greatest importance from both political and sociological standpoints.

A number of papers describing itineraries in various portions of the world were presented to the section, but reference need be made to but few of these and of the more general topics discussed a few may be briefly mentioned. Professor Ireland, in a paper on 'The Geographical Limits of Popular Government,' maintained that climatic conditions unfitted the inhabitants of tropical regions for representative government, and in these regions the administration must be placed in the hands of trained Europeans. Dr. W. G. Smith presented an account of the botanical survey of Scotland, which is at present being carried out on the basis of a modification of the plan adopted by Professor Flahault of Montpelier. The entire flora is regarded as being composed of a number of 'plant associations,' in each of which there is one or more dominant species, and the object of the survey is to map out these associations. Maps of the associations of Northern Perthshire and of an area in the vicinity of Edinburgh have already been published and the work on Fife and Forfar is ready for publication. Professor Moreno, of the Museum of La Plata, gave an interesting account of the anthropogeography of the Argentine Republic, in the course of which he took the position that the races of South America were of great antiquity and that instead of the civilizations of Peru and Bolivia coming from the north, they were in reality much older than such civilizations as that of the Pueblos.

An account of the National Antarctic Expedition organized by the Royal and the Royal Geographical Societies was given by Dr. Scott Keltie, and Mr. W. S. Bruce described the plans of an expedition which he hoped to lead next year to the Weddell Sea and which he spoke of as the Scottish National Antarctic Expedition, since the expenses have been entirely defrayed by Scotsmen. Captain Lemaire gave an interesting account of the Belgian Scientific Expedition to Ka-Tanga, Central Africa, in 1897, and spoke in hopeful terms of the possibilities of the high plateaus of that region for European colonization, stating that all the usual European vegetables and many fruits had already been cultivated with great success. Finally, a paper by Dr. A. Lawrence Rotch, director of the Blue Hill Observatory near Boston, was presented under the title 'Exploration of the Atmosphere at Sea by Kites.' It was pointed out that on land the use of kites was possible only when the wind blew at a velocity of over twelve miles an hour, but on ships this difficulty was done away with, the motion of the vessel giving the desired velocity. The importance of some knowledge as to the height to which the trade winds extended and also as to the direction and strength of the higher currents was pointed out and the possibility of acquiring such knowledge by the use of kites was suggested.

A conference was held with the Geological and Zoological Sections for the purpose of discussing the scheme of a survey of the lakes of the British Isles which is to be carried out by Sir John Murray and Mr. Lawrence Pullar. It is intended to make a complete survey of each lake from all standpoints, bathymetrical, thermometrical, geological, botanical and zoological. Many interesting suggestions were made in the discussion which followed the reading of a letter by Sir John Murray stating the plans that he had formed for the work and a resolution was passed expressing the gratification of the Sections that such a survey was to be carried out.

THE ANTHROPOLOGICAL SECTION.

The address of the president of the Anthropological Section, Professor D. J. Cun-

ningham, of Dublin, was devoted to a consideration of the characteristics of the human brain and their significance. After pointing out the necessity for greater attention on the part of craniologists to the relations which exist between the brain and the cranium, reference was made to the discussions as to the relative development of the occipital lobe in man and apes, which enlivened the meetings of the Association forty years ago. With the knowledge we now possess it seems strange that such a discussion was ever precipitated, for not only is the occipital lobe largely developed in the ape, but it possesses even a greater development than in man. Measured along its medial border the percentage length of the lobe to the entire length of the cerebrum in the baboon, orang and man is, respectively, 29.7, 23.2 and 21.2, and even these figures do not show the full preponderance of the occipital lobe in the ape, for its anterior border extends so far forward as to overlap a portion of the parietal lobe and form an occipital operculum, a condition entirely lacking in man. Instead, then, of the preponderance of the occipital lobe being the distinguishing feature of the human brain, it is the greater relative development of the parietal, which encroaches to a certain extent upon the territory occupied in the lower forms by the occipital.

