50.5 mm.	42.2 mm.	76.3	83.6
Unabai	13	164.8 cm.	183.6 mm.	141.1 mm.	49.3 mm.	41.6 mm.	76.8	84.4
Matarai	10	161.1 cm.	186.4 mm.	143.0 mm.	42.9 mm.	41.1 mm.	76.7	95.8
Au-Aru	6	156.8 cm.	191.5 mm.	139.3 mm.	45.3 mm.	41.5 mm.	72.7	91.6
Torai	20	158.4 cm.	185.0 mm.	141.1 mm.	47.8 mm.	41.2 mm.	76.3	86.2
Tubara	10	158.3 cm.	180.1 mm.	143.1 mm.	46.2 mm.	41.4 mm.	79.5	89.6
Uraut	8	159.3 cm.	183.4 mm.	144.0 mm.	46.0 mm.	42.3 mm.	78.5	92.0
Sigakiai	11	157.5 cm.	183.9 mm.	143.4 mm.	46.0 mm.	41.2 mm.	78.0	89.8
Total	105	159.9 cm.	185.4 mm.	142.4 mm.	47.1 mm.	41.5 mm.	76.8	88.2

show more agreement than the village averages. With regard to the totals for Buka and Bougainville we can have little hesitation in concluding that the Ontong Javanese are significantly different from the Solomon Islanders. The Ontong Javanese are taller, their heads are longer and wider. The nasal diameters are, however, less divergent. Taking the individual villages, none appears to show a pattern of traits which approaches very closely to that formed by the Ontong Javanese means, with the possible exception of Kunitua of the Siwai tribe. This series is composed, however, of only ten subjects. Both the head diameters and the nasal diameters approach Ontong Javanese means, although the stature is considerably below.

The description of the pigmentation and the hair of these Solomon Islanders does not agree with that of the natives of Ontong Java. The former are "black" with frizzly hair, while the latter are lighter in skin with hair that is wavy but rarely frizzly.

TABLE 11
COMPARISON OF THE NATIVES OF ONTONG JAVA WITH SOLOMON ISLANDERS
Males

	Ontong Java	Total Buka	Total Bougainville	Solomons (Howells)
Number	102	52	196	85
Stature	163.7 cm.		159.9 cm.	160.2 cm.
Head Length	193.08 mm.	187.6 mm.	186.6 mm.	188.46 mm.
Head Width	143.05 mm.	140.75 mm.	141.9 mm.	144.73 mm.
Face Width	134.60 mm.			137.95 mm.
Face Height	117.36 mm.			116.40 mm.
Nose Height	48.46 mm.		48.17 mm.	49.86 mm.
Nose Width	40.30 mm.		41.55 mm.	44.60 mm.
<i>Indices</i>				
Cephalic	74.11	75.21	76.06	76.80
Cephalo-Facial	94.00			95.36
Facial	87.37			84.54
Nasal	83.45		86.34	87.14

In Table 11 I have again compared the Ontong Javanese with Solomon Islanders. Here, however, we have a southern group, mainly from Malaita, measured by Moss and analyzed by Howells. For the sake of the comparison I have carried over the subjects in Chinnery's series, but have pooled all the Bougainville data. The agreement between Howells' Solomon Islanders from Malaita and those from the northern Solomons (Buka and Bougainville) is good for stature, head length, and nose height, but there is some divergence for head width and

for nose width. The southern group of Solomon Islanders in one respect shows a close resemblance to the Ontong Javanese. This is in face height, where the difference is only 1 mm. In the head width, too, there is a greater approximation than we found with the northern Solomon Islanders, although this approach in head widths is not equally duplicated in head lengths. Finally we may note that the noses of the southern series are much wider than the corresponding diameters of either the northern Solomon Islanders or the Ontong Javanese.

ONTONG JAVANESE AND NATIVES OF BISMARCK ARCHIPELAGO

If certain of the Polynesian migration theories be correct, the ancestors of the present Polynesians must have coasted along the northern shores of New Guinea and must have inevitably been caught in the hook which the Bismarck Archipelago forms with the north coast of New Guinea. In order to detect, if possible, any trace of these Polynesian precursors in the Bismarck Group and particularly to seek evidence there of the kin of the Ontong Javanese, I have gathered in Table 12 all the materials on these islanders which were available.¹ Without dwelling over long on an exhaustive comparison, measurement by measurement, I shall indicate briefly some of the principal issues from a comparison of the various means. First of all, let me say that among these islanders there are no close affiliations with the Ontong Javanese. With the exception of the Tanganeese, they are all shorter than the Ontong Javanese. But these differences are for the most part not very great. The cranial vaults, however, show real divergencies. The length of the Ontong Javanese head far exceeds any of the Bismarck means. The head width, likewise, exceeds or falls short by considerable margins the averages of the Bismarck groups, with two exceptions: the islands of E Mira and St. Matthias. But in both these, although their head width is appreciably close to that of the Ontong Javanese, the corresponding head lengths are very much shorter, thus producing an index considerably more brachycephalic. The facial width of the Ontong Javanese here shows a vague similarity to a generalized Bismarck type, though none of the individual groups has a face width and face height which are both consistent with those of the Ontong Javanese. Judged, however, by previous comparisons we do see a slight resemblance which is hardly close enough to warrant regarding the means as representative of the same population. As to the nasal diameters, the nose height is identical with that of the Namatanai and only slightly shorter than the Baining

¹Friederici, 1912; Chinnery, no date; Hambruch, 1909; Schlaginhaufen, 1908.

