

ANTHROPOLOGICAL NOTES IN THE SOLOMON ISLANDS

IN my last paper on the physical characters of the natives of St. Christoval and the neighbouring islands (NATURE, vol. xxvii. p. 607) I drew attention to the variation which was presented towards the opposite extremity of the Solomon group by the Treasury Islanders, of whom I considered the natives of the large adjacent island of Bougainville would prove to be a more pronounced type. My observations during 1883, which were confined, however, to the islands of the Bougainville Straits, and did not extend to the large island of that name, have confirmed the existence of this variation in the type of the natives at the western end of the group.

Proceeding at once to the comparison of the inhabitants of these two regions, I find that the most important distinction lies in the form of the skull. The cephalic indices obtained from forty head-measurements amongst the men of the islands of Bougainville Straits (Treasury Island, Shortland Islands, Faro Island) ranged between 76 and 85; three-fourths were included between 79 and 83 (inclusive); and the mean was 80.6. Of the same number of measurements amongst the men of St. Christoval, half produced cephalic indices between 75 and 78 (inclusive); the range was 69 to 83; and the mean 76.7. In the first region therefore brachycephaly may be said to prevail; in the latter, mesocephaly. But in addition to being more brachycephalous, the men of Bougainville Straits belong to a noticeably taller and more robust race, their average height being 5 feet 4½ inches to 5 feet 5 inches, as contrasted with 5 feet 3 inches to 5 feet 4 inches in the case of the St. Christoval natives. I should also add that the hue of the skin is of a darker shade, corresponding to numbers 35 and 42 of the colour-types of M. Broca. The character of the hair resembles that of the natives of the eastern islands of the group in being frizzly and bushy; but there is introduced among the populations of these islands in the Bougainville Straits an almost straight-haired element, to which further reference will be made.

The inhabitants of the islands just alluded to are also distinguished from those of St. Christoval and the eastern islands of the group in many of their arts and usages, to some of which I can here only just refer. Cannibalism is rarely if ever practised among the natives of Bougainville Straits: it is, however, frequent amongst those of St. Christoval. Polygamy is more prevalent in the former region, where Gorai, the powerful chief of the Shortlands, possesses between eighty and one hundred wives, and Mulé, the chief of Treasury Island, owns between twenty-five and thirty. The patriarchal and despotic rule of these chiefs must be contrasted with the little authority which belongs to the majority of the chiefs in the eastern islands. The women of Bougainville Straits manufacture a kind of unglazed pottery, employing for this purpose a wooden trowel, a large smooth pebble 3 to 4 inches across, and a ring-cushion of palm leaf; a rudely-shaped saucer is first made from a lump of the clay; and upon this the vessel is built up, strip by strip. A large number of the houses in the principal villages of Faro—an island in the middle of the Straits—are built upon piles. I should here refer to the greater prevalence amongst the natives of the islands in Bougainville Straits of the cutaneous disease—an aggravated form of "body-ring-worm"—to which I alluded in my description of the St. Christoval natives: four-fifths of the inhabitants of Treasury Island are thus affected; and half of the chief's wives are covered with this disease from head to foot.

From frequent observation of the different modes of wearing the hair which prevail among the Solomon Islanders, I am of the opinion that their variety is to be attributed more to individual fancy than to any difference in the character of the hair. According to his taste, a man may prefer to wear his hair close and uncombed, when the short matted curls with small spiral give a

woolly appearance like that of the hair of the African negro. Should he allow his hair to grow, making but little use of his comb the hair will hang in ringlets 3 to 8 inches long—a mode more frequent amongst the natives of the eastern islands of the group, and best described as the "mop-headed" style. More often from a moderate amount of combing, the locks are loosely entangled and the hair-mass assumes a somewhat bushy appearance, the arrangement into locks being still discerned and the surface of the hair presenting a tufted aspect. The majority of natives, however, produce by constant combing a bushy periwig in which all the hairs are entangled independently into a loose frizzly mass, the separate locks being no longer discernible. These four styles of wearing the hair—the woolly, the mop-like, the partially bushy, the completely bushy—prevail with both sexes, the fashion varying in different islands of the group. I am inclined to view the mop-headed style as the natural mode of growth, it being the one which the hair would assume if allowed to grow uncombed and uncut. The Solomon Islander unfortunately makes such a constant use of the comb that one rarely sees his hair as nature intended it to grow. When, however, a man with bushy hair has been diving for some time, the hairs, disentangling themselves to a great extent, gather together into long narrow ringlets—nature's *coiffure* of the Solomon Island native.

