

acknowledging such tremendous powers, we may mention that sailors who have irritated cephalopods with their boathooks, have had their naked arms, immersed in the water, suddenly seized by the suckers, while the animal in its fury has endeavoured to plunge its beak-like mouth into the flesh.

But these more highly organized and more locomotive animals do not appear to leave such lasting memorials of their presence as those of simple construction. Their mission is essentially destructive. They keep down redundancy of life, but we do not find that they raise atolls like the corals.

We must, however, qualify this statement by limiting it to comparatively modern times, for as the late Dr. Mantell remarked, "The living species are but representatives of the countless myriads which swarmed in the ancient seas."* Their fossil remains comprehend the most varied and striking forms of extinct beings that occur in the sedimentary strata, from the earliest secondary to the latest tertiary formations. Their fossil remains consist of the external shells, the osselet, or the internal calcareous support, the ink-bladder, with its inspissated contents or sepia; the mandibles, and some of the soft parts in a state of "molluskite."

This imperfect sketch of the nervous system of the invertebrates, and its relation to the functions which it performs, must serve as an introduction to the study of those higher types to which I hope at no distant period to direct attention. In these the relations of structure and function will be more clearly appreciable, and the connection between both and the objects of animal existence will be made manifest.

† III. THE POLYNESIANS AND THEIR MIGRATIONS.

By ALFRED R. WALLACE, F.R.G.S., &c.

THE origin of the various races of the islands of the Pacific has always been one of the most difficult problems for the believers in the unity and the recent origin of man. Their diversity of physical features, of civilization, and of language, the absence of any continental races to which they could be affiliated, and the wide spaces of ocean over which they are distributed, have hitherto seemed to indicate that their origin dates from a period so remote that we cannot hope to determine it with any approach to certainty.

M. Quatrefages, however, an eminent anthropologist, has courageously attempted to solve the enigma of the origin of the Polynesians, the most important of the Pacific races. He very properly

* 'Medals of Creation,' p. 448.

† 'Les Polynésiens et leurs Migrations,' par M. de Quatrefages, Membre de l'Institut, Professeur au Muséum. Paris, pp. 199. Arthur Bertrand, Editeur, 21, Rue Hautefeuille.

limits this term to the brown races spread over a wide area from the Sandwich Islands in the north to New Zealand on the south, and from Easter Island on the east to the Tonga and Samoan groups on the west, but all speaking dialects of one well-marked language. Now what M. Quatrefages attempts to prove is, that these people are simply Malays, who migrated from some islands of the Malayan Archipelago (probably Bouru in the Moluccas), and have more or less intermingled with the races of Melanesia and Micronesia. His evidence to prove this is of two kinds:—first, he endeavours to show that a migration has taken place; secondly, that the Polynesians are in their physical, mental, and moral characteristics, a true Malayan race.

1. *Migrations.*—We find in M. Quatrefages' volume a very careful summary of all the native accounts of their migrations, and also of the involuntary migrations that have recently occurred. These, no doubt, prove that the Sandwich Islands and New Zealand have been peopled by emigrants from the Marquesas and Tahiti, and the fact of this emigration is confirmed by the independent evidence of language. It is proved, therefore, that the Polynesians have passed over immense spaces of ocean, in directions not especially favoured by winds or currents, and thus the difficulty of any migration, merely from its distance, is quite overcome. It is further shown that all the traditions point to the Samoan group and the Fiji Islands as the central points to which almost all Polynesians trace their origin. It is to be observed here that these are the largest of all the islands in the central Pacific inhabited by the Polynesian race, and it is these, therefore, that we should naturally expect to have sent out colonies to the smaller islands. So far we have the strongest corroboration of there having actually been a migration in the fact of the community of language, and all the legends of these migrations speak of them as having been made by simple men, the natural ancestors of the existing Polynesians. But in the legend which refers the origin of the Samoans themselves to a migration from a large country "further west," we get into pure legend,—for the mythic Boulotou, whence the first inhabitants are said to have come, is a spiritual and not a real country, and these inhabitants are believed to have been not men, but inferior gods. And even the direct evidence of migration having been generally from the west, is by no means so clear as M. Quatrefages appears to believe; for one of the latest authorities on the subject, Mr. W. T. Pritchard, who has spent his whole life in the Pacific, and who from his long residence in the Fiji and Samoan Islands as British Consul, and his intimate knowledge of the Polynesian languages, is well qualified to give an opinion on this matter, says it is just the contrary. In his 'Polynesian Reminiscences,' p. 402, he observes: "It is, however, remarkable that in all these many instances of authenticated driftings, the course of the

drifted canoes has been *from east to west*, before the prevailing trade winds, and *not from west to east* before the westerly winds ;” during the prevalence of which he tells us the natives do not usually venture out on fishing or travelling expeditions. In this case, too, the corroborative proof by language completely fails, for though there is an undoubted Malay element in the Polynesian language, it is an element derived from the civilized Malay and Javanese tongues, not from those of the Moluccas, which are totally distinct.

It is to be noted also that this Malay element in the language has all the character of a recent introduction, since the Malay words are hardly changed, except by the phonetic character of the language which has received them.

2. *Physical Characters.*—The Malayan origin of the Polynesians at a comparatively recent date implies much physical similarity; for even if the Malay formed a still larger portion of the Polynesian language than it does, this would not prove a community of race, unless the physical characters also in some degree corresponded. It is here that we find an absolute defect of all evidence bearing upon the point in question—the similarity of the Polynesians to any race speaking the Malay language. Almost the only evidence adduced by M. Quatrefages goes to show the similarity of the brown race of Timor to those of Polynesia. But the Timorese are not Malays at all; they belong to that curious race which has close affinities to the Papuan in all moral and physical characteristics except colour, and their languages are much further removed from the Malay than even the Polynesian itself. The resemblance physically of this race with the Polynesian proves absolutely nothing with regard to the Malay question.

Now let us compare the most important and thoroughly well-established physical and mental characteristics of the two races :—

<i>Polynesians.</i>	<i>Malays.</i>
Tall, averaging—	Short—
5 ft. 10 in. . . Wilkes (Samoans).	5 ft. 4 in. or 5 ft. 6 in.
6 ft. . . Dupurey (Tahiti).	
Hair wavy, curly, or frizzly.	Hair always straight.
Beard often full.	Beard scanty or none.
Face handsome, European type.	Face never of European type.
Nose often aquiline.	Nose never aquiline.
Disposition active and joyous.	Disposition slow and morose.
Character open and frank.	Character eminently secretive.
Often erected stone edifices.	Never used stone for building.
Use double canoes.	Use single canoes.

In the following passages from Consul Hopkins' recent work on Hawaii, the italicized passages show points in which the Polynesian is the exact opposite of the Malay :—

“The hair of the Hawaiians is black or *brown*, strong, and frequently *curly*.”

“The Hawaiians are strong, well-made, and active, in height rather above the average of *Englishmen*. . . The Hawaiians possess the virtue of *courage in an unquestionably high degree*. . . They are now as peaceful a people as any upon earth; they are more *free from crimes of violence* than any nation that can be named. . . The natural disposition of the Hawaiians is everything that is *opposite to the gloomy and morose*. The pleasant universal ‘*aloha*’ or salutation, the *merry ringing laughter* of the women wherever found, proclaim the people to be a *light-hearted race*.”

Taking the whole of these differences, they appear to indicate a radical diversity of race, not to be overcome by any mere similarity of colour and some common words in language, which is all that really exists to prove identity of race. The one single fact of stature is conclusive against any such comparatively recent common origin as M. Quatrefages argues for. A race which averages 5 ft. 10 in., and has many men 6 ft. 2 in. or more, can hardly have been derived, at such a recent period as to have retained community of language, from a race averaging 5 ft. 5 in. or 5 ft. 6 in., and among whom a single individual of 5 ft. 10 in. is rarely, perhaps never, found. Again, the hair of the Malay is of the true Mongol type—black, coarse, and perfectly straight. The least approach to wavy or curly hair is never found among the unmixed Malay. I cannot find evidence that the Polynesians *ever* have this character of hair, while it is undoubtedly often as frizzly as the most decided Papuan. Again, the mental character of two races in a parallel state of civilization and inhabiting very similar countries, is surely of great importance; yet, what contrast can be greater than between the phlegmatic, suspicious, undemonstrative Malay, and the active, frank, and joyous Tahitian? Are we to throw down all these barriers of diversity for the sake of solving by main force a problem that is probably insoluble?

3. *Geological and Zoological Evidence*.—M. Quatrefages dismisses with a very brief notice the proofs of a former much greater extent of land in the Polynesian area than now exists. These proofs are of two kinds: first, the existence of numerous groups of coral islands, which are admitted to indicate sunken land; and secondly, the distribution of animals in the existing islands. That coral reefs and atolls are proofs of a subsidence of the land, has never been seriously denied since Darwin's work on Coral Reefs was published; and as immense areas of the Pacific are occupied by such coral islands alternating with volcanic groups and such as show signs of elevation, it is only a question of time as to whether man could have inhabited these sunken lands.

