little. Each addition to the neck so acquired was transmitted to the descendant, and by accumulation of the changes thus produced the modern long-necked condition was attained. According to Weismann, what happens is this. In each generation slight variations in the length of the neck, as in the other parts of the body, occur. These variations are due to constitutional causes which are transmitted. When greater length of neck became important to the animal, those animals with necks a little longer or capable of being stretched out a little further, would have the advantage, would survive longer, and leave more offspring. The offspring, inheriting the constitution of their parents, would inherit this tendency to have longer necks. By the continual elimination in many generations of the short-necked forms, and by the seizing hold of each naturally-occurring variation, the long-necked condition would finally appear.

As variations are constantly occurring, natural selection must constantly be at work to maintain the standard of any organ. Whenever an organ ceases to be of use, or even when it becomes merely of subordinate utility, this selective maintenance falls into abeyance. A state that Weismann calls *Panmixia* results. Variations below the standard cease to be eliminated, and the organ slowly degenerates. In this way is explained degeneration through disuse: degeneration from conditions that are not harmful but merely unnecessary. In many cases organs that are not used degenerate very much during individual lives, but this occurs through failure of nutrition. Weismann believes such effects not to be transmitted. Were these effects inherited, useless organs must inevitably disappear very much more rapidly and completely than there is evidence for.

Instincts are elaborated, not by the accumulation of transmitted individual experience, but by continual selection of mental variations in the required direction. For instance, the instinct to avoid enemies arose not by accumulation of experience, for experience of the inconvenience of being devoured could hardly be transmitted, but by the naturally more timid forms surviving, and leaving more offspring than their less wary brethren.

Talent and even genius often run through several generations; and certainly mental powers can be much increased in individual lives. But the exhibition of talent and genius depends on a combination of many physical and mental conditions in which constitutional variation is ever present, and these variations are undoubtedly inheritable. Moreover, the history of families of conspicuous ability (as, for instance, that of the musical family Bach) shows that the highest development often occurs in the middle of the series, while the theory of the transmission of acquired characters would demand to find it at the end.

Selection of variations best explains cases of adaptation to new climates. But the immense influence of climate conditions on nutrition in each ontogeny must be taken into account.

Qualitative changes at first present some difficulty, but it must be remembered that qualitative changes are nearly always at bottom quantitative. A surface appears naked, though covered with many small hairs; or light-coloured, though scattered pigment-cells are present. Quantitative variations in such conditions certainly occur, and are certainly transmitted, and natural selection can readily change the number or size of hairs or pigment-cells, and produce so-called qualitative results.

It is not claimed as yet that the inheritance of acquired characters can be excluded in every case. But increasing knowledge of the conditions of life and of the functions of organs causes ever a larger and larger part of the phenomena of the organic world to be explained by the selection of naturally-arising variations.

P. CHALMERS MITCHELL.

IMPERIAL GEOLOGICAL UNION.

REFERRING to my letter on the above subject, published in NATURE, vol. xxxvi. p. 146, I beg to communicate, for the information of those interested in the matter, the substance of a report made to the Royal Society of Canada at its meeting on May 22, in Ottawa.

The Committee reported that it had, as directed, printed the letter of Sir William Dawson to the President of the Royal Society, and the first report of the Committee, and had circulated these extensively, sending them especially to geologists and Societies in Great Britain and the colonies and dependencies of the Empire. A large number of replies had been received, testifying to a somewhat general wish for union and co-operation.

The matter was then laid before the Council of the Royal Society, with the view of holding a Conference in London under its auspices. The subject was taken up by the Council in October last, and a resolution was passed and communicated to the Committee to the effect that, having regard to the existing condition of the question of scientific federation, and the various contingencies that may occur during the next few years, they do not see their way to summon such a Conference as that recommended.

In view of this resolution it was felt to be useless for the present to attempt any farther action. Still, as the desire for and appreciation of the benefits of the union contemplated seemed to be very general, and as opportunities may occur later for giving it a practical form, it was thought best by the Royal Society of Canada to continue its Committee, with power to correspond with other bodies and with persons interested. The undersigned will therefore be glad to receive any communications on the subject.