Amongst the natives of Bougainville Straits the hair is coarser and of a darker hue, corresponding to numbers 34 and 49 of the colour-types of M. Broca; whilst the lighter hue of the hair of the St. Christoval natives more accords with numbers 35 and 42. The diameter of the spiral when measurable varied between 5 and 10 mms.—its usual range throughout the group; but on account of the practice of combing it was often difficult to measure it with any accuracy. Here I may allude to the almost straight-haired element which has been infused among the inhabitants of Bougainville Straits. The individuals thus characterised have very dark skins, which for want of comparison might be termed black; the hue, however, nearly agrees with colour-type 42 of M. Broca; the hair, which is even darker, corresponding with types 34 and 49, is almost straight, often erect, and giving the person a shock-headed appearance; whilst it may in some instances tend to gather into curls of a large spiral. I was unable to detect any constant change in physical characters accompanying this variety in the growth of hair. The general colour of the iris amongst the natives of Treasury Island may be described as a deep muddy-violet, approaching nearest to number 11 of the colour-types of M. Broca.

The relation between the lengths of the upper and lower limbs in over thirty individuals was fairly constant, the mean intermembral index being 68. A steady index, giving a mean of 33.4, indicated the proportion of the length of the upper limb to the height of the body; but the corresponding index which my measurements gave for the lower limb was somewhat variable, and the mean 49.2 is therefore not so reliable.

H. B. GUPPY

H.M.S. *Lark*, Auckland, N.Z., January 2

ON THE CLASSIFICATION OF THE ASCIDIÆ COMPOSITÆ

COMPOUND ASCIDIANS should undoubtedly be studied in the fresh condition. This becomes evident to any one who, after having admired the graceful forms, gorgeous colouring and transparency of tissue exhibited by the living animals on our western and southern coasts, or in such a favoured spot as the Chausey Archipelago, seeks in vain for these or any other beauties in the leathery repulsive-looking masses usually exhibited in a collection of Tunicata.¹ And it becomes painfully impressed upon one when working through a large collec-

¹ There are exceptions: some few species retain both form and colour fairly well when preserved.

tion which has been in alcohol for about ten years. Laborious dissection and the preparation of large numbers of sections are necessary to reveal characteristics which may often be seen in the living specimen by observation merely. And, what is of more consequence, there is a risk of being led into errors and misinterpretations by the abnormal contraction and distortions caused by the alcohol.

Such plates as those of Prof. Giard,¹ and of Dr. R. von Drasche's beautifully illustrated monograph on the Synascidiæ of the Bay of Rovigno,² which has just appeared, show how much can be made out from a natural representation of the living animal, and leave little or nothing to be desired so long as we must be content with some substitute for the actual specimen. In this important work von Drasche criticises Giard's classification of the Synascidiæ, and explains fully a scheme of his own which appeared in the *Zoologischer Anzeiger* for 1882. Many attempts have been made to classify naturally this difficult group, and this latest effort, although it has corrected some previous errors, appears still to be susceptible of improvement, especially as regards the interesting forms which occupy the borderland between simple and compound Ascidiæ. Some of these (the Clavelinidæ) are placed by Giard and von Drasche in the Synascidiæ, while in 1880 I tried to show that their proper position was amongst the Ascidiæ Simples, and close to the genus *Ciona*. At the present moment I confess that I am unable to find a single satisfactory character by which to distinguish these two large groups, the simple and compound Ascidiæ.

