that the theory of mimicry appeared to offer the most feasible interpretation of the conditions obtaining in this genus.

Geological Changes and the Distribution of Fish.

Prof. A. Meek exhibited lantern slides of maps illustrating Tertiary changes and their relation to the distribution of fish. He said that from geological evidence it was known that during the Tertiary era the northern hemisphere was the scene of important changes affecting the sea and the land. A consideration of the distribution of marine and fresh-water fish bears out this evidence, indicates the refuge regions of the Glacial epoch, and shows that the reaction of changing conditions has during the era led to the formation of many species (*e.g.* those of Acipenser) and even of genera (*e.g.* Caspiomyzon). The fish of the Antarctic seas appear to be northern in origin, but the fresh-water fish-fauna of the southern hemisphere is characterised by the presence of primitive types, which appear to have survived from the period of Gondwanaland and the spread of the Glossopteris flora.

Regeneration of the Tail in the Lizard.

Dr. C. Powell White gave an account of the regeneration of the tail of *Lacerta vivipara*. Autotomy of the tail takes place through the middle of a vertebra; there is no special autotomy site as in the legs of crabs, but apparently any vertebra may be involved. After autotomy the wound is quickly covered with new skin, beneath which is a mass of spindle cells, originating in the connective-tissue, which acts as a growing point to the new tail, and from it the cartilage, fat, muscles, and vessels are developed and differentiated. All the nerves are derived from the last three pairs of nerve-roots in the stump of the tail. The main trunks of the sympathetic accompany the aorta some distance into the regenerated tail and send branches to the different blood-vessels. In the centre of the tail is an unsegmented tube of cartilage (perforated by blood-vessels which pass to the interior) continuous with the body and neural arch of the vertebra through which the fracture took place. This cartilage surrounds an epithelial tube continuous with the central canal of the spinal cord. Regeneration may continue until the regenerated tail is as long as the original one.

The Vermiform Appendix.

Dr. W. C. Mackenzie demonstrated a fine series of specimens of the appendix vermiformis in Monotremes and Marsupials. He drew attention to the fact that Ornithorhynchus has a cæcum, while Echidna has a true vermiform appendix, comparable macroscopically and histologically to that of man, ape, and wombat, the three mammals regarded as having a true vermiform appendix. In Phascolomys the appendix has reached a much more advanced degree of degeneration than that of man, even to complete disappearance by incorporation in the wall of the ileum (various grades of this were shown), a condition suggestive of the mode of further evolution of the appendix in man.

An Explanation of Secondary Sex Characters.

Mr. F. W. Ash suggested that male secondary characters are characters of abandoned function suppressed in the young in favour of more essential growth (of organs still fully functional), and in the adult female because, with her, nutritive surplus is more directly diverted to the purposes of reproduction. Hence such characters usually find opportunity for full expression in adult males. Secondary sex exaggerations may significantly parallel enlargements due to accidental loss of function, *e.g.* the tusk of the male babirussa may be compared with occasional circular overgrowth in the tusk of the hippopotamus. The dependence of the development of the secondary character on the presence of the active male gonad may perhaps be explained by reference to the phenomena of periodicity.

History of Comparative Anatomy.

Prof. F. J. Cole and Miss N. B. Eales presented materials for a graphic history of comparative anatomy based on an examination of 6304 papers on the anatomy of animals published between 1543 and 1860. The graphs exhibited show that before the year 1650 only intermittent research was carried on, but in the next fifty years there was considerable activity, culminating at about 1683, and thereafter subsiding. This sudden revival was due almost exclusively to Academia Naturæ Curiosorum (founded 1652), the Royal Society of London (1660), the French Academy of Science (1666), and, to a less extent, the Collegium Anatomicum of Amsterdam (1665). From 1700 to 1750 work was steadily maintained, and a second revival began in 1750, gradually increasing to 1800, and suddenly reaching a high maximum between 1835 and 1840, finally declining somewhat to 1860, where the investigation ceases. The second revival was initiated by France, followed closely by Germany, and at some distance by England, but the last country reached her maximum first, then Germany, and finally France. Holland and Denmark took a distinct part in the seventeenth-century revival, and Italy was undoubtedly concerned in initiating the similar movement in the nineteenth century. The seventeenth-century revival related chiefly to mammals, but concerned to a less extent birds, fishes, and arthropods, and to a slight extent reptiles and molluscs. In the nineteenth-century revival, mammals, arthropods, fishes, and organography play the leading part, followed by birds, molluscs and reptiles.

