

Frome; and out of a cartload of it he had been enabled to obtain more than a million organisms, in addition to twenty-nine types of mammals and various kinds of reptilia. He had discovered in these beds many genera that had never been previously recognized. In these beds he had obtained over 70,000 teeth of one kind of fossil alone in the rhetic beds.—Mr. Moore made some observations with regard to the ironstone that is to be found in the neighbourhood. One landed proprietor owned 40,000 acres of land, which for agricultural purposes was valueless, but it contained ironstone throughout its whole extent. Multiplying 40,000 acres by 80,000, the quantity of ironstone might be approximated, and this quantity converted into iron, and sold at the present price of iron, would more than pay off the national debt. He was therefore surprised that in this district there were not smelting-furnaces the same as in other districts of the country where ironstone was found.—Mr. Moore produced some interesting specimens of stones which he had found in the neighbourhood of Bath. These stones were about five inches in diameter, and about six or seven long, and each of them contained a specimen of some kind of fish. Indeed he could tell by the appearance of the stone what it contained, and he would break open several to show this. He did so, and in every case the fish Mr. Moore had previously indicated was discovered; but the most interesting specimen was the ova which contained the cuttle-fish. When Mr. Moore broke open the stone, not only was the cuttle-fish discovered, but the inky fluid—the sepia—was discovered as in a fish of the same kind that might be taken out of the sea at the present day. There was as much of it as would fill an ordinary-sized ink-bottle, and Mr. Moore took a portion of it and smeared it over a piece of white paper, making it literally as black as ink. He then produced some specimens of the Ichthyosauri found in the neighbourhood of Bath, and a specimen of a fish, about the size of a salmon, of six or seven pounds weight. It was so perfect in its form and appearance and shape, that but for its colour, as Mr. Moore said, it might be handed by mistake to the cook to dress, and yet it must have been millions and millions of years since this fish lived and moved about in the water. In the mammal drift which entirely surrounded Bath, the remains of the mammal tribe were abundant, and Mr. Moore exhibited many specimens.

Sir C. LYELL said that the bone-bed and mammal drift to which Mr. Moore had alluded, had been long known to geologists, especially the one in the neighbourhood of Bristol, and Mr. Moore had rendered service in the discoveries he had made of the fossils which this drift contained. He (Sir C. Lyell) had seen the same kind of drift occupying just the same position in conjunction with the lias, in the neighbourhood of Stuttgart, in Würtemberg. Mr. Moore had discovered the remains of the musk buffalo in the drift of this neighbourhood, an animal which now inhabited the Arctic regions only. He (Sir C. Lyell) had also discovered a similar specimen close upon the gates of Berlin. Similar fossils had been discovered at Salisbury, together with the mammoth and rhinoceros; and with them were discovered evidences that were conclusive that man existed at the same time as those animals.

'On the Foraminifera of the Middle and Upper Lias of Somersetshire,' by Mr. H. B. BRADY.

'On the Lower Silurian Rocks of the South-East of Cumberland and the North-East of Westmoreland,' by Prof. HARKNESS.

'On the Formation and Condition of the Ice in certain Ice Caves of the Jura, Vosgian Jura, Dauphiné and Savoy,' by the Rev. G. F. BROWNE.

'On the Lowest Beds of the Clifton Carboniferous Series,' by Mr. W. W. STODDART.

'On the Geological Formation of the District around Kingswood Hill with especial Reference to the supposed Development of Millstone Grit in that Neighbourhood,' by Mr. H. COSSHAM.

SECTION D.—ZOOLOGY AND BOTANY.

FRIDAY.

'Contributions to the Anatomy of the Quadrumana with a Comparative Estimate of the Intel-

ligence of the Apes and Monkeys,' by Dr. E. CHIEP.

'On the Special Differences between the Larynx of the Negro and that of the White Man,' by Dr. G. D. GIBB.—These consisted in the invariable presence of the cartilage of Wrisberg, generally absent or quite rudimentary in the white race; the obliquity of the plane of the vocal cords from within outwards, but varying in degree; and of the more or less pendent position of the ventricles, which permitted of a view of their fundus with the laryngoscope. The two latter conditions he had never seen in the white race in an examination of some 900 healthy living persons. These facts were made out from an examination of 58 negroes, including 15 post mortem.