TABLE 12
COMPARISON OF THE NATIVES OF ONTONG JAVA WITH VARIOUS GROUPS FROM THE BISMARCK ARCHIPELAGO

	Males						
	Ontong Java	Baining New Britain	Namatani New Ireland	E Mira Island	St. Matthias Island	Luf Island	Tanga Island
	102	78	26	63	101	9	31
Stature	163.70 cm.	159.10 cm.	161.85 cm.	161.5 cm.	160.4 cm.	162.2 cm.	164.7 cm.
Arm Length	71.24 cm.					74.4 cm.	
Head Length	193.08 mm.	177.78 mm.	183.81 mm.	185.9 mm.	185.0 mm.	181.7 mm.	188.7 mm.
Head Width	143.05 mm.	148.64 mm.	147.27 mm.	142.7 mm.	143.2 mm.	139.7 mm.	149.3 mm.
Face Width	134.60 mm.	136.47 mm.	137.77 mm.			132.7 mm.	
Face Height	117.36 mm.	110.15 mm.	114.46 mm.				
Nose Height	48.46 mm.	48.94 mm.	48.40 mm.			50.7 mm.	50.6 mm.
Nose Width	40.30 mm.	47.06 mm.	42.50 mm.			41.4 mm.	43.2 mm.
<i>Indices</i>							
Cephalic	74.11	83.65	83.35			77.04	79.16
Cephalo-Facial	94.00	91.87	93.38			95.18	
Facial	87.37	80.77	83.46			81.97	
Nasal	83.45	96.54	88.40				85.72

average. The nose width shows less agreement with the Bismarck groups, although the Luf Islanders and the Namatanai again are the nearest.

Considering the Bismarck Islanders themselves for a moment, we may point out in passing that in some respects the Namatanai appear to be a group which may have resulted from miscegenation between the Baining and a people like the Ontong Javanese.

TABLE 13

COMPARISON OF THE NATIVES OF ONTONG JAVA WITH VARIOUS GROUPS FROM THE
BISMARCK ARCHIPELAGO

	Females			
	Ontong Java	E Mira	St. Matthias	Tanga
Number	53	71	7	5
Stature	153.2 cm.	151.7 cm.		154.0 cm.
Head Length	181.42 mm.	177.3 mm.	178.1 mm.	174.4 mm.
Head Width	136.38 mm.	134.9 mm.	137.75 mm.	141.4 mm.
Nose Length	44.26 mm.			45.6 mm.
Nose Width	37.26 mm.			39.0 mm.
<i>Indices</i>				
Cephalic	75.21			81.17
Nasal	84.70			85.69

ONTONG JAVANESE AND NATIVES OF DAMPIER STRAITS

In Table 14 are gathered together a number of groups centering in the Dampier Straits which lie between New Guinea and New Britain.¹ Finschhaven is on the New Guinea mainland, while Siassi and Rook islands are in the Straits. Unfortunately the series are represented only by a few measurements. But these do reveal in the Siassi Islanders a deviation from the Melanesian type. The combination of a relatively long and narrow head with a great nasal height and relatively narrow width departs from the generalized types of New Guinea and Melanesia which we have so far considered. There is hardly, however, sufficient data to offer firm ground for speculation concerning the significance of this deviation, which seems to me may also to a lesser extent involve the group from Finschhaven and the Barim of Rook Island. The scantiness of the Iangla sample precludes any generalization on its means. Both the Siassi series, which we may take to represent best this atypical strain, have longer and narrower heads than have the natives of Ontong Java. The nasal diameters of the former likewise differ radically, being very much longer and somewhat wider, but producing an index which is

¹Chinnery, 1925?, no date, 1926?.

TABLE 14
COMPARISON OF THE NATIVES OF ONTONG JAVA WITH SOME GROUPS FROM THE DAMPIER STRAITS

	Number	Stature	Males				Cephalic Index	Nasal Index
			Head Length	Head Width	Nasal Height	Nasal Length		
Ontong Java	102	163.69 cm.	193.08 mm.	143.05 mm.	48.46 mm.	40.30 mm.	74.11	83.45
Finschhaven	25	161.00 cm.	189.50 mm.	142.80 mm.			75.53	
Aramot, Siassi I.	21	166.60 cm.	195.40 mm.	140.40 mm.	53.60 mm.	43.14 mm.	71.88	80.74
Tavuru, Siassi I.	20	162.90 cm.	194.60 mm.	141.80 mm.	57.75 mm.	42.45 mm.	72.82	73.77
Barim, Rook Island	21	160.90 cm.	190.60 mm.	143.10 mm.	54.20 mm.	42.10 mm.	75.10	77.48
Iangla, Rook Island	10		186.30 mm.	137.90 mm.	52.40 mm.	41.80 mm.	73.53	81.68
			Females					
Ontong Java	53	153.21 cm.	181.42 mm.	136.38 mm.	44.26 mm.	37.26 mm.	75.21	84.70
Finschhaven	7	154.70 cm.	183.40 mm.	134.90 mm.			73.52	
Aramot, Siassi I.	12	155.40 cm.	188.75 mm.	134.20 mm.	52.30 mm.	38.60 mm.	70.94	73.90
Tavuru, Siassi I.	20	153.60 cm.	181.20 mm.	134.10 mm.	49.90 mm.	37.80 mm.	74.00	76.21
Barim, Rook Island	18	152.60 cm.	182.60 mm.	136.90 mm.	51.80 mm.	36.40 mm.	74.98	70.56
Iangla, Rook Island	12		175.70 mm.	133.25 mm.	46.75 mm.	38.00 mm.	75.82	82.11