Some misconception appears to exist as to the relations of the intended movement to the International Geological Congress which is to meet in London in September next. They have in reality no connection, except that, under certain contingencies, they might be mutually helpful.

A Union of British Geologists might exercise an influence for good in connection with the plans for unification of classification, nomenclature, and mapping, which have occupied the attention of the Congress; but its function would rather be the positive one of uniting workers throughout the wide area occupied by the British Empire, and enabling them more effectually to co-operate in the extension of actual knowledge, in giving mutual aid, in enlarging the mental vision of local and special workers, in making accessible to isolated labourers the common stock of knowledge, and in preventing the interference and discordance which result from disunited effort.

That there are difficulties in the way of the realization of such a plan as applied to British and colonial geologists in the first instance, and ultimately to all English-speaking geologists, there can be no doubt; but they are continually diminishing, in consequence of greater facilities for intercourse and the rapid growth of scientific work in the various outlying parts of the Empire. The idea is thus a fruitful one, certain to be realized in the future; and possible even at present if a central nucleus could be secured for an Imperial organization. It is not impossible that the large gathering of English-speaking geologists in London in September may afford opportunity for further discussion of the plan; and if the invitation which it is understood will be given by our friends of the United States to hold the next meeting in America be accepted, this may constitute another step in the same direction.

Montreal, May 31.

J. WM. DAWSON.

NOTES.

THE Laboratory of the Marine Biological Association at Plymouth is now approaching completion, and, after the opening ceremony on the 30th inst., it will be, in all essential respects, ready for work. The salt-water reservoirs have, after several delays, been filled, and the water is now circulating freely in the tanks of the aquarium. The fittings of the main laboratory are complete on the north side, and will give accommodation for seven naturalists, besides the Resident Director. In addition to this there are the physiological and chemical laboratories, all the fittings of which are now in place, and the library is in process of formation. The Association stands very much in need of presents of books, and it is hoped that those who are interested in its work, and have duplicate copies of biological works on their shelves, will be disposed to present them to so deserving an institution. At the opening ceremony on the 30th, upwards of a hundred members and their friends are expected to be present. The fact that Parliament is in session will keep away many of those who take a liberal interest in the Association, but it is hoped that Sir Lyon Playfair, Sir Edward Clarke, and Sir Edward Birkbeck will be present to represent the Parliamentary interest. Prof. W. H. Flower will be the presiding zoologist, and with him will be many well-known men of science, including Profs. Ray Lankester, Milnes Marshall, McIntosh, C. Stewart, Dr. Günther, Mr. Adam Sedgwick, and many others. The Hydrographer has stated his intention to be present, and the naval and military element will be fully represented by the commanding officers of both services at Plymouth. The Fishmongers' Company, which has been so munificent a patron of the Association, will be fully represented by its Prime Warden, Sir James Clarke Lawrence, and several members of the Court. They have kindly undertaken the hospitable duties of the occasion, and there can be no doubt that the *déjeûner* at the Grand Hotel, and the speeches that may be expected to be made there, will form a most important part of the day's proceedings.

THE annual meeting for the election of Fellows of the Royal Society was held at the Society's rooms in Burlington House on June 7, when the following gentlemen were elected: Thomas Andrews, F.R.S.E., James Thomson Bottomley, M.A., Charles Vernon Boys, Arthur Herbert Church, M.A., Prof. Alfred George Greenhill, M.A., Lieut.-General Sir William F. D. Jervois, R.E., Prof. Charles Lapworth, LL.D., Prof. T. Jeffery Parker, Prof. John Henry Poynting, M.A., Prof. William Ramsay, Ph.D., Thomas Pridgin Teale, F.R.C.S., William Topley, F.G.S., Henry Trimen, M.B., Prof. Henry Marshall Ward, M.A., William Henry White, M.I.C.E.

DR. S. H. VINES, F.R.S., Fellow of Caius College, Cambridge, has been elected to the Sherardian Professorship of Botany at Oxford.