'On the Ornithology of Palestine, and the Peculiarities of the Jordan Valley,' by the Rev. H. B. TRISTRAM.

'On the *Turdus torquatus* as observed in Devonshire,' by Dr. SCOTT.

'On the Genus *Synapta*,' by Dr. HERAPATH.

SUB-SECTION D.—PHYSIOLOGY.

FRIDAY.

'Report on Muscular Irritability,' by Dr. M. FOSTER.

'Observations on the Measurements of the Head and Weight of the Brain in 696 Cases of Insanity,' by Dr. D. R. BOYD.

'On Cranial Deformities: Trigono-cephalus,' by Mr. W. TURNER.

'On the Obliteration of the Sutures in one Class of Ancient British Skulls,' by Dr. J. THURNHAM.

'On the Presence of Indigo in Purulent Discharges,' by Dr. W. B. HERAPATH.

'On the Temperature of the Sexes,' by Dr. J. DAVEY.—The author gave the results of some experiments he had made as to the relative temperature of the two sexes. The theory of Aristotle, that a man possessed more warmth than a woman had been disputed; and it had been held by some, as the result of modern research, that the temperature of woman was slightly superior to that of men. Notwithstanding this, however, from such observations as he had been able to make, he considered the early opinion the more correct. Taking the average, it appeared that the temperature of males and females was as 10.58 to 10.13. He had more recently made some additional observations, using a thermometer of great delicacy and taking for the purpose of his experiments six persons, three men and three women, all in good health. The result was, that the temperature in the case of the men varied between 90 and 99, that of the women was between 97 and 98. An examination of other animals gave a somewhat higher temperature for the male than the female: six fowls showing the proportion of 108.33 for the former, to 107.79 for the latter.

'On the Functions of the Cerebellum,' by Dr. T. S. PRIDEAUX.

SECTION E.—GEOGRAPHY AND ETHNOLOGY.

FRIDAY.

'Ethnology of Dahomey,' by Capt. R. F. BURTON.

After the paper was read, the PRESIDENT stated that Capt. Burton wished to express his feelings with regard to the untimely death of his fellow-explorer, Capt. Speke. As he could not trust himself to address the meeting he had recorded his sentiments in a note, which the SECRETARY would read:—"I cannot touch upon African matters without a few words of deeply-felt allusion to my old colleague, Capt. Speke. The differences of opinion that are known to have existed between us while he was alive make it the more incumbent on me to publicly express my sincere feelings of admiration of his character and enterprise, and my deep sense of his loss, now that he is so suddenly and shockingly removed from among his geographical associates."

'Latest News from Mr. S. Baker, the Traveller in Central Africa,' by J. PETHERICK.—This was an extract from a recent letter of Mr. Petherick, dated Khartûm, May 23, 1864. A number of men belonging to Kurchid Aga, a trader of the Upper Nile, had returned to Khartûm from Gondokoro,

and had informed Mr. Petherick that they had accompanied Mr. Baker as far as Kamraai's Palace, near Lake Victoria Nyanza, and that Mr. Baker had, on arriving there, dismissed them, intending to pass the rainy season at Kamraai's, preparatory to further explorations in the succeeding dry season. No letter had been received from Mr. Baker himself.

Capt. BURTON explained to the meeting by the aid of the map the positions alluded to in the previous communication, and stated his opinion that the Lake Victoria Nyanza was not the most southerly head of the Nile, but that this title belonged to Lake Tanganyika, which he believed was the Western Lake of Ptolemy. It still remained, however, to be decided whether a river flowed out of the northern end of this lake into the Luta N'Zigé and thence into the Nile.—Dr. KIRK, the companion of Livingstone, supported the views of Capt. Burton in so far as that he believed the drainage of Lake Tanganyika was not to the south into Lake Nyassa. He had himself navigated the latter water, almost to its northern end, and was satisfied no great river flowed into it from the north. Besides, the freshwater shells of the two lakes had been found to be wholly of different species. It was much to be regretted that Capt. Burton had not collected specimens of the fishes of Tanganyika as he (Dr. Kirk) had of Lake Nyassa, for the examination of their species would go far to settle the question.