TABLE 15

COMPARISON OF THE NATIVES OF ONTONG JAVA WITH THE INHABITANTS OF THE INTERIOR AND THE NORTH COAST OF NEW GUINEA

	Ontong Java	Jakumul	Leitere	Arup	Males Toricelli Mountains	Aua Island	Mismis Bubu Valley	Repu Ono Valley	Sepik River	Central New Guinea
Number	102	100	21	20	30	30	10	19	44	27
Stature	163.69 cm.	158.2 cm.	158.4 cm.	160.0 cm.	151.9 cm.	157.14 cm.	155.5 cm.	160.8 cm.	164.4 mm.	155.7 mm.
Head Length	193.08 mm.	190.7 mm.	187.1 mm.	186.5 mm.	183.5 mm.	184.33 mm.	189.8 mm.	190.7 mm.	188.4 mm.	190.0 mm.
Head Width	143.05 mm.	141.2 mm.	146.0 mm.	143.7 mm.	142.5 mm.	145.07 mm.	147.6 mm.	147.3 mm.	141.27 mm.	147.0 mm.
Face Width	134.60 mm.	137.6 mm.	139.2 mm.	138.0 mm.	133.9 mm.					138.0 mm.
Face Height	117.36 mm.	112.2 mm.	111.9 mm.	114.1 mm.	108.7 mm.					112.0 mm.
Bigonial	103.33 mm.	102.4 mm.	105.1 mm.		99.2 mm.					
Nose Height	48.46 mm.	50.6 mm.	51.1 mm.	52.0 mm.	50.9 mm.		55.4 mm.	56.8 mm.		50.0 mm.
Nose Width	40.30 mm.	44.0 mm.	42.7 mm.	45.4 mm.	44.3 mm.		44.8 mm.	41.8 mm.		45.0 mm.
<i>Indices</i>										
Cephalic	74.11	73.4	77.7	76.6	77.7	78.73	77.3	76.7	75.02	77.4
Cephalo-Facial	94.00	97.8	94.9	95.7	93.5					97.1
Zygomatico-Gonial	76.72	74.0	74.4		74.2					
Facial	87.37	80.8	79.8	82.2	81.1					81.6
Nasal	83.45	86.8	83.2	87.2	87.4		81.1	73.7		92.7

lower than that for the Ontong Javanese. Although from the above one may conclude that a foreign strain has influenced the character of the Dampier Straits people, we cannot link it with the population of Ontong Java.

ONTONG JAVANESE AND NATIVES OF THE NORTH COAST OF NEW GUINEA

Before completing our survey of Melanesia for the relatives of the Ontong Javanese, there remains the necessity of inspecting the New Guinea mainland groups. Nine samples from New Guinea and the coastal island of Aua have been brought together in Table 15. The first four are located on the north coast and were gathered by Schlaginhaufen.¹ The next four are taken from Chinnery's published data,² while the last, from Central New Guinea, has been collected by Wirz.³ There is, with some local variation, a certain unity to be seen in all these groups. Omitting for the moment the groups from Toricelli and Aua, we may note that head length ranges from 186.5 mm. to 190.7 mm.; head width from 141.2 mm. to 147.6; face width from 137.6 mm. to 139.2; face height from 111.9 mm. to 114.1; nose height from 50.0 mm. to 56.8 mm.; and nose width from 41.8 mm. to 45.4. Reverting now to the Ontong Javanese we observe that only in head width do they fall within the ranges given above. Nor are the deviations all in one direction. The head length of the Ontong Javanese exceeds the range for New Guinea, the face width falls short as do the nose height and width.

Returning once more to the Toricelli and Aua groups, it has been noted by Schlaginhaufen that the Toricelli people represent a pygmyoid variant of the taller coastal groups. A careful consideration of the means in Table 15 will bear this out. The reduced head length and face height are undoubtedly correlated with the depressed stature of these people. The Aua sample may exhibit this same phenomenon to a lesser extent, but the inadequacy of the material makes such a conclusion premature.

To sum up this comparison of Ontong Javanese with New Guinea natives we may conclude briefly that there is no indication of any relationship between them.

ONTONG JAVANESE AND MICRONESIANS

It is regrettable that so little is known of the physical characteristics of the Micronesians with whom we must next deal. No published material on the Gilbertese and only one very small series of Marshall

¹Schlaginhaufen, 1914.

²Chinnery, 1925?, 1927?.

³Wirz, 1924.

Islanders from Jaluit¹ have come to our hands. Some relief is however afforded by an unpublished series of Gilbertese and another representing Marshall Islanders which were gathered by O. Finsch. These records are from various islands and have been necessarily pooled. We are somewhat better off for the Carolines. The results of three investigators² make up the sum total of our comparative data for that archipelago. There are some discrepancies between their means, but a more serious difficulty is the paucity of the numbers which compose most of the series. We have, however, as has been necessary throughout this paper, used what data were available.

On examining the photographs of the Ontong Javanese with which Doctor Hogbin kindly supplied me, I was impressed by the number of individuals who resemble Caroline Islanders. I recognize the danger inherent in assigning group classifications on judgments derived from photographs alone. I have therefore compared our sample of Ontong Javanese with the Jaluit in Table 16, with Finsch's Gilbertese and Marshall Islanders in Table 17 and with various Caroline Islanders in Table 18.

TABLE 16
COMPARISON OF THE NATIVES OF ONTONG JAVA WITH MARSHALL ISLANDERS FROM
JALUIT

	No.	Stature	Head Length	Head Width	Cephalic Index
Males					
Ontong Java	102	163.69 cm.	193.08 mm.	143.05 mm.	74.11
Jaluit	11	165.5 cm.(31)	189.0 mm.	145.4 mm.	76.90
Females					
Ontong Java	53	153.21 cm.	181.42 mm.	136.38 mm.	75.21
Jaluit	8	148.0 cm.	180.1 mm.	143.5 mm.	79.90

The Jaluit are represented by stature, head length and width, and cephalic index. From these few characters we must conclude that the Ontong Javanese do not show any close affinity with the Jaluit. The males from Ontong Java are shorter, have longer and narrower heads than the Jaluit men. The Ontong Javanese women on the contrary are taller, but they also have longer and narrower heads than Jaluit females.

A few words only are required to accompany Table 17 where the Ontong Javanese are compared with Finsch's series of Gilbert and Marshall Islanders. The Gilbertese are clearly different from our Ontong

¹Hirako, 1918.

²Hirako, 1918; Hasebe, 1928; Hambruch, 1909.

TABLE 17
COMPARISON OF ONTONG JAVANESE WITH MARSHALL AND GILBERT ISLANDERS
Males

	No.	Stature	Acromion Height	Arm Length	Head Length	Face Height	Nose Height	Nose Width
Ontong Java	102	163.69 cm.	134.65 cm.	71.24 cm.	193.08 mm.	117.36 mm.	48.46 mm.	40.30 mm.
Gilbert Islanders	169.5 cm. (23)	142.6 cm. (21)	132.9 cm.	77.9 cm. (21)	190.75 cm. (12)	135.95 mm. (20)	57.8 mm. (20)	43.95 mm. (20)
Marshall Islanders	12	163.6 cm.		72.0 cm.	190.67 cm.	129.0 mm.	51.5 mm.	43.08 mm.

Javanese. They are taller with longer arms; they have shorter heads; their faces are very much longer, as are their noses; and the width of the nose is greater. In every one of the measurements they show very appreciable differences. The Marshall Islanders on the contrary have statures identical with the Ontong Javanese, but in head length, face height, nose height and nose width they are obviously distinct.

From the preceding discussion it is clear that the Ontong Javanese are not Melanesians. The possibility, of course, exists that some Melanesian influence has affected the group characteristics of these people. But their relatively light pigmentation, their straight to wavy hair, and their relatively narrow noses combine to weigh against their inclusion among the true Melanesians. The two immediate alternatives are, broadly speaking, Polynesia and Micronesia. We have already on several counts, I believe, demonstrated the disharmony between Polynesia and Ontong Java. There remains Micronesia. The scanty sample from Jaluit in the Marshalls and Finsch's Marshall and Gilbert Islanders has also failed to provide satisfying evidence of any intimate relationship with the Ontong Javanese. Until fuller data are forthcoming from the Marshalls and the Gilberts we cannot dismiss altogether the possibility, however remote it may appear from our inadequate material, that a connection exists between Ontong Java and these particular Micronesian groups.

Turning now to the Carolines, another Micronesian archipelago, let us examine the data representing these islands. The means figured in Table 18 lead us to conclude that considerable heterogeneity is represented in the Caroline Islands. From Yap and the Palaus (Pelews) in the western end of the group to Kusaie at the other end a picture is presented of dolichocephaly increasing toward the east. But this correlation with geographical position is not perfect. I have grouped the islands which resemble each other in Table 19. It is apparent that this is a natural classification of the various islands, for it is improbable that four or five islands, widely separated in some instances, should agree so well unless there were a fundamental relationship joining them together. The first group consists of the West Carolines (Satoval, Lamotrek, Elato, Ifaluk, Aurepig, Voleai, Fais, and Mogmog), Oleai, Mogmog, Ponape, and Kusaie. Stature within this group of islands ranges from 162 cm. to 165 cm. Head length ranges from 193.1 mm. to 195.5; head width from 143.2 mm. to 147.7; minimum frontal diameter from 106.5 mm. to 110.7; and the cephalic index from 73.6 to 76.3.

The second group, which includes the Southwestern Carolines (Sonol, Merir, and Bur), Mortlocks, Truk, and possibly Togobei, does not