Savigny, in 1815, in his "Observations sur les Alcyons gélatineux à six tentacles simples,"³ first rescued the compound Ascidiæ from the Alcyonaria with which they had previously been associated, and demonstrated their affinity with the other Tunicata.⁴ In the "Tableau Systématique" Savigny gives no formal statement of the characters distinguishing the two groups, but it is evident from some passages in his "3^e Mémoire" that he relied chiefly, if not entirely, for their separation upon the arrangement of the Ascidiæ zoids of the compound forms around a central cloaca—a character which he declared was visible even in the young embryo. In this latter point he was mistaken, and it seems rather singular that he should have laid such stress upon the union of the atrial apertures when we find that he describes and figures their separate and independent existence in *Diazona* and *Distoma*, two of the genera of his "Téthyes Composées." *Clavelina* in his system is placed next to the "Phallusie Cionæ" (= the modern genus *Ciona*) in the Ascidiæ Simples.

Savigny classified the nine genera which he recognised amongst compound Ascidiæ by means of characters taken from the branchial and atrial apertures. But although such characters are most useful and constant marks of affinity in the simple Ascidiæ, they fail signally as applied by Savigny to the compound forms, and result in the separation of his closely allied genera *Didemnum* and *Eucalium*, while *Diazona*, *Distoma*, and *Sigillina* are thrown together in one group, and *Eucalium* is placed with *Botryllus*, a genus with which it has certainly no close relationship.

Lamarck's arrangement of the Tunicata, published about the same time, showed no improvement upon that of Savigny.

In 1841 Milne-Edwards⁵ established the group of "Ascidiæ Sociales" as occupying an independent position between the simple and compound forms. This group

(in which he placed the genera *Perophora* and *Clavelina*) he defines as comprising Ascidiæ which reproduce by buds as well as by eggs, and which live united by common radicleform prolongations, but which otherwise are free of all adhesion to one another. He distinguished the simple Ascidiæ as forms which never reproduced by gemmation and were never found in groups united by a common tegumentary tissue; while he separated the compound from the social Ascidiæ on account of their possessing a test common to all the members of the colony. If we unite the simple and social Ascidiæ, which I have shown in the Report upon the *Challenger* Tunicata there is reason for doing, we shall have, according to Milne-Edwards, the simple and compound Ascidiæ distinguished merely by the members of the colony in the latter being united by a common test, while in the former each individual has its own distinct tunic. This character, although better than the one made use of by Savigny, is, as we shall see later on, by no means an infallible guide.

Milne-Edwards formed a classification of the genera of compound Ascidiæ into "Polycliniens," "Didemniens," and "Botrylliens," which, with our present knowledge of the group, still seems fairly natural. These three divisions are distinguished by such anatomical characters as the relations of the other viscera to the branchial sac. In the "Polycliniens" the body has three regions—the "thorax," containing the branchial sac; the "abdomen," formed by the stomach and the greater part of the intestine; and the "post-abdomen," having the reproductive organs and the heart. In the "Didemniens" there are only two regions—thorax and abdomen—the reproductive organs and heart being placed on the intestine. In the third group, the "Botrylliens," the viscera form a single mass, in which the alimentary canal lies alongside the branchial sac.

This arrangement of the Ascidiæ Compositæ was generally accepted until 1872, when Giard published¹ his important memoir, "Recherches sur les Ascidies Composées ou Synascidiæ," in which is given a classification based upon the method of gemmation. He distinguishes three points of origin for the buds—the pyloric region of the alimentary canal, the reproductive organs, and the posterior end of the body. The latter region is the place of gemmation in his "Catenatæ," a group which contains three families—the Clavelinidæ, the Perophoridæ, and the Botryllidæ. But he gives no sufficient reasons for placing the first two families in the compound Ascidiæ, and, as von Drasche has pointed out, the third one does not really exhibit the essential character of the Catenatæ.

Giard's second group, the "Glomeratæ," is characterised mainly by the formation of ovarian buds. It corresponds to Milne-Edwards' "Polycliniens," in addition to half of the "Didemniens." The remainder of the "Didemniens" correspond to Giard's third group, the "Reticulatæ," and are characterised by gemmation taking place from the pyloric region. This seems a natural and well-defined section, including two families, the Didemnidæ and the Diplosomidæ, but the "Glomeratæ" cannot stand without several changes which von Drasche suggests, and which really reduce it merely to Milne-Edwards' section "Polycliniens." Upon the whole, there can be little doubt that Milne-Edwards' classification is preferable to that proposed by Giard.