Dr. J. Stuart Thomson gave an account of the morphology of the telencephalon of Spinax as a type of Elasmobranch fore-brain, and detailed the various grey masses and fibre-tracts which he had recognised. He has not obtained any satisfactory evidence of the existence of a *corpus callosum*.

Dr. A. E. Cameron described the insect community of a local environmental complex. A soil-insect census of two different grasslands in the association, differing in their soil-types and vegetational covering, showed that in any given locality the soil-insect fauna of grassland is not likely to vary to any great extent. In the absence of the illustrations these two communications cannot be adequately summarised.

On the Thursday afternoon the members of the Section were received by Prof. and Mrs. Hickson in the Zoological Laboratories, where there was an interesting and extensive exhibit of specimens by members of the staff and by visiting zoologists.

J. H. ASHWORTH.

EDUCATION AT THE BRITISH ASSOCIATION.

AS women are playing an ever-increasing part in the national work of education, it was an eminently reasonable departure from precedent for the council of the Association to elect Mrs. Sidgwick to the presidency of Section L. The full text of her address has already appeared in NATURE, and need not, therefore, detain us here, except in so far as it gave an opportunity to Lord Bryce to dot the "i's" and cross the "t's" of what was, in fact an extremely sane pronouncement. Those who heard him will not

soon forget the vigour with which he associated himself with every word which the president had used. The confusion between education and book-learning, the fool's paradise in which modern democracies were apt to live when dealing with education and votes, the want of intellectual curiosity in England, a lament for the increasing disuse of the Bible—these were the main points, apart from some interesting personal reminiscences, of an unexpected but most welcome intervention.

Following the address came a series of papers on the "Methods and Content of History Teaching in Schools." Prof. F. J. C. Hearnshaw, after a pointed reference to the education section as the happy hunting-ground of the amateur, dealt in the main with the purpose of historical teaching. The aim of education seemed to him less simple than of old. There are no heroic figures typifying the national or religious ideal—a Leonidas, a Pericles, a St. Thomas Aquinas—such as had given unity to educational effort in the past. Instead of that, we talk of technical, or intellectual, or moral training, emphasising the individual and losing sight of the civic aspect. The current appeals to self-interest, upon which sections of our countrymen were basing anti-political organisations, showed how much British democracy was in need of mental and moral salvation.

History in its right place would do much in this direction. The subject has greatly altered in its methods and aims. Its procedure is now scientific. It seeks for laws. It is the memory of the race, and as such the finest school for statesmen. From the civic viewpoint its purpose is threefold, as the subject is at once a school of political method, a storehouse of political precedents, and a basis of political progress. To serve such a purpose it must be wider and more empirical in treatment. Prof. Ramsay Muir regarded intensive work on a special period as essential to the study of history. It was just this intensive work which gave force to the old classical training, and which helps it still to hold its own. But though the intellectual gain from history could only come in this way, the intensive study of a period must have a background which would make the world of to-day intelligible. Such a background was best found in the unique character of British empire history and the development of self-government in the last four centuries. Dr. E. O. Morris protested strongly against the views of Prof. Ramsay Muir, which neglected entirely the working conditions of the schoolmaster who has to deal, not with the cream of creation who become professors, but with the average boy who has to present eight subjects in an examination, failure in any one of which means failure in the whole. He urged the abandonment of the rigid division between English, history, and geography. Until examination systems were reformed, no useful suggestions can be made unless they are on examination lines. Mr. J. A. White dealt with the problem from the point of view of the elementary school. Any scheme should be based on three fundamental principles: the matter must appeal to the pupils, development must be its cardinal feature, and it must explain modern conditions. Prof. T. F. Tout opened the discussion by expressing serious disagreement with some of the papers. He did not share the dark views of democracy held by Prof. Hearnshaw. Unfortunate as was the South Wales strike, it was not so bad as the mutiny of the Nore, and the corruption of the Whigs and Tories of the eighteenth century was colossal as compared with the mild corruption and amateur log-rolling of to-day. Prof. Ramsay Muir seemed to see his own subject in false perspective—the ordinary vice of the specialist. Whilst agreeing with him in his condemnation of constitutional history and of economic history as school studies, he was altogether out of sympathy with his idea of beginning history with the Reformation. Such a course would leave out of English history the study of all those forces which gave the England of to-day its special character. He referred sympathetically to the special difficulties of the schoolmaster, and incidentally expressed his belief that the good schoolteacher of history need not be in any sense a specialist on the subject. Sympathy and intelligence are more important than special knowledge.