TABLE 18

COMPARISON OF THE NATIVES OF ONTONG JAVA WITH THE CAROLINE ISLANDERS
Males

	No.	Stature	Arm Length	Head Length	Head Width	Minimum Frontal	Face Width	Face Height	Bigonial	Nose Height	Nose Width	Cephalic Index	Cephalo- Facial I.	Facial Index	Nasal Index
Ontong Java	102	163.69 cm.	71.24 cm.	193.08 mm.	143.05 mm.	118.02 mm.	134.6 mm.	117.36 mm.	103.33 mm.	48.46 mm.	40.3 mm.	74.11	94.00	87.37	83.45
Hirako:															
Kusaie	8	162.3 cm. (9)		193.6 mm.	147.7 mm.	106.5 mm.						76.3			
Ponape	8	163.2 cm. (18)		193.7 mm.	146.7 mm.	106.7 mm. (7)						75.7			
Luknor	9	160.7 cm.													
Mortlocks	12	164.4 cm. (2)		193.2 mm.	139.3 mm.	105.6 mm.						72.0			
Truk	29	164.0 cm. (48)		194.3 mm.	139.6 mm.	111.0 mm.						71.8			
Oleai	7	162.0 cm. (6)		193.1 mm.	145.3 mm.	110.7 mm.						75.2			
Mogmog	8	165.2 cm.		195.5 mm.	146.4 mm.	108.4 mm.						74.4			
Yap	8	163.7 cm.		190.6 mm.	149.9 mm.	107.0 mm.						78.6			
Palau	8	162.8 cm.		184.4 mm.	151.6 mm.	111.7 mm.						82.1			
Hasebe:															
West Carolines ¹	43	163.8 cm.		194.5 mm.	143.2 mm.		141.1 mm.	125.30 mm.	102.7 mm.			73.6		89.7	76.3
Yap	46	160.5 cm.		189.1 mm.	146.5 mm.		143.9 mm.	123.10 mm.	101.3 mm.			77.7		85.5	75.4
Palau	140	160.9 cm.		185.4 mm.	149.6 mm.		141.2 mm.	123.00 mm.	101.9 mm.			80.9		87.2	76.3
S. W. Carolines ²	11	164.4 cm.		194.5 mm.	138.5 mm.		137.4 mm.	130.80 mm.	101.5 mm.			71.3		94.6	73.1
Togobei	6	156.8 cm.		191.2 mm.	139.2 mm.		136.2 mm.	116.70 mm.	104.3 mm.			73.1		85.6	84.7
Hambruch:															
Truk	14	160.2 cm.	69.3 cm.	189.5 mm.	136.4 mm.		132.3 mm.			46.1 mm.	39.4 mm.	71.93	96.34		86.19
Yap	7	163.5 cm.	70.1 cm.	187.6 mm.	146.0 mm.		141.1 mm.			47.9 mm.	40.9 mm.	75.53	96.74		85.47
Palau	9	161.7 cm.	71.2 cm.	185.4 mm.	147.2 mm.		142.4 mm.			46.7 mm.	41.0 mm.	79.4	96.7		88.2

¹West Carolines include the islands of Satoval, Lamotrek, Elato, Ifaluk, Aurepig, Voleai, Fais and Mogmog.²Southwest Carolines include Sonsol, Merir, and Bur.

TABLE 19

COMPARISON OF ONTONG JAVANESE WITH THE CAROLINE ISLANDERS ARRANGED ACCORDING TO CRANIAL RESEMBLANCE

	Stature	Head Length	Head Width	Minimum Frontal	Face Width	Males Face Height	Bigonial	Nose Height	Nose Width	Cephalic I.	Cephalo- Facial I.	Facial I.	Nasal I.
Ontong Java	163.69 cm.	193.08 mm.	143.05 mm.	118.02 mm.	134.60 mm.	117.36 mm.	103.33 mm.	48.46 mm.	40.30 mm.	74.11	94.00	87.37	83.45
West Carolines	163.8 cm.	194.5 mm.	143.2 mm.		141.1 mm.	125.30 mm.	102.7 mm.			73.6		89.7	76.3
Oleai	162.0 cm.	193.1 mm.	145.3 mm.	110.7 mm.						75.2			
Mogmog	165.2 cm.	195.5 mm.	146.4 mm.	108.4 mm.						74.4			
Ponape	163.2 cm.	193.7 mm.	146.7 mm.	106.7 mm.						75.7			
Kusaie	162.3 cm.	193.6 mm.	147.7 mm.	106.5 mm.						76.3			
S. W. Carolines	164.4 cm.	194.5 mm.	138.5 mm.		137.4 mm.	130.8 mm.	101.5 mm.			71.3		94.6	73.1
Mortlocks	164.4 cm.	193.2 mm.	139.3 mm.	105.6 mm.						72.0			
Truk (Hirako)	164.0 cm.	194.3 mm.	139.6 mm.	111.0 mm.						71.8			
Truk (Hambruch)	160.2 cm.	189.5 mm.	136.4 mm.		132.3 mm.			46.1 mm.	39.4 mm.	71.93	96.34		86.19
Togobei	156.8 cm.	191.2 mm.	139.2 mm.		136.2 mm.	116.7 mm.	104.3 mm.			73.1		85.5	84.7
Yap (Hirako)	163.7 cm.	190.6 mm.	149.9 mm.	107.0 mm.						78.6			
Yap (Hasebe)	160.5 cm.	189.1 mm.	146.5 mm.		143.9 mm.	123.1 mm.	101.3 mm.			77.7		85.16	75.4
Yap (Hambruch)	163.5 cm.	187.6 mm.	146.0 mm.		141.1 mm.			47.9 mm.	40.9 mm.	75.53	96.74		85.47
Palau (Hirako)	162.8 cm.	184.4 mm.	151.6 mm.	111.7 mm.						82.1			
Palau (Hasebe)	160.9 cm.	185.4 mm.	149.6 mm.		141.2 mm.	123.0 mm.	101.9 mm.			80.9			76.3
Palau (Hambruch)	161.7 cm.	185.4 mm.	147.2 mm.		142.4 mm.			46.7 mm.	41.0 mm.	79.4	96.70		88.2

differ essentially from the preceding one in stature with the exception of Togobei. In head length also there is no real distinction, although the Truk series of Hambruch has a measurably shorter head length, but in head width there is a marked reduction in the magnitude of the means. Face width likewise appears to be of lesser dimension in this group than in the preceding one.

The third division is composed of the natives of Yap and the Palaus in the northwestern corner of the Carolines. This group has a shorter head length but an increased head width.