The conclusions of Rüdinger, derived from a study of the brains of a number of distinguished men, that the intellectual endowment of an individual stands in relation to the development of the upper part of the parietal lobe, Professor Cunningham believes to be entirely without foundation. Indeed, in the evolutionary development of the cerebral cortex it is the lower part of the lobe which shows the greater relative increase and has extended itself both backwards and downwards, the latter process leading to a marked depression of the Sylvian fissure to an extent quite foreign to the brain of any ape. And in this connection it is interesting to note that the recent studies of the brains of the astronomer Hugo Gyldén and of the mathematician Sophie Kowalewsky by Retzius, of Helmholtz, by Hansemann and of the musician Rudolph Lenz by Guszman, have all revealed an apparently marked development of the cortex of the lower parietal region. Furthermore, it is an interesting fact that in the left cerebral hemisphere the Sylvian fissure is more depressed than in the right. It is well known that physiologically the left hemisphere shows a decided preeminence, to account for which various theories have been suggested. That it is due to the greater bulk or weight of the hemisphere seems to have been disproved, nor can it be held to be due to the greater complexity of the convolutions, nor to a better blood supply.

What, then, may have been the cause both of this asymmetry and of the general development of the parietal lobe. Professor Cunningham points out that in the parietal region are the centers for the arm, hand, face, throat and mouth and, to a certain extent, the motor center for speech, and the center for the facial muscles. These latter, it is true, present a greater bulk in the ape than in man, but both they and the muscles governed by the other centers named are certainly more highly differentiated and capable of performing movements of greater refinement than in the ape, and it is this very degree of refinement which determines the amount of the area covered by a cortical center, rather than the mass of the organ supplied. On this basis, then, the greater development of the parietal lobe in man is readily explained, and since it is well known that the motor center for speech is asymmetrical and on the left side, an explanation is afforded of the asymmetrical development of the lower parietal region in

the human brain. Indeed Professor Cunningham holds that the "stimulus which must have been given to general cerebral growth in the association areas by the gradual acquisition of speech can hardly be exaggerated." "Some cerebral variation—probably trifling and insignificant at the start, and yet pregnant with the most far-reaching possibilities—has in the stem-form of man contributed that condition which has rendered speech possible. This variation, strengthened and fostered by natural selection, has in the end led to the great double result of a large brain with wide and extensive association areas and articulate speech, the two results being brought about by the mutual reaction of the one process upon the other."

Of the papers presented to the Section several were on matters of local archeology, Dr. R. Munro giving an account of a 'Kitchen-midden at Elie'; Messrs. J. G. Cunningham and Thomas Ross describing respectively Roman camps at Ardoch and Delvine and Dr. Duncan and T. H. Bryce reporting on 'The Results of their Excavations in the Island of Arran' where they found a number of skulls and implements evidently belonging to a prehistoric dolichocephalic race. Of somewhat more general interest were papers by Dr. J. F. Gemmill, who described the development of the human stapes, coming to the conclusion that it arose quite independently of the periotic bone and was developed from the hyoid, though not from its most proximal portion, this giving rise to the incus; by Mr. R. A. S. Macallister, on 'The Age of the Ogham writing in Ireland,' the conclusion reached being that for the most part the inscriptions were certainly christian in origin; and by Dr. Rivers, 'On the Functions of the Maternal Uncle in Torres Straits,' showing that the wife's brother was really the head of the house, even in tribes where the descent was now paternal. Especial interest attached to a paper by Mr. Brant Sero, a Canadian Mohawk, on 'Dekanawideh, the law-giver of the Canienghakas,' in which was given an account of the law still in use, with some modifications, among the Canienghakas or Mohawks of Canada and of which the salient principle was the establishment of a totemic council of women, who in turn elected an hereditary council composed of seven lords or masters, who made the laws and whose titles descended through the maternal line.