We come now to Dr. von Drasche, the latest authority, who, both in his preliminary note² and in the detailed memoir,³ wisely abstains from any attempt to form main divisions, and merely groups the genera in a series of carefully chosen families. Of these the Botryllidæ corresponds to Milne-Edwards' section "Botrylliens," while the Didemnidæ and Diplosomidæ are identical with Giard's families bearing the same names. The Polyclinidæ

¹ "Recherches sur les Ascidies Composées ou Synascidiæ" (*Archives de Zoologie expérimentale et Générale*, t. i. 1872).

² "Die Synascidien der Bucht von Rovigno." Ein Beitrag zur Fauna der Adria, von Dr. Richard von Drasche (Wien, 1883).

³ "Mémoires sur les Anim. sans Vert."

⁴ The class Tunicata was established by Lamarck in the year following—1816.

⁵ "Observations sur les Ascidies Composées des Côtes de la Manche" (*Mém. Instit. France*, vol. xviii.).

¹ *Arch. de Zool. expér.*, t. i.

² *Zoologischer Anzeiger* for 1882, p. 695.

³ "Die Synascidien der Bucht von Rovigno" (Wien, 1883).

and Distomidæ do not correspond exactly to any of Giard's families, but the former is Milne-Edwards' "Polycliniens" without change. A new family, the Chondrostachyidæ, has been formed for the reception of Macdonald's *Chondrostachys* and von Drasche's *Oxycorynia*, remarkable forms in which the Ascidiozooids are placed upon a common peduncle penetrated by large canals. I am inclined to admit the necessity for this new family, and several undescribed and interesting forms obtained during the *Challenger* Expedition will, I hope, take up a position within its bounds. The two remaining families of von Drasche's system, the Clavelinidæ and the Perophoridæ, I would still maintain are more closely allied to the simple than to the compound Ascidiæ. They correspond to Family IV. Clavelinidæ of my arrangement of the Ascidiæ Simplices.

Dr. von Drasche does not define the Synascidiæ, and from one or two passages in his work it seems probable that he is in very much the position in which I now find myself, viz. unable to find any character or combination of characters which will serve to distinguish simple from compound Ascidiæ. Reproduction by gemmation and the formation of colonies in the latter group will not hold, since it is possible to pass from *Ciona*—a typical simple Ascidian—to *Distoma* and the very heart of the compound Ascidiæ through the following series of forms, which shows a perfect gradation of these characters:—*Ciona*, *Rhopalæa*, *Ecteinascidia*, *Clavelina*, *Diazona*, *Chondrostachys*, *Oxycorynia*, *Distoma*. The formation of common cloacal cavities, canals, and apertures cannot be considered as a diagnostic feature of the compound Ascidiæ. Although Giard has demonstrated their presence in some genera in which they were previously unknown, yet there are some forms considered by all authorities as Synascidiæ, such as *Chondrostachys*, *Diazona*, *Distoma*, and others, in which the atrial apertures of the Ascidiozooids open independently on the surface of the colony, and no common cloaca is formed.

Lastly, we come to characters taken from the condition of the test, but these break down like the others. In the first place, in passing along the series of forms mentioned above as connecting *Ciona* and *Distoma*, we encounter all stages between a distinct test or tunic for each individual and a common mass in which a number of Ascidiozooids are embedded. And, secondly, the remarkable group "Polystyelæ," briefly characterised by Giard in 1874, presents many of the characters of highly differentiated simple Ascidiæ (the Cynthiidæ), along with the supposed Synascidian feature of a colony composed of many Ascidiozooids completely buried in a common test.

In the *Challenger* collection there is an interesting series of Polystyelæ—all from southern seas—in which it is possible, I believe, to trace a passage from such aggregated Styelinæ as *Polycarpa* to the Botryllidæ. If this passage indicated genetic affinity between these two very distinct groups, which I greatly doubt, it would be impossible to escape from the conclusion that the Ascidiæ Simplices and the Ascidiæ Compositæ have two points of connection, almost at the extreme ends of the two series. I think I am justified in believing that probably both groups were derived from a form not unlike *Ecteinascidia* or *Clavelina*. From this common ancestor the simple Ascidiæ diverged through the Ascidiiidæ to the Cynthiidæ (including *Polycarpa*) and the Molgulidæ, while the compound Ascidiæ diverged through *Diazona* and the Chondrostachyidæ to the Polyclinidæ, Didemnidæ, and Botryllidæ. Hence it seems much more probable that the Polystyelæ have acquired independently certain characters of *Polycarpa* or of *Botryllus* (I have not yet been able to determine to which of the two they are really most closely related) than that there is any direct affinity between such highly differentiated groups as the Cynthiidæ and the Botryllidæ. This, however, does not affect the practical difficulty that the Polystyelæ completely bridge

across the gap between simple and compound Ascidiæ as distinguished by the nature of the test or tunic, and consequently it is extremely difficult to separate them from either of these two great series.

Thus all the diagnostic features usually employed fail utterly, and we find ourselves unable to discover a single character or combination of characters which will serve to distinguish the Ascidiæ Simplices from the Ascidiæ Compositæ.

W. A. HERDMAN

A METEOROLOGICAL LABORATORY

TO the last issue of *Science et Nature* M. L. Mangin contributes an interesting account of the chemical laboratory recently installed on the Pic du Midi, Pyrenees, at an altitude of nearly 9500 feet above the sea. As shown in our first illustration, the laboratory stands between the dwelling-house and the Observatory, of which it forms a dependency, under the direction of MM. Müntz and Aubin. In the second illustration a fuller view is given of the building, which faces southwards, and the slated roof of which is so constructed as to constitute a sort of pluviometer registering the annual rainfall, and retaining sufficient for chemical analysis. This unique establishment, which promises to render great services both to meteorology and to the economic industries, is at present chiefly occupied with the constituent elements of the terrestrial atmosphere, especially in connection with vegetable life. The student of chemistry need scarcely be reminded that, besides oxygen and nitrogen, the air contains in smaller proportions carbonic acid, ammonia, and certain nitric compounds playing an important part in the nutrition of plants, and supplying them with nearly all the nitrogen and carbon that enter into the composition of their tissues. During the summer months of the years 1881-82, MM. Müntz and Aubin were mainly engaged with the quantitative analysis of these substances, under conditions peculiarly favourable for the prosecution of such investigations. The results so far obtained may here be briefly resumed.

Carbonic Acid.—The proportion of this element found in the air at different altitudes is still a subject of discussion amongst analytical chemists. But de Saussure's average of from '0004 to '0006 has been shown to be considerably too high by various observations taken of late years at different stations on the globe. These observations are now fully confirmed by the researches on the Pic du Midi, which reduce the average to 2·86 thousandths.

Another important conclusion is that the carbonic acid does not perceptibly vary with the altitude, as had hitherto been supposed. Thus the proportion is found to be much the same at Vincennes near Paris, Luz (740 m.), Pierrefitte (500 m.), and Pic du Midi (2900 m.). On the other hand, the quantity varies slightly in the same locality, being somewhat greater at night and in moist weather than during the day and in dry weather. The subjoined table shows the average quantity of carbonic acid present in the atmosphere here during the day and at night at various meteorological stations in different parts of the world:—

	Night	Day
Vincennes ...	2·98	2·84
Pic du Midi...	2·90	2·86
Hayti ...	2·92	2·70
Florida ...	2·94	2·89
Martinique ...	2·85	2·73
Mexico...	2·86	2·66
Patagonia ...	2·67	2·66
Chili ...	2·82	2·66

Ammonia.—Although the presence of ammonia in the air has long been known, Schlösing was the first to show that for this substance, as well as for carbonic acid, the sea is the great reservoir whence the atmosphere receives its supplies. But no light had hitherto been thrown upon