

seems as if the value of material was such as to induce the makers of these flakes to adopt a plan by which the maximum number was obtained with a minimum amount of waste. All the flint flakes and cores from the ten different stations along the coast, from Croyde to Bude, show a singular uniformity in their design; and the method by which they were formed appears to have been as follows: A model having been selected, a flat surface or base was then formed by striking off the flattest end as near the point as possible. If the flint was cherty, or showed an uneven and hackey fracture, it seems to have been rejected in this first stage of its manufacture; but if, on the other hand, it split with a smooth conchoidal fracture, a series of blows was administered from the flat surface at intervals round the margin, so as to peel off the rough coating of the nodule on three sides. The second series of blows produced the largest flakes; and a third, or even a fourth, set of flakes would successively be obtained in this manner before the core was used up. This peculiarity was incidentally noticed by me about two years ago, in the course of a communication to the Society of Antiquaries; and a subsequent examination of many hundred flakes and cores has served to prove that the same process was in use throughout the whole of this district. The largest flakes hitherto found in North Devon are about three inches in length, but between these and the smallest, which measure not more than three parts of an inch, there are innumerable gradations in size. The result of the principal excavations which had been made at Croyde and Northam shows that the average proportion of cores to flakes is about fourteen per cent.

Sir JOHN LUBBOCK did not see that there was any difference in the formation of the flakes found in North Devon and those found in other parts of the country. He had noticed in the Exeter Museum one or two labels which he would like to see removed; he referred to some natural flakes which were labelled as cores, but there was not the slightest evidence that they had been subjected to human operation.

The PRESIDENT observed that if private remark were made to the curator of the museum, he had no doubt that the labels would be corrected. When there was any doubt or uncertainty about objects, they should be kept separate.

Mr. R. GARNIER read a brief paper *On the Head of a Negro*, which he compared with the European skull.

This was followed by a lengthy paper *On the Frontier Line of Ethnology and Geology*, by H. H. HOWORTH, Esq.

Mr. J. H. KINAHAN, in his paper, *On the Race Elements of the Irish People*, remarked that they seemed to be of a very mixed origin.

*Race Affinities of the Madecasses*, by Mr. C. S. WAKE, was too voluminous to be read at the present point of the proceedings.

A short extract was read of Mr. J. STIRLING's paper, *On the Races of Morocco*; after which the Chairman declared the work of the section at an end.

The following papers, which were taken to Exeter, were withdrawn by the authors, in consequence of no Anthropological Department having been appointed:—

Dr. BEDDOE—"Anthropology of Devon and Cornwall."

L. O. PIKE—"Method of Anthropological Research."

L. O. PIKE—"Psychical Elements of Religion."

Dr. HUNT—"On the Question of the Acclimatisation of Man considered with reference to Europeans in the United States."

Dr. HUNT—"On the Negro in the New World."

E. PEACOCK—"On the Anthropology of the Isle of Axholme."

Drs. CHARNOCK and CARTER BLAKE—"On the Mosquito and Wulwa Dialects."

J. P. HEPWORTH—"The Races of Jamaica."

And others the names of which have not reached us. The following papers were read in other departments of the Association:—

*The Occasional Definition of the Convolutions of the Brain on the Exterior of the Head*.—This paper, which was read by Mr. T. S. PRIDEAUX, was illustrated by a cast, and the leading conclusions were thus stated:—The general outline of the skull—with the exception of its base and certain

limited portions covered with muscle, more especially beneath the arch of the zygoma and behind the external angle of the orbit—is convex, presenting a flowing curve. Occasionally, however, and perhaps more frequently in the forehead than elsewhere, the outline of a cerebral convolution is so prominently defined in the skull as to be very apparent in the exterior of the head through all the integuments. Sometimes it happens that, after wasting from sickness, the outline of convolutions masked before through the thickness of the integuments, becomes so conspicuous that relatives call the attention of the medical attendant to these prominences, and declare them to have grown out since the illness. Now, could we discover the cause which underlies this exceptional configuration of the brain, we could scarcely fail of being much enlightened as to the laws which generally preside over the development of this organ. Are we to regard this peculiarity as an indication of progress towards perfection, or the reverse. The result of my own observations leads me to think there can be little doubt of the greater frequency of this occurrence in civilised than in savage races. Minute examination reveals great differences in the proportion the size of the convolutions bear to each other in brains of the same general size. In two foreheads of the same breadth, for example, in A the convolutions seated in the mesial line shall be much wider than in B, whilst in B the lateral convolutions shall be much wider than in A. As in different families or races, the features of the face bear very different proportions in size to each other, a certain average proportion being characteristic of each, so with the convolutions and groups of convolutions of the brain. Now, the theory I have to propose as an explanation of the protuberance of isolated cerebral convolutions is that either exercise or the crossing of races by marriage has caused offspring to be born with a predisposition towards the more energetic manifestation of a function than the extent of surface allotted to it by the brain type of its race will furnish; that this extent of surface not being susceptible of being widened without subverting the general packing arrangement and proportionate surfaces of organs and figure of the brain as a whole belonging to the type, Nature effects her purpose by thrusting the skull outwards. This theory requires that the cerebral convolutions most frequently protuberant shall be those appropriated to functions which the progress of civilisation has a tendency to cultivate, and render men more active than they are found in a ruder state of society; and, if I am right in believing that the convolutions which in the frequency with which they occur, defined on the exterior of the head, surpass all others, are those of the organs of music and causality, I think it must be admitted that so far the test does not fail. Gall especially described two different forms or modes of development assumed by the organ of music. In some of the most eminent composers, the external corners of the forehead are enlarged and rounded towards the temples, giving extent of superficies to the organ without clearly defining its outline. In others, equally celebrated, the organ presents a well defined prominence in the form of a pyramid, the base of which rests above the eye, whilst the apex reaches half way up the forehead, and terminates at its external edge. Gall gives the Mozarts, father and son, Michael Haydn, Paer, Dussek, Crescentini, and several others, as examples of the first conformation; Beethoven, Joseph Haydn, J. J. Rousseau, Gluck, etc., as examples of the second; and I may add to the list of great musicians presenting the outline of the organ in a well defined pyramidal form the names of Mendelssohn and Weber. I am acquainted with a lady, who possessed from childhood an extraordinary genius for music, in whom the organ presents the first form. The configuration of the external corners of the forehead is such as to provide a wide extent of surface for the organ of music, but no defined outline is perceptible. This lady married into a family singularly wanting in musical capacity. She has two daughters who, without equalling their mother in genius, inherit from her a capacity for music much above the average. Their heads, however, follow in general outline the type of their father's family; they lack the spacious temporal region of their mother, and present the organ of music in the pyramidal form, and this form is, beyond doubt, that which is most commonly met with in England. On an average, I have

my attention arrested at least once in six months, by seeing a very conspicuous development of the organ of music in the pyramidal form in a complete stranger. When circumstances permit, I always endeavour to ascertain whether the endowment with the faculty is commensurate with the development of the organ, and I can say with truth, that I never yet received a negative answer. This mask which I hold in my hand, I took from the head of a gentleman a few days since, as a good example of the development of the organ of music in the pyramidal form. Calling recently at an office in the city, a perfect stranger came forward to address me. As he approached, the cross-light from a window brought his organ of music into such prominent relief, that I half-involuntarily exclaimed, "Why, you ought to be a musician." "What makes you say so?" said he. "Because you have it written in your forehead," I replied. "Ah! I suppose you are a phrenologist," he rejoined; "but it is strange you should have discovered it, for I have had my head twice examined, especially for the organ of music, by lecturers on phrenology, who visited the town where I then resided, and they both told me I had very little of it. You, however, are right; by an accident you found me in this office, but I am the organist of —, and well known in the musical world."

In the course of the discussion, which was more irregular and conversational than usual, various objections were started by the Chairman, Professor McClelland, Mr. Wallace, and others, to the theory of Mr. Prideaux, as to how it was that Mr. Prideaux could distinguish between the human voice in conversation and in music, as he (Mr. Prideaux) had stated he could.

The CHAIRMAN (Professor Busk) said he should be glad to hear remarks upon the subject. He was not satisfied himself that the prominence pointed out by Mr. Prideaux was caused by the development of the brain at the particular point, or whether it might not be the temporal muscle, or whether it might not be fat.

Mr. PRIDEAUX denied that it could be a development of the temporal muscle which produced such a protuberance, as that did not extend so far.

The CHAIRMAN said he doubted whether the convolutions of the brain could produce a change of appearance on the exterior of the skull. They were often made on the interior of the skull.

Mr. PRIDEAUX said they would always find the prominences, as he showed them to exist in this case, in all great musicians.

The CHAIRMAN said it remained to be seen whether there were not brains of people of equal musical power which did not show any such external mark.

Mr. PRIDEAUX said that was just what the phrenologists had been asking the anti-phrenologists to show them for years. It was for the anti-phrenologists to produce those proofs. He would take upon himself to say that it was an invariable fact that a great power for music would be accompanied by the conformation of skull which he now pointed out.