A report was presented by Mr. R. A. S. Macallister on the recent excavations made under the Palestine Exploration Fund, the main purpose of which had been the recovery of the city of Gath. Though the work in this direction had proved unsuccessful much material had been collected which throws light on the culture of the inhabitants of Palestine at different periods. At Tel-es-Safi, a height overlooking the valley of Elab, a building was found at the depth of 14 to 18 feet which there are reasons for regarding as one of the 'high places' mentioned in the Book of Kings.

A report was also submitted upon the results of the Cretan explorations. Excavations which were begun in 1900 have been continued at Knossus and have revealed an ancient palace which there are reasons for identifying with the traditional House of Minos. Upon the walls and floors of this were remains of a large series of frescoes among which are full-length figures of the cup-bearer, interesting as being the first known portrayal of a man of the Mycenæan age. The art remains evidence a high degree of skill and artistic perception, and several finds illustrate a close connection with ancient Egypt and Babylonia. The most striking discovery, however, is that of a series of clay tablets engraved with a linear script and demonstrating the existence in prehistoric Hellas of a system of writing antedating by about eight centuries the

earliest known Greek inscriptions, and by six or seven the first dated record of Phœnician script. In addition to the linear tablets others of a contemporary age were discovered inscribed with characters of a hieroglyphic nature, probably of an entirely different language. Excavations have also been carried on at Praseos, the capital of the ancient Eteocretans, and have yielded an inscription in Greek characters of the fifth century B. C., but composed in the Eteocretan language, and excavations at Zakro, in the extreme east of the island, revealed about 150 clay impressions of Mycenæan gems and signets, some of which throw new light on the early religion of Crete.

In connection with the meeting of the Section a pleasing incident was the formal opening of the new Anatomical Laboratory of the University of Glasgow, erected with the aid of a bequest from the trustees of the late Mr. J. B. Thompson. The chair was occupied by Lord Lister, and speeches were made by Mr. Barr in behalf of the Thompson trustees, Principal Story on behalf of the University, Sir William Turner and Professor Cleland, who has presented to the University his large collection of anatomical preparations. At the close of the speech-making the guests were entertained in the new laboratories by Professor and Mrs. Cleland and were given an opportunity of examining the arrangement of the rooms and the collections.

THE PHYSIOLOGICAL SECTION.

The opening address of the Physiological Section, delivered by the President, Professor J. G. McKendrick, was a consideration of the dilemma suggested by Clerk Maxwell in his article on the Atom in the Encyclopædia Britannica. The dilemma was to the effect that a germ cell cannot be structureless, yet it is too small to contain a sufficient number of molecules to account for all the characteristics which are transmitted by it. Professor McKendrick, on making calculations based on more modern data concludes that Maxwell's estimate of the possible number of molecules in an ovum is too small and instead of containing only something like a million the fecundated ovum may start with as many as twelve million million organic molecules, a number probably sufficiently great to account for the transmission of all hereditary characters. He also suggested that since the physicists conceive of molecules as being more or less in motion, it is possible that the activities of living matter may be due to a certain *kind* of motion as yet unknown to physicists.

Sir John Burdon Sanderson described the application of the telephone to the investigation of the rhythmic phenomena of muscles and detailed the results obtained by this method by Miss Buchanan, working in the physiological laboratory at Oxford, and which have already appeared in the *Journal of Physiology*. Professor Sherrington gave an account of experiments upon the cerebral cortical centers in two chimpanzees, the first experiments of the kind which had been performed on animals higher in the scale of life than monkeys. In one of the animals the cortical center for the hand was delimited and excised, the result being an immediate paralysis of the hand, which, however, in a few weeks completely passed away. In the second animal the center for the foot was similarly treated, with similar results. A study of the degenerated tracts in the first animal revealed the existence of a direct pyramidal tract in the spinal cord, a group of fibers which has hitherto been supposed to occur only in man. The degeneration resulting from the extirpation of the foot center did not affect this tract.

Dr. Kennedy, of Glasgow, described, with lantern views, a case in which a long-standing spasm of the facial muscles had been