THE King of Sweden, who was elected an Honorary Member of the Linnean Society at the centenary anniversary meeting of that Society held at Burlington House on May 24 last, gave an audience on Friday afternoon to the President (Mr. W. Carruthers, F.R.S.), Secretaries (Messrs. B. D. Jackson and W. P. Sladen), and Librarian (Mr. Harting), and inscribed his name in the album wherein the names of all Fellows and Honorary Members have been inscribed since 1788. The Royal signatures include those of George IV., William IV., Queen Victoria, Prince Albert, the Prince of Wales, the King of the Belgians, the King of Saxony, and now the King of Sweden.

THIS week the University of Bologna is celebrating the eighth century of its existence. A congratulatory Greek ode has been written by Prof. R. C. Jebb, who represents the University of Cambridge as its senior delegate at Bologna. The verses, which are composed in the metres of Pindar's eighth Olympian ode, are suggested by the circumstance that the University of Glasgow, in which Prof. Jebb holds the Chair of Greek Literature, is the only University in this country of which the model was taken directly and exclusively from Bologna.

THE second annual *soirée* of the Middlesex Natural History and Science Society was held at the Society's rooms, 11 Chandos Street, Cavendish Square, on Thursday evening last. Lord Strafford, the Lord-Lieutenant of the county, President of the Society, was in the chair. Many objects of scientific interest were exhibited.

THE Hon. J. Collier has undertaken to paint the portrait of Prof. Williamson, which is to be presented to University College.

THE Conferences convened by the London Chamber of Commerce to consider the question of commercial education led to the appointment of a Committee for the full discussion of the subject. This Committee nominated a sub-Committee, among the members of which were Sir John Lubbock, Sir Henry Roscoe, and Sir B. Samuelson. A scheme for the improvement of commercial education has now been drawn up by the sub-Committee and sent to various business men, schoolmasters, and other authorities on education, with a request for practical suggestions. The scheme, as it stands, proposes as obligatory subjects for examination for a commercial certificate: (1) English; (2) Latin; (3*a*) French; (3*b*) German, Spanish, or Italian; (4) history of British Isles and colonies, general and modern history, including commercial history; (5) geography, physical, political, commercial, and industrial; (6) mathematics; (7) drawing. Proficiency is also required in at least one of the following: physics, chemistry, natural history, commerce, and political economy.

PROF. LÜTKEN, Director of the Zoological Museum of Copenhagen, has addressed a strong appeal to country people in Denmark to protect the sand grouse. He points out that the only countries in which the birds nested in 1863 were Denmark and Holland, but that owing to people gathering and eating the eggs no birds were hatched. He trusts that this wanton conduct may not now be repeated. The Professor feels sure that the bird can be acclimatized in Denmark, as the sandy cliffs and shores of that country are particularly suited to its breeding. The Zoological Gardens in Copenhagen have obtained a live specimen of the bird, caught in the Island of Fünen. Flocks upwards of a hundred in number have of late been seen in many parts of Denmark.

ONE of the largest pine-trees ever grown in Sweden was felled the other day in Lapland. It measured over 120 feet in height, and was 12·5 feet in diameter 2 feet from the ground.

ON the evening of May 14, about 10 p.m., a brilliant meteor was seen at Kalmar, in Sweden. It was about the size of an ordinary plate, the colour being pale yellow, and it had a train about 100 feet in length. It went in a north-westerly direction, apparently only some little height above the ground, and exploded some distance from the town with a noise like that of burning gunpowder. During its progress a whizzing sound was distinctly heard.

IN vol. iv. Part 4, of the *Indian Meteorological Memoirs*, Mr. J. Elliot gives a list and brief account of the south-west monsoon storms generated in the Bay of Bengal during the years 1882–86. This list, which contains Nos. 47–101 of the series of storms, is a continuation of that given in the sixth paper of the second volume of the *Memoirs*, and is accompanied by yearly and monthly track charts. Some of the principal storms have been fully discussed in previous parts of the *Memoirs* and in the Journal of the Bengal Asiatic Society. The retreat of the south-west monsoon in October 1866 was followed by the occur-