Let us see how well the Ontong Javanese fit any of these groups of Caroline Islanders. We notice first that in stature the natives of Ontong Java fall within the range of the means of the Caroline Islanders who are fairly homogeneous in this trait. In head length, too, they are similar to the first and second of the groups detailed in Table 19. In head width they stand closest to the first group. The resemblances to the West Caroline Islanders, moreover, in both head length and width are particularly close. The minimum frontal diameter has been omitted from discussion heretofore because there was some doubt concerning the accuracy of the technique for this measurement. The mean as given is an extraordinarily large one and far exceeds that of any of the groups with which we have been concerned. I have given it here because even after discounting its inaccuracy it does reflect, it seems to me, the fact that the Ontong Javanese are broad-browed. So too are the Caroline Islanders whose minimum frontal diameters are far in excess of those found among Polynesians or Melanesians. In this regard then the Ontong Javanese show some resemblance to Caroline Islanders. The bigonial diameter of the Ontong Javanese likewise approximates the mean of the West Caroline Islanders. So far we have found few groups which have as small a nasal width as is found for Ontong Javanese. Here in the three groups for whom we have this diameter there is a close resemblance. The principal discrepancies between our sample and those from the Carolines are in the face height and width. The group which in all else seems closest to the Ontong Javanese—the West Carolines—has a face width 6.5 mm. and a face height 7.94 mm. greater. It is true that the face widths of the second group are less discrepant and that the Togobei have a face width only 1.6 mm. greater and a face height only .66 mm. less than the Ontong Javanese. But in other respects this approximation to Togobei does not hold. On the basis, therefore, of their metric approximations we must conclude that the Ontong Javanese do resemble the Caroline Islanders more closely than the other Micronesians, the Polynesians, or the Melanesians.

The similarity between the Caroline Islanders and the Ontong Javanese in metric characters is not strengthened by a comparison between them for skin color and hair form. In both Tables 20 and 21 it is clear that the Ontong Javanese have lighter skins and straighter hair. The difference in percentages is quite large. Even allowing for a personal equation in these subjective judgments on hair form and skin color, there can be no doubt that a real difference exists. Contrary to what we might have expected from the dissimilarity in anthropometric traits, the Ontong Javanese do, however, approximate the Polynesians in hair form and skin color.

TABLE 20
HAIR FORM OF ONTONG JAVANESE AND CAROLINE ISLANDERS

	Males							
	Straight and		Medium and		Curly		Frizzly	
	Low Waves		Deep Waves					
	No.	%	No.	%	No.	%	No.	%
Ontong Java	56	57.15	32	32.65	10	10.20	0	0
West Carolines	0	0	7	16.28	32	74.42	4	9.30
Yap	1	2.17	17	36.96	23	50.00	5	10.87
Palau	5	4.24	35	29.66	67	56.78	11	9.32
S. W. Carolines	0	0	5	50.00	5	50.00	0	0
Togobei	0	0	3	50.00	3	50.00	0	0
	Females							
Ontong Java	49	92.45	4	7.55	0	0	0	0
Palau	7	9.21	43	56.58	21	27.63	5	6.58
S. W. Carolines	3	33.33	3	33.33	3	33.33	0	0
Togobei	0	0	2	100.00	0	0	0	0
Total Ontong Java	105	69.54	36	23.84	10	6.62	0	0
Male and Female								
Total Carolines	16	5.16	115	37.10	154	49.68	25	8.06
Male and Female								

ONTONG JAVANESE AND NATIVES OF NUKUMANU, MORTLOCKS, AND
KAPINGAMARANGI

The present day contacts between Ontong Java and Nukumanu, a neighboring island, have a counterpart in the traditions of both these islands. Some resemblance in physical type might, therefore, be reasonably expected. In Table 22 two small series from Nukumanu are presented. One was gathered by Chinnery,¹ the other by Friederici.² Although both these samples are similar in stature, they show a discrepancy in head length and an even larger difference in head width.

¹Chinnery, 19257.

²Friederici, 1912.

TABLE 21
COMPARISON OF THE SKIN PIGMENTATION OF ONTONG JAVANESE WITH THAT OF VARIOUS CAROLINE ISLANDERS
Males

Inner Side of Upper Arm; von Luschan scale	10-12		13-15		16-18		19-21		22-24		25-27	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Ontong Java	1	1.15	44	50.57	33	37.94	3	3.45	6	6.90	0	0
West Carolines	0	0	5	12.19	18	43.90	0	0	14	34.15	4	9.76
Yap	0	0	3	7.14	25	59.52	0	0	11	26.19	3	7.14
Palau	0	0	3	2.17	16	11.59	0	0	52	37.68	67	48.55
S. W. Carolines	0	0	1	9.09	5	45.45	0	0	3	27.27	2	18.18
Togobei	0	0	1	16.67	2	33.33	0	0	2	33.33	1	16.67
Females												
Ontong Java	6	11.54	42	80.77	4	7.70	0	0	0	0	0	0
Palau	4	5.33	11	14.67	32	42.67	0	0	24	32.00	4	5.33
S. W. Carolines	1	11.11	7	77.78	1	11.11	0	0	0	0	0	0
Togobei	0	0	2	100.00	0	0	0	0	0	0	0	0

Chinnery's series of sixteen males are longer headed and wider headed. No doubt part of this non-conformity in the two groups is the result of insufficient sampling. A comparison of the absolute values of the means of the Ontong Javanese with those of Friederici's Nukumanu islanders reveals that except in head length, head width, and face height there is substantial agreement. In eight out of eleven means the series approximate each other. Of the three that show a marked difference, head length and width have the same relative proportions in both the Ontong Javanese and the Nukumanu Islanders. Finally the face height of the Ontong Javanese, although 3.46 mm. higher than that of the Nukumanu sample, partakes nevertheless of the same tendency to a lowered facial height as compared with Polynesians and some Micronesians. Furthermore, the differences just noted in these three characters might also be reasonably expected in so small a sampling as Friederici's series represents. From this comparison it seems clear that the Nukumanu population is closely related to the Ontong Javanese.

Another nearby island, Mortlock (Marqueen, Tauu¹), is represented by a sample of fifteen. In stature the Mortlock Islanders are only slightly taller than the natives of Ontong Java, but their head width is very much greater, as their head length is smaller.

Finally, I have introduced into this section the series obtained by Schlaginhaufen (1929) from Kapingamarangi. This island is situated between New Guinea and the Caroline Islands. Physically and culturally the island is distinct from Melanesia. Schlaginhaufen traces its affinities to Micronesia and Polynesia, but he failed to make any metrical comparisons of the natives of Kapingamarangi with any of the published Polynesian data. With the exception of face height, the means for the natives of Kapingamarangi produce a pattern similar to that of the Marquesas-Maori. This comparison given in Table 23 shows clearly enough the striking relationship of the Kapingamarangi islanders to the Marquesas-Maori group of Polynesians. Their relationship with the Micronesian islanders in the light of these data recedes to a secondary position.

The obvious Polynesian character of the anthropometric traits of the Kapingamarangi again raises the question of Ontong Javanese relationship with Polynesia. We have already seen, by direct and indirect comparisons with Polynesian samples, that the Ontong Javanese showed no similarity with the former. Now, when we examine the means of Ontong Java in connection with the Kapingamarangi series, we once

¹Chinnery, 1925*

TABLE 22

COMPARISON OF ONTONG JAVANESE WITH OTHER NON-MELANESIAN GROUPS IN MELANESIA

					Males				Cephalic	Cephalo-	Facial	Nasal
	No.	Stature	Head Length	Head Width	Face Width	Face Height	Nose Height	Nose Width	Index	Facial I.	Index	Index
Ontong Java	102	163.69 cm.	193.08 mm.	143.05 mm.	134.60 mm.	117.36 mm.	48.46 mm.	40.30 mm.	74.11	94.0	87.37	83.45
Friederici's Nukumanu	14	163.9 cm.	188.3 mm. (23)	140.8 mm. (23)	134.3 mm.	113.9 mm.	49.8 mm.	42.0 mm.	74.8	95.3	85.0	84.9
Chinnery's Nukumanu	16	162.3 cm.	191.5 mm.	146.2 mm.					76.0			
Mortlock	15	165.7 cm. (13)	186.0 mm.	152.9 mm.					82.0			
Kapingamarangi	34	171.1 cm.	195.4 mm.	153.3 mm.	144.6 mm.	117.3 mm.	52.6 mm.	45.0 mm.	78.5	94.4	81.1	85.7
					Females							
Ontong Java	53	153.21 cm.	181.42 mm.	136.38 mm.					75.21			
Chinnery's Nukumanu	14		180.6 mm.	138.2 mm.					76.2			
Mortlock	16	157.8 cm. (14)	183.1 mm.	146.7 mm.					82.06			

more find no resemblance. The natives of Kapingamarangi are significantly taller, with wider heads and faces, greater nose heights and wider noses. For face height, the one trait in which the Kapingamarangi natives differed materially from the Polynesians, we do find a similarity with the Ontong Javanese.

Schlaginhaufen quotes a legend attributed to Liuanie (Ontong Java) which mentions Makarama (Kapingamarangi, according to Parkinson) as a former home of the Ontong Javanese. If the association of Makarama and Kapingamarangi be correct, we are impelled to deny any corroboration in our data for this traditional physical relation.

TABLE 23

COMPARISON OF THE NATIVES OF KAPINGAMARANGI WITH MARQUESANS AND MAORIS

	Males		
	Kapingamarangi	Marquesas	Maori
Stature	171.1 cm.	170.3 cm.	170.6 cm.
Head Length	195.4 mm.	193.2 mm.	196.5 mm.
Head Width	153.3 mm.	153.20 mm.	152.80 mm.
Face Width	144.6 mm.	143.20 mm.	145.70 mm.
Face Height	117.3 mm.	124.10 mm.	124.00 mm.
Nose Height	52.6 mm.	53.10 mm.	52.80 mm.
Nose Width	45.0 mm.	43.20 mm.	40.10 mm.
<i>Indices</i>			
Cephalic	78.5	79.40	77.70
Cephalo-Facial	94.4	93.50	95.30
Facial	81.1	87.0	85.10
Nasal	85.7	81.90	75.90

DISCUSSION AND SUMMARY

As was indicated in the beginning of this paper, a considerable speculative structure has been erected, based on the hypothesis that there exists a racial as well as a cultural integration of Polynesia with various non-Melanesian groups in Melanesia. These islands such as Ontong Java, Tikopia, and Rennell, commonly called Polynesian colonies, are sometimes regarded as marking the path of the migrating Polynesians in their hegira from the Asiatic mainland. The consequences flowing from the establishment of such a connection are of great importance and warrant the necessity for exhaustive studies of the evidence adduced to prove its existence. To some extent the investigations of an ethnological and linguistic nature which have already been completed point to certain affinities between Polynesia and these foreign colonies in Melanesia. But no adequate study, to my knowledge, had ever been made on the physical characteristics of these islanders. Consequently the primary concern in the analysis of the present series from Ontong Java was to test the validity of its supposed racial affinity with Polynesia.

A direct comparison with data on living Polynesians unequivocally opposed any assumption of a close relationship between the Ontong Javanese and the Polynesians. In fact, each of their anthropometric traits revealed them as distinctly different from each other. The possibility that the Ontong Javanese had been contaminated by Melanesian admixture, thereby concealing their original and perhaps fundamental association with Polynesians, was also considered. Fortunately, two groups, the Fijians and the coastal New Hebrideans from Tanna and Eromanga, representing crosses between Melanesians and Polynesians, were available as examples by which to gauge our series for analogous miscegenation. But in neither of these two samples could any similarity in anthropometric pattern with our series from Ontong Java be detected.

Still another aspect of this problem, however, presented itself in the search for a Polynesian kin of the Ontong Javanese. Our comparisons have been limited to the living populations, among whom no group offered any support for the hypothesis of a racial kinship with the Ontong Javanese. But the brachycephalic type characteristic of most of contemporary Polynesia appears to have been preceded in many islands by a more dolichocephalic type. Even the recently extinct Easter Islanders whose craniology has just been published by von Bonin, and the Moriori studied by Thomson show differences from the dominant type of the present. But to none of the cranial data accessible to me has it been

possible to approximate the Ontong Javanese, after making the usual allowances for the presence of soft tissues.

In none of the various comparisons of Ontong Javanese with diverse groups of Melanesians have we been able to find any evidence of a Melanesian origin for the natives of Ontong Java. It is true that contrary to the Polynesian means, individual means of various Melanesian groups could be found which agreed quite closely with the corresponding means for the Ontong Javanese. But none of the Melanesian groups showed a pattern of characters which corresponded with that of the Ontong Javanese. In view also of the lack among the Ontong Javanese of such Melanesian traits as frizzly hair, deeply pigmented skin and platyrrhine noses, it did not seem to me that an occasional coincidence of a single anthropometric trait deserved much weight or should be regarded as other than fortuitous and within the range of probability.

After having exhausted without success the Polynesian and Melanesian sources for a connecting link with the Ontong Javanese, we turned our attention to Micronesia in the hope of discovering there a population similar to that on Ontong Java. We were, in part, led to this by the resemblance to Micronesians which some of the photographs of Ontong Javanese showed. Unfortunately the physical anthropology of Micronesia has been sadly neglected and only the very scantiest corpus of material on the Gilbertese and Marshall Islanders is available. Information on the physical type of the Caroline Islanders, however, is somewhat fuller. With the two samples of Gilbert and Marshall Islanders gathered by Finsch and with a series of Jaluit Islanders from the Marshalls our Ontong Javanese showed no relationship whatever.

The Caroline Islanders, on the contrary, gave considerable evidence of a kinship with the Ontong Java population. It was possible to classify, according to crude resemblances, the various Caroline islands into three groups. While it is true that no single island sample showed in all its traits a decisive approximation to the Ontong Javanese, nevertheless in stature, head length, head width, bigonial diameter, cephalic index and facial index the natives of the West Carolines were sufficiently close to warrant regarding them as related. In face width, face height, and nasal index the Ontong Javanese diverge from the West Caroline Islanders, but approach the Togobei natives whom they resemble less in other respects than they do the West Caroline Islanders. The third group in Table 19, consisting of Yap and Palau in the northwestern corner of the archipelago, showed the least likeness to our series from Ontong Java. The type dominant in Yap and Palau, in contrast with the rest of the

Carolines, is more brachycephalic and rather Malay-like in appearance. It may well be that the Yap-Palau type represents a recent invasion which has already modified the physical characters of some of the other Caroline Islanders. If this be so, we may take the Ontong Javanese to typify a population once more widely spread in the Carolines but which has now been overlain and undergone permutation by miscegenation with succeeding populations. Survivors would then be found in its pristine character only on remote or isolated islands such as Ontong Java.

The qualitative characters of the Caroline Islanders are represented by only a limited sample, and although serious discrepancies exist between their percentages and those for the Ontong Javanese, I hesitate to place any weight on their significance.

Finally, we may note that the series from Kapingamarangi which Schlaginhaufen recently presented does not appear to be related to the Ontong Javanese. Traditionally there is supposed to be a connection between the two islands, but whatever physical similarity they might once have exhibited has now been wiped out. The natives of Kapingamarangi, unlike the Ontong Javanese, reveal Polynesian affinities.

Throughout the course of this paper we have referred to the so-called Polynesian colonies in general terms. It has not been our intention to deduce from our study of the Ontong Javanese a generalization for all these colonies. We can, of course, speak only for Ontong Java and specifically for the sample which we have of the population. Studies on the physical anthropology of the other islands have been lacking. It may be that investigation of Tikopia and Rennell, for example, will uncover a Polynesian population. The only other information I could find on the population of the islands which are ethnologically comparable to Ontong Java is for Nukumanu and the Mortlocks. The material from the latter consists of only stature, head length, and head width. These scanty data exhibit a type distinct from the Ontong Javanese. The natives of Nukumanu, however, are represented by two small series, one collected by Chinnery, the other by Friederici. There is some discrepancy between these two samples, but since Friederici's offers a wider selection of characters I have found it convenient to depend on his data. Between Friederici's Nukumanu, then, and Ontong Java, a similarity was found. Beyond this one cannot go and until fuller material is available our conclusions refer only to the Ontong Javanese and the natives of Nukumanu.

To summarize briefly, we have determined after an analysis of a series consisting of 102 males and 53 females from Ontong Java, that the

hypothetical physical relationship of this so-called Polynesian colony in Melanesia with the Polynesian stock itself does not exist. Nor could any evidence be discovered that the Melanesian physical type had either influenced or given rise to the population of Ontong Java. The closest approximation seemed to be with certain of the Caroline Islanders.

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