Can we form any notion how long it is since the Pacific lands have disappeared? This can perhaps be approximately determined by the existing distribution of animals in these islands. The only

group we yet know with any approach to completeness are the Birds ; and though these may not be supposed to be the best adapted to test a question of this kind, yet ornithologists know that a very moderate extent of ocean practically limits the range of most land birds. The total number of species found in any of these islands is very small. For example, if we exclude the waders, swimmers, and birds of prey as having roving habits and great powers of flight, we find that according to the best information only twenty-two species of land birds inhabit the group of the Society Islands, and of these seven are found in other groups ranging as far as the Marquesas, the Fiji Islands, and even to the Sandwich Islands. These are almost all birds of moderate powers of flight and such as inhabit the forests and mountains, and do not generally range far. In Mr. G. R. Gray's list of the birds of the Pacific Islands I find eleven species of the genera *Myzomela*, *Meliphaga*, *Tatara*, *Monarcha*, *Coriphilus*, *Eudynamis*, and *Ptilonopus*, which are known from two or more of the distinct and well separated groups of islands in the central Pacific, and some of them have a very wide range. Among these are two very distinct genera, *Tatara* and *Coriphilus*, which are entirely confined to the Polynesian area. Now these facts would certainly indicate a more intimate connection of the various groups of islands within the period of living species, and therefore within the human period, than now exists. The phenomena presented by the distribution of man are thus to some extent reproduced by the distribution of land-birds in the same area, and entitle us to believe that the subsidence of land indicated by coral reefs took place since man inhabited the earth. This subsidence was probably coincident with, perhaps caused by, the elevation of the existing volcanic islands ; and while man and birds were able to migrate to these, the mammalia dwindled away and finally perished, when the last mountain-top of the old Pacific land sank beneath the Ocean.

This hypothesis is one which does not outrage nature, as does that of the direct and recent derivation of the Polynesians from the Malays. It harmonizes at once with the Geological, the Zoological, and the Anthropological phenomena ; and if it is held that the facts are not sufficient to prove it, or that even if proved it only removes the origin of the race in question one step further back into the obscurity of the past, it may be suggested that in a case of such admitted difficulty we can hardly do more. We ought not to expect that the beginnings of every race are to be discovered within the short epoch of human history or tradition, and we have every reason to be suspicious of the theory that professes such a discovery. In the present case, the very erroneous views prevalent on the subject arise from two causes. One is the occurrence of a number of Malay words in the Polynesian language ; the other, the similarity of the brown tint of the Malays and Polynesians,

while they are separated by a group of people of a much darker colour. The similarity of tint has led many travellers in the one area to jump to the conclusion that the people of the other area, of which they have little knowledge, are the same race. It unfortunately happens that not a single traveller appears to be well acquainted with both races, and for that reason their opinions as to the similarity of the two should be received with great doubt. If, on the contrary, my account of the physical and mental characteristics of the Malays be taken as correct (and I resided among them for eight years), and if it be compared with that of the Polynesians given by Cook, and by recent travellers and missionaries, the differences will be seen to be so striking and radical, that all idea of their being the same race must be given up. In the case of the Malays in particular, much confusion has arisen from travellers having confounded with them the many peoples of distinct race which inhabit the eastern parts of the Malayan Archipelago, such as the Timorese, the mountaineers of Ceram and Gilolo, and of the small islands near New Guinea; and this mistake has been rendered excusable by the number of half-breeds between the two races to be found everywhere. Many of these people are, perhaps, allied to the Polynesians,* but they are certainly not Malays, who are essentially a Mongol race, with many of the Mongol characteristics very strongly marked. The Papuans of New Guinea form the extreme type of another and a widely different race, and all the evidence goes to show that in every characteristic except colour, the Polynesians are nearer to the Papuans than they are to the Malays, although it is not improbable that they are equally distinct from both.

IV. LOUIS FIGUIER.

THERE are two distinct classes of scientific writers whose labours tend to raise the intelligence of our age; those who, by the publication of original researches (usually in the Transactions of Scientific Societies, or in the pages of technical journals), constitute the pioneers of scientific progress, and by their industry extend our knowledge of the laws of nature; and those again, who, appreciating the value of such original researches, and feeling the necessity for diffusing knowledge amongst the masses in a form in which it will be best understood by them, bring their literary powers to bear in a noble cause, and render comprehensible to the multitude laws and facts which would otherwise be appreciated only by the limited circle of what we are accustomed to call "Savans." Each of these two

* The mountaineers of Gilolo and Ceram are perhaps true outliers of the Polynesians, and may represent the effect of that westerly migration from Samoa, of which Mr. Pritchard speaks.