The CHAIRMAN said in this particular instance the man Mr. Prideaux spoke of seemed to have been amongst phrenologists, and they had not discovered his musical powers.

Mr. PRIDEAUX said that was because the people who pretended to a knowledge of phrenology were often not capable of distinguishing such cases.

Mr. WALLACE complained that only one instance had been brought before them. They ought not to be asked to accept such a theory except on the production of an overwhelming mass of facts. If the crania of two hundred or three hundred musicians could be brought before them, all showing the development of that one part of the skull, then there would be some force in the argument; but to bring a solitary case, and say there were others, was merely a waste of time.

Mr. PRIDEAUX, in reply to various other questions, said that he could not tell how the brain performed its functions with regard to musical pitch. It could only, of course, be a matter of analysis, and in every great musician ever known, that part of the forehead had been very large. The theory of music was founded on the musical pitch, or the number of vibrations in a second, and in some way the organ of music, or that part of the brain, took cognisance of the number of those vibrations, just as the organ of colour

would take cognisance of the number of vibrations in the rays of light. He would venture to say that he could at once detect, in a number of strangers, those who would be likely to sing in tune. He was himself deficient in that faculty, but had an extraordinary memory for voices, and could recognise any one he knew by hearing him utter two syllables.

Mr. WALLACE: How do you distinguish between that faculty and that which gives the power of a musician?

Mr. PRIDEAUX said by the peculiar intonation of the voice. He did not know whether physicists had as yet defined mathematically what produced an agreeable voice or otherwise, but phrenologists could, by the shape of the head, tell what sort of a voice a man had. A man with a low head never had a rich voice. There was, too, a deep ringing voice given by the presence of what the phrenologists called destructiveness, which in some actors lent great force to their outbursts of rage. As to bringing a great number of examples, that had been done by Gall years ago. Phrenologists had filled the museums with casts and examples, and he only wanted men of science to turn their attention to the subject, and to bring facts in opposition. The onus rested with their opponents to disprove the position taken by phrenologists.

The CHAIRMAN suggested to Mr. Prideaux that he should experiment upon the audience in picking out the musicians, but Mr. Prideaux demurred to that course as not being scientific in method; and the discussion shortly ended, as did also the business of the section, with a vote of thanks to the chairman.

Mr. PENGELLY, F.R.S., was called on by the President to read the *Fifth Report of the Committee on the Exploration of Kent's Cavern*. He said that beneath the floor of the "vestibule" was a layer of black soil, six to nine inches deep, which had yielded 366 flint implements, bones and teeth of recent and extinct animals, charcoal, flint cores, &c. It had been objected that people could never have lived in the caverns, because smoke would have suffocated them. An experiment which had been tried, in burning six faggots of wood, showed the fallacy of the objection. In the exploration of the cavern, a daily journal had been kept, and every circumstance was noted down. 3,948 boxes of fossil bones had been found, and these Mr. Boyd Dawkins undertook to examine for the purpose of determining the species to which they belonged. Among other objects, a bone needle had been found in the black band beneath the stalagmitic floor. The eye was capable of carrying a thread the thickness of thin twine. A bone harpoon or fish-spear, forked on one side only, had been met with. Other undoubted evidences of early human art had been found. During the years 1868-9,

Mr. Everitt, who is engaged by the Rajah of Sarawak to explore the caves of Borneo, visited Kent's Hole for the purpose of familiarising himself with the mode of operation. Mr. Pengelly then detailed the various layers underlying the stalagmitic floor, in which he was aided by a series of large diagrams. The cave earth, or floor underneath the stalagmite, was full of flint implements, teeth of the mammoth, bear, hyæna, &c., and gnawed and split bones. Inscriptions dated 1688 had been found on the stalagmitic walls of that part of the cavern known as the "crypt." The deduction drawn by Mr. Pengelly was that this period of time, although the dripping of water was very copious, had been insufficient to coat over and obliterate the writing. This gives some idea of the immense age of the stalagmite floor, and of the time occupied in its formation. Beneath the earth was a breccia, and up to last year not the slightest traces of man had been found. This year, however, a flint flake was met with, thus carrying the antiquity of man further back. A monthly report had been sent up to Sir Charles Lyell. In some places the stalagmitic floor was as much as twelve feet thick. Associated with the flake were the remains of the cave-lion, the cave-bear, mammoth, &c. In fact, this was the most important anthropological relic which the cavern had yielded. Mr. John Evans, F.R.S., had seen the flint flake, and had declared it to be of undoubtedly human workmanship.

Mr. BOYD DAWKINS read a few notes on the mammalian remains men-