'On the Increasing Desiccation of Inner Southern Africa,' by Mr. J. F. WILSON.—A very noticeable fact has of late years attracted the attention of residents in South Africa—namely, the gradual drying up of large tracts of country in the Trans-Gariep region. The Calabari Desert is gaining in extent, gradually swallowing up large portions of habitable country on its borders. Springs of water have diminished in their flow, and pools—such as that at Serotli, described by Livingstone—are now either dry or rapidly becoming so. A long list of springs and pools now gradually drying up, was given by the author of the paper. The great change, however, had commenced, if we may trust native traditions, long before the advent of Europeans, which are corroborated by the existence of an immense number of stumps and roots of acacia in tracts where now not a single living tree is to be seen. In seeking to account for this, it was necessary to dismiss from the mind all idea of cosmical changes or earthquakes, of which no trace is visible in Southern Africa. The causes lie in the physical characteristics of the country and in the customs of the inhabitants. The region drained by the Orange river is naturally arid, from the interposition of the Quathlamba mountains between it and the Indian Ocean, whence the chief rain-clouds are derived. The prevailing winds are from the north-east. The clouds, heavily laden with vapour from the Indian Ocean, are driven over Caffraria, watering those lands luxuriantly; but when the moisture-bearing nimbi arrive at the summits of the mountain range which divides Caffraria from the interior country, they are not only deprived already of part of their moisture, but they meet with the rarefied air of the central plains, and consequently rise higher and evaporate into thinner vapour. There are few spots, however, which are wholly destitute of vegetation, and large trees are frequent. There is no district which does not maintain its flocks of wild animals; but the diminution of even one or two inches of rain in the year is most severely felt. The author came to the conclusion, after a careful inquiry into the geological formations of the region and the sources of springs, that much water must lie, throughout wide tracts, deep below the surface of the soil, and that the boring of artesian wells would yield a permanent supply for irrigation. But as a remedy for the growing evil, he laid particular stress on legislative enactments to check the reckless felling of timber and burning of pastures, which has been long practised both by the natives and the European colonists.

A long and interesting conversation followed the reading of this paper. Sir H. RAWLINSON, Capt. BURTON, Capt. JENKINS, Mr. C. R. MARKHAM, Mr. F. GALTON, and Sir J. ALEXANDER

quoted instances to show how the destruction of trees led to the desiccation of countries, especially in or near the tropical zone. The protection of forests on hill-sides, it was shown, had long been part of the policy of our Indian Government.—Capt. JENKINS cited, as coming within his own experience, the instance of the arid territory of the Imaum of Muscat, which, in a few years, owing to the wise forethought of the Imaum in extensively planting cocoa-nut and date-palms, had much increased in humidity and fertility.

'On the Growth of Desert in Morocco,' by Dr. T. HODGKIN.

'On the Early Migrations of Man,' by Mr. J. CRAWFURD.—The author maintained that the view advocated by many writers of extensive migrations having taken place in primitive times was entirely erroneous. To undertake migrations even on a very moderate scale, a people must have made a considerable advance in civilization. They must have learnt to produce some kind of food capable of being stored, to serve them on a long journey, and must have attained some skill in fabricating and using weapons of offence and defence. The earliest authentic records of emigrating are those of the Greeks, and they were all by sea, requiring a provision of sea-stock, ships, and some nautical experience. There is no example of a people, considerable in number and tolerably civilized, wholly and voluntarily abandoning the country of their fathers, or even of a whole people being driven to do so by a conqueror. The early migrations of the Malays bear a tolerably close resemblance to those of the Greeks; but when these migrations were undertaken, the Malays had acquired a certain measure of civilization. They were a people quite equal to the enterprise of emigrating and establishing colonies. Notwithstanding these and similar facts, some very learned writers have indulged their imaginations with the supposed migrations of such savages, fancying that the whole earth was peopled from a single starting-point, and by one race of men. From the learned Dr. Prichard we have an example of these imaginary migrations, in the supposed peopling of the New World from the Old, the latter being fancied to have contained that spot from which the entire earth was peopled. It is now admitted that the people who achieved this marvellous migration were in the rudest savage state, and that all their arts and acquirements, down to their very languages, were attained after their arrival in America. It is unnecessary to show that the shortest of the sea-voyages by which these primitive tribes could have passed from Asia to Europe would be impossible to be performed by them. The paper concluded by a protest against the modern theory of the Indo-Germanic or Aryan migration, which the author said was founded entirely on philology run mad, and not on ethnology at all.

Prof. RAWLINSON, of Oxford, combated, in a long discourse, the views of Mr. Crawford, especially with regard to the Aryan theory, which, he observed, was not a German theory, as the author of the paper asserted, but was originally propounded by our own countryman, Sir William Jones. The speaker explained that the primitive migrations of man need not be supposed to have been undertaken by large bodies, but to have been gradual and slow. For instance, with regard to the peopling of India by successive nations of barbarians from the north-west; this may have commenced originally by a few wanderers, who, finding the climate agreeable and the lands unoccupied, would remain, but, having partial communication with their compatriots left behind, would induce these, one family after another, to follow their example. The principles of the Aryan theory rested more upon an identity of grammatical structure than on that of the vocabularies of languages. He was inclined to believe in a single centre of creation for man. The great difficulty was in the received chronology not being sufficient to allow for the great modifications of race that had since ensued. But we need not be bound by the chronology of Genesis, seeing that the three versions of Scriptures all differed in this respect. He held himself at liberty to say that the true chronology had

not been revealed to us. The revelation was not meant to give us a physical history of the world, and it did not detract from the general credibility of the Bible that it should be allowed to have become corrupted on these points.—Mr. C. C. BLAKE, Mr. M. D. CONWAY (of Boston, U.S.), Rev. C. M. NEWNHAM, Sir J. BOWRING, M. VAMBERY and Mr. R. S. POOLE also took part in the discussion.

'On the Ethnic Relations of the Egyptian Race,' by Mr. R. S. POOLE.—The writer commenced by stating that his object was to inquire what light the ancient Egyptian monuments throw upon the single or more than single origin of the Egyptian race, and thus to call in the aid of archaeology in the examination of one of the most interesting problems of ethnology. He brought forward no evidence as to which the general body of Egyptologists were not agreed. The simplest division into which the races of man can be reduced, was black, white, and intermediate. Of the black race, one of the varieties of the lowest type was the African negro; of the white, one of the varieties of the highest type, the Shemite Arab: these varieties the author selected because the Egyptian monuments show us that, for the last 3,000 years, they have been the two most typical neighbours of the Egyptians. The ancient Egyptians constituted a variety of what has been called the Ethiopian race, but might be better called the Lower Nilotic. The modern Egyptians constituted a somewhat different variety. The ancient Egyptians, as known to us from monuments ranging from 4,000 to 2,000 years ago, are acknowledged by all ethnologists to hold an intermediate place between the Negroes and the Arabs. The physical characteristics of the Egyptians were then minutely described, their intermediate place was shown, and the difference of the modern from the ancient Egyptians in the further departure from the Negro and approach to the Arab was proved. The cause of this difference was well known to be the great influx of Arabs into Egypt, especially since the Moslem conquest. But, notwithstanding this change, which was less than we should expect, the Negro type still asserted itself in the Egyptians, and a period of 4,000 years gave us no parallax. In race the Egyptians thus seemed to present the traits of a double ancestry. The heathen religions might be thus classified: High nature-worship, low nature-worship, and use of charms (or Fetishism), and magic (or Shamanism). Shemite idolatry was high nature-worship; Iranian, the same, or of the same origin; Nigritian, low nature-worship; Tatar, magic. The ancient Egyptian religion had never been explained as a system. It was self-contradictory, as proved in the case of animal worship, for which no reason could be assigned. A critical examination would tend to show that the Egyptian religion consisted of two elements, high and low nature-worship, Shemite and Nigritian, which was further proved by the actual Shemite and Nigritian characteristics of these two portions. Art was often connected with race. But as pure Shemites and Negroes had no art, the Egyptians could not have been of either stock alone. The gradual increase in size and importance of the monuments and engineering works to the earliest period might be explained by the existence of a serf race of Nigritians gradually destroyed or absorbed by the Shemites. Languages might be classed, according to seeming development, as monosyllabic, agglutinate and amalgamate: according to relations, as the Semitic family, the Iranian family, and the so-called Turanian family. The last is not proved to be a family, and its different groups are connected by similarities that do not establish cognation. Mr. Poole proposed the term "Barbaric" for this class, not family. The monosyllabic and agglutinate languages were Barbaric; the amalgamate, Semitic and Iranian. The Egyptian language had a Barbaric monosyllabic vocabulary and an amalgamate Semitic grammar. This, it was maintained, could only be explained on the supposition of a double origin of the Egyptians. These opinions were stated in 'The Genesis of the Earth and of Man,' and were adopted by the author of this paper as affording a solution of the great difficulties of his special study of Egyptology.

A brief but animated discussion followed the reading of this paper; Sir H. RAWLINSON contending for the change of colour by climate, and Mr. CRAWFURD opposing this view.—In reply, Mr. POOLE observed that Sir H. Rawlinson had not explained cranial changes as due to climate.

SECTION F.—ECONOMIC SCIENCE AND STATISTICS.

FRIDAY.

'Report on the best Means of providing for a Uniformity of Weights and Measures, with reference to the Interests of Science,' by a Committee consisting of Lord Wrottesley, the Right Hon. C. B. Adderley, Sir W. Armstrong, the Astronomer Royal, S. Brown, W. Ewart, the Master of the Mint, Sir John Hay, Bart., Prof. HENNESSY, J. Heywood, Dr. Lee, Dr. Leone Levi, Prof. MILLER, Prof. Rankine, Rev. Dr. Robinson, Col. SYKES, W. TITE, Prof. WILLIAMSON, and F. PURDY.—For a uniformity of weights and measures with reference to the interests of Science, the Committee recommend to the British Association the following resolutions:—1. That it is desirable, in the interests of science, to adopt a decimal system of weights and measures. 2. That in furtherance of this proposal it is desirable, from its scientific capabilities, to adopt the metric system. 3. That as the weights and measures of this country are gradually undergoing a process of decimalization, it would be more advantageous, instead of drifting by degrees into a heterogeneous variety of systems, to change at once to a really convenient system. 4. That it be recommended to the Government, in all cases in which statistical documents issued by them relate to questions of international interest, to give the metric equivalents to English weights and measures. 5. That in communications respecting weights and measures, presented to foreign countries which have adopted the metric system, equivalents in the metric system be given for the ordinary English expressions for length, capacity, bulk, and weight. 6. That it be recommended to the authors of scientific communications, in all cases where the expense or labour involved would not be too great, to give the metric equivalents of the weights and measures mentioned. 7. That the influence of the British Association would be beneficially exerted in obtaining from Paris an authorized set of metric weights and measures, to be placed in some public and frequented building in London. 8. That advantage will be derived from the recent publication of metric tables, by C. H. DOWLING, C.E., in which British standard weights and measures are compared with those of the metric system. That treatises explaining the metric system, with diagrams, should be forthwith laid before the public. That works on arithmetic should contain metric tables of weights and measures, with suitable exercises on those tables; and that inspectors of schools should examine candidates for pupil-teachers in the metric system. 9. On the subject of temperature, it is recommended that the authors of Reports to be presented to the British Association, relative to temperature, be requested to give the degrees of heat or cold according to both the Centigrade and Fahrenheit's thermometers. 10. It is recommended that the scales of thermometers constructed for scientific purposes be divided both according to the Centigrade and Fahrenheit scales; and that barometric scales be divided into fractions of the metre, as well as into those of the foot and inch. 11. That a committee on uniformity of weights and measures be re-appointed. Prince Talleyrand, in 1790, distributed among the members of the Constituent Assembly of France a proposal, founded upon the excessive diversity and confusion of the weights and measures then prevailing all over that country, for the reformation of the system, or rather for the foundation of a new system upon the principle of a single and universal standard. A committee of the Academy of Sciences, consisting of five of the most eminent mathematicians of Europe—Borda, Lagrange, Laplace, Monge and Condorcet—were subsequently appointed, under a decree of the Constituent Assembly, to report upon the selection of a national standard; and the Committee proposed in their Report that the ten-millionth part of a quarter of the meridian of Paris should be taken as the standard unit of