Miss E. E. C. Jones read a paper on the teaching of ethics and politics, which had to be cut short before it reached the practical problems involved, and the first day's proceedings were brought to an end by a stimulating paper from Prof. R. S. Conway, who was concerned lest literary, and especially classical, teaching should suffer from the stimulus to technical and scientific education which would come from the war. The Prussian *Realschulen* taught the German youth how to build strategic railways, but not how to find his way to the affections of alien subjects.

The second day was given up to "Military Training in Schools." Dr. A. A. David pointed out the difference between the cadet training of to-day and the old military drill of the sergeant-instructor. The latter system was never taken seriously either by masters or boys. The drill was usually bad, and bad drill is worse than no drill. The new opportunities have completely transformed many boys who especially appreciate the greatly increased chances of leadership. The work had, moreover, a bracing effect on the whole school. Mr. J. L. Paton entirely dissented from the headmaster of Rugby on the general question of the desirability of military training in school. He felt this a particularly bad time for its discussion. The emancipation from the drill-sergeant was no substitute for physical exercises and games. The strategic point of education is adolescence, and co-operation, not struggle, is the keynote of progress. Lancashire, he was sure, would have nothing to do with a system which means officers from public schools and privates from elementary schools. Compulsion in patches was undesirable. The hope of the future lay in federation and international co-operation. This movement means we are to shut our eyes to social consequences and to turn the nation into a barracks. War, like all other forms of evil, was only temporary. Mr. A. A. Somerville strongly disagreed with Mr. Paton. The object of the movement was not to train for war, but to enable the future citizen to defend his home and its development, and, above all, the justification for it lay in its educational possibilities—in cultivating the powers of leadership, of taking initiative, qualities of vast import to the empire. The O.T.C. has provided 30,000 officers for the present war. There was no thought of compulsion in the schools. Mr. Wood dealt with the facts of the position in the colonies and in western Europe. Prof. Hearnshaw, Prof. Boyd Dawkins, Mr. Roper, Prof. Findlay, Rev. W. J. Barton, and Mr. Richardson took part in the subsequent discussion.

The third day's discussion on the "Education of Girls with Special Reference to their Careers" was perhaps the best of the series. There was a large audience of people who were evidently keenly interested in the question, and all the papers reached a high level both as to matter and mode of delivery. Mrs. W. L. Courtney divided the possible occupations for girls into three groups:—(*a*) Those requiring university training, *e.g.* medicine, teaching, and the like. The requirements of the university must in these cases determine the curriculum. (*b*) Nursing, social work, and public health service. School can do nothing special here. A sound general education

and good health were the prime requisites, though school might do more to awaken girls' interest in public questions. (*c*) Occupations which can be begun at an earlier age, *e.g.* secretarial and clerical work—journalism, accountancy, and civil service. Two views as to this class of girl. Either she should leave school at fifteen and go to a "crammer's," or the school should organise special courses. But school-trained girls are not wanted by business men. They find the school training rather "amateur," and in any case the atmosphere of school, when it is right, is not that of business. Six months or a year in a reorganised business school is a desirable interlude. Civil service ought not to encourage competitive examinations before sixteen, and so cut short the proper school time of a girl. Miss Haldane also opposed all utilitarian claims upon school. A better education of a general kind is what is wanted. The want of prospects under which most girls had to do their work and the narrow specialisation of the preparation for Government work had a most depressing influence. "We cannot afford to be economical in the matter of education. If school buildings must be plain, at least we must see to it that the staff is well-qualified and efficient." Miss Oldham pointed out the increased necessity for training women for economical independence. "What strengthens women in the best sense strengthens the nation." She urged free entry and free progress for women into all professions for which they are physically fit, an improved status for the home-maker, who should have a right to the best education and to the honour and rewards which belong to great tasks well discharged. "Motherhood is so important that a whole year might well be given to its problems in the education of every girl. Even for those who never marry, it should be remembered that the preservation of babies born is the first line of defence of our sex." Miss Charlesworth, "a voice from the bottom," as she expressed it, spoke from the clerk's point of view. The most important thing in the education of a girl is to develop "self-reliance and independence"—much more important than technicalities. A girl with this feeling will not do a woman's work for 12*s.* 6*d.* a week "if only it is genteel." School should teach girls not to take work without prospects. Girls are very apt to mistake permanence of employment for a career. Some standardisation for the education of clerks was a great need in these days. Miss Burstall, Miss Escott, Miss Foxley, Miss Sheavyn, Miss Higgs, and Mrs. Findlay took part in a very lively discussion. Miss Burstall was severely criticised for the view that Latin should be left to the *clever* girls—an expression which probably did not mean to its author what it suggested to her audience.

The section met again on Saturday morning. The large gathering was significant of the interest taken in the subject—education and industry. Sir William Mather declared that the two were connected as intimately as soul and body. Future historians will marvel at the fact that we made no attempt whatever between 1872 and 1889 to deal with technical education, and that until quite recently we gave more time and energy to quarrelling about the place of religion in education than to the problem of how to make our boys and girls "children of light." After paying a warm tribute to the work of the City and Guilds Institute, he pointed to the waste of elementary educational expenditure, because of the absence of any general form of continued schooling. Happily, Great Britain was a peculiarly plastic country. It learned best from its own mistakes, and herein lay the hope of the future. Such voluntary movements as that of the boy scouts had much to teach us. Mr. Maxwell Garnett pointed out the great gulf fixed between education and industry. We have thought out the material and equipment side of education much in advance of the human. The scientific way of handling educational problems was much handicapped by the want of a technical language. The use of the words of ordinary life was productive of all kinds of misconceptions. Education should aim at developing a single wide interest. The old notion of a general education was psychologically absurd. Coherence at seventeen is the surest way to comprehensiveness at twenty-seven. By means of a chart, Mr. Garnett showed what should in his view be the relation of each grade of education to the rest. Mr. J. Graham described the practice of the Leeds authority in providing a quasi-technical training for boys about to leave the elementary school. The work began in two or three so-called "Day Preparatory Trade Schools," in which the time-table was divided into three broad sections dealing about equally with English, drawing, and manual work. Now it is proposed to extend this provision to all the elementary schools of the city. On leaving the school, the boys enter a trade, and a real technical education should begin, lasting for four years (fourteen to eighteen), and occupying half the pupil's time. In the secondary schools the vocational claim is being admitted. The matriculation examination should be broadened. The present dominating influence of the university upon the schools should be weakened, but the secondary schools ought not to be made into technical schools. The president of the Association pleaded for practical suggestion. He did not think our present system was wrong because it turned out too few trained minds. Incidentally he criticised the use of the term "Honours" in the universities. Principal Griffiths raised the question of education in its relation to want of understanding between employers and employed, not a little, he thought, due to such "class" education as that of Ruskin College. The discussