

imagined that black beetles were being encouraged rather than got rid of, for the sake of the bird. My specimens appear to have been brighter than those previously in collections, or there is some slight difference, and it has been given the rank of a sub-species named *Guttera cristata seth-smithi*, though the difference is, I believe, so slight that it would appear to be a mistake to form a sub-species of it until many more specimens have been obtained.

I am afraid that the above is but little more than a list of birds ; but I think it shows that there are a great many birds of immense interest in forests, especially when I mention that most of these birds were obtained in my spare time during a few days I spent in the forest in 1907.

I am quite sure that if one could spend a year collecting, not only skins but notes of nests, eggs, and habits of forest birds, a great deal of new and extremely interesting information would be obtained, as I believe very little is at present known about this most fascinating branch of Ornithology.

A NOTE ON ANTHROPOMETRY

BY NORMAN LEYS, M.B., B.Ch.

Anthropometry is the least interesting branch of anthropology. It has no room for the exercise of imagination and no human interest. On the other hand, there is little room for fancy or prejudice, and one's facts, unless indeed one cooks them, are final and indisputable.

In anthropometry measurements of the human body are made with the purpose of determining race. Races, of course, are popularly determined by other means. We tell a man's race by his language, his clothes, his religion. Unfortunately, investigation shows that these tests are unreliable. Probably, for instance, only a minority of those who now speak English are of the English race. Not only in Ireland and Scotland, but in French Canada, Dutch South Africa, Asiatic India, Cosmopolitan America, our language

is the mother tongue of aliens in blood. A good half of Germany is Slav in race though German in speech, and a good half of France is Latin in speech though German in race. To come near home, the Kavirondo plain is inhabited by people whose ancestors, many of them, were Bantu. Now they speak a language as far removed from any Bantu speech as English is from Chinese.

It must not be thought that language is no guide at all. The villages in Kavirondo where Bantu was once spoken are still distinguishable by defects in pronunciation, vocabulary, and grammar, from villages of true Luo origin. English bears the marks, in its simplicity of structure, its absence of case and tense inflexions, of having been learnt laboriously and imperfectly by Celtic, Danish and Norman strangers. Swahili has undergone modifications of the same kind from the typical Bantu pattern, having been affected by successive Mohammedan invasions ; so has Hindustani from its older form. The rule is, accordingly, that the more elaborate the structure of a language the more likely it is to be spoken by a ' pure ' race, and the simpler the language the more mixed the race. The Australian aborigines, for instance, isolated as they have been for very many centuries, speak a language with such a detailed vocabulary and such an elaborate grammar that no European has ever learned to speak any of its dialects properly.

If language is an uncertain guide religion is still less certain. In our age we have the spectacle of Europe, having learned its faith from Asia, teaching it back to Asia. The North of Africa was once the most solidly Christian part of Christendom, and Spain once the richest, most learned, and most glorious country in Islam. Buddha was a native of India, but few among the millions of his followers are found in India to-day.

Nor do the customs embodying beliefs from which religions spring, persistent though they are, help us much. The use of the wedding ring, the Sun myth, sacrifice, and a score of other ancient customs and beliefs exist all over the world to-day; but have wandered so far from home, and have so changed in their wanderings, as to prove little but the deep differences of the learned. Even a definite institution like circumcision

is of little help. A map of Bantu Africa distinguishing the circumcised from the uncircumcised would be like a patchwork quilt. In one province of life, indeed, where fashion is proverbially fickle, people in certain parts of the world are strangely unchanging. The East has seen many invasions, social revolutions, new religions, since she last changed her clothes. And one of the indications of the profundity of Western influence over the East is that her sons now put on trousers and boots.

But if man can thus change his language, religion, customs, he cannot add a cubit to his stature. The one thing that does not change in the members of a race is the shape of the bony framework of their bodies. The shape of the cranium and the nasal bone, for instance, are believed to persist unchanged in spite of changes in diet or with emigration to new latitudes and elevations.

The application may be described as follows: If one measures a man's head in two dimensions, lengthwise and breadthwise, and divides the breadth by the length, one gets his 'cranial index.' The head, for instance, may be eight inches long and six inches wide. The cranial index in that case, omitting the decimal point, is 75. If one takes a thousand typical Englishmen and measures their heads one finds that their cranial indices vary between, roughly, 72 and 88. More perhaps will be found to have the index 79 than any other, and the indices found next most commonly will be 78 and 80, while instances of men with larger or smaller cranial indices will grow scarcer the farther they get from the average index. One may write down the data graphically, in the form of a curve. The top of the curve will correspond to the index 80, as more have that index than any other, and at the bottom on one side will be represented, perhaps one man with the index 72, and at the other perhaps two men out of the thousand with the index 89.

A second curve taken in the same way from measurements of a second thousand typical Englishmen will coincide with the first. But a curve drawn on the same plan for Armenians or Chinamen will be very different. In these races the longest-headed may have an index of 80 and the broadest one of 95.

Punjabis' heads again run from 67 to 80. These racial differences in head shape have been shown, by examination of skeletons, to persist over centuries. The co-ordination of the measurements of various physical features has made possible an ethnographic map of the world. In this map there are areas where the outlines depend on abundantly proved facts. In many Continental countries part of the work of the doctor who examines conscripts is for the ethnographic survey. Similar work is often done among children in schools. In Europe ethnographers have the help, too, of a long history to explain the results of anthropometry. The existence, for instance, of a fair-haired, tall, long-headed element in the population of North Italy is explained by the Lombard invasion and settlement.

But in most of Africa such an anomaly would be at the best a subject for guess work. The ethnographic map of Africa has uncertain outlines, often even large unexplored areas. What history the continent has is of constant migrations, conquests, absorptions, dispersions. Few tribes in East Africa lived a hundred and fifty years ago where they live now. Many, as the Kikuyu, the Taita, the Kavirondo, the Suk, are recent amalgamations. All this confusion, and the absence of any reliable history except of recent generations, means that in Africa anthropometry is almost the sole means of determining race.

A few hints may be of service to men who may wish to take anthropometric data. The only instruments necessary are a pair of callipers which can be got for two guineas through the Secretary of the Anthropological Section of the British Museum, and a notched pole for measuring heights. Measurements are best made on the metric system. The most important datum is the cranial index. The next two in importance are stature and the nasal index, taken in the same way as the cranial, i.e. breadth across nostrils divided by length from the tip to the wrinkle at the root. Other data of importance are the shape of the individual hair and the depth of cutaneous pigmentation. But the first of these needs a microscope and the second is not easy to determine accurately. It is most important to know that a few measurements taken from

each of many individuals are of more value than numerous measurements taken from fewer individuals. The average of a thousand cranial indices is a more accurate figure than the average of twenty. And there is great difficulty in coordinating more than a few different kinds of data. Accuracy of mathematical expression of the difference between two classes of things diminishes as the number of features regarded as differential increases.

It is also most important to classify individuals as accurately as possible. In Africa it is very difficult. Not everyone is a Swahili who calls himself one. Anthropometrically a man is only a Swahili if his ancestors so far as he knows lived on the coast and spoke Swahili. This definition excludes many who are Swahili in their own opinion. A Swahili, for instance, whose paternal grandparents were Digo and maternal ancestors Makua, should have an entry to himself. A similar difficulty exists in the case of other tribes. Many Kikuyu are of Dorobo ancestry. A simple way of discovering the fact is to ask if they eat game. Classification, also, should be as detailed as possible. The Wagunia, for instance, should have a page to themselves and not be classed with Mombasa people.

A note on the interpretation of data may be of service. A pure race will vary little from its own average in respect of any one physical feature. All will, that is, have nearly the same stature and nearly the same shape of head. Curves drawn to represent such data will be sharp and symmetrical. In the case of races containing two or more types these curves will be differently shaped. It might be thought that the offspring of a broad-headed man and a long-headed woman would have an intermediate-shaped head. But the law governing the transmission of parental differences is that the children more often take after one parent or other in respect of each character. Only frequently repeated blends are liable to result commonly in intermediates. Thus the curve of a mixed race shows evidence of diversity of origin in irregularity of outline. It can easily be understood that a broad flat-topped curve would indicate a fusion of different types, while a curve with a shoulder in it would show the

persistence of a type subsidiary to the main type. Examples of all these can be got in East Africa.

The fact should be mentioned that the results of anthropometry are of no immediate practical value. Nothing can be predicted of a man's character or capacity from the physical type he belongs to. Not everyone with a nose as broad and flat as Socrates is a philosopher, nor does a nose like Wellington's argue a good soldier. No shape of head or any other physical feature is the best. Further, mental characteristics of races seem to change. The Jew was once a cultivator and only engaged in trade and finance when he was cut off from the soil by Roman conquerors and Christian persecutors. The Scot, now known as canny and hard-fisted, was known to the Europe of the Middle Ages as 'Scotus perfervidus.' In still earlier times he seems to have had a much less savoury reputation. Gibbon records the unpleasant tradition that the inhabitants of the Clyde Valley were once cannibals.

One thing that does appear probable is that mixture up to a certain point is advantageous. The modern world was born and cradled in the eastern Mediterranean basin, the place of conflict and commingling of three continents since the dawn of history. In recent centuries indeed from a number of causes words like patriot and nationality have come to have narrower boundaries. The phrase now common in law, 'of European descent,' would have seemed strange indeed to Justinian.

But absorptions of widely different racial types still go on in the modern world. The Hungarians are an Asiatic people, who, by a political accident, took sides with the West rather than with the East. Now, in their religious, social and industrial life they are typical Europeans, while their kinsfolk of Central Asia are still semi-savage nomads. In our own time Maoris and North American Indians are rapidly being absorbed by a European race. The magic of the term pure-bred comes from its associations with biology. But there is the difference that the scientific farmer knows what to work for, while we do not know what types in men to breed. If we ever learn it is safe to say that no one race will provide all the qualities of the best breeds.

Meanwhile the history of racial conflict and conquest will repeat itself. And its great paradox will not seldom also be repeated. As in the old world Greek slaves and Jewish outlaws proved stronger than their Roman conquerors, so in the future will races and their empires that rest on force be swayed and transformed by invulnerable revolutions of the mind.

SEASONAL VARIATION WITH SPECIAL REFERENCE
TO THE GENUS JUNONIA

BY THE REV. K. ST. AUBYN ROGERS, M.A., F.E.S.

The subject of variation is a study of no little importance, inasmuch as it is probable that it will throw more light on the vast subject of the inception of new species than any other investigation. It, moreover, requires co-operation on a large scale because for its pursuit large numbers of specimens from properly authenticated localities and duly dated are necessary. Breeding on an extensive scale is of primary importance, and is sure to repay the trouble by the interest of the results obtained if carried on with due care. The butterflies especially are suitable for experiments of this nature, because they are so variable and are influenced by so many different conditions. Not only do the males and females show great differences in many cases, but most species of wide distribution show considerable, and in some cases large, amounts of variation in different geographical areas. It is, for instance, often possible to say at a glance whether specimens of many species have come from East or West Africa. In this case specimens which come from the districts where these two areas overlap are of the first importance.

Then, again, in butterflies there are often marked differences between the specimens characteristic of the wet season and the dry season respectively, and these differences reach their highest development in Africa. Owing to the fact that our wet and dry seasons are not so well defined as in other parts of the continent, it may happen that one form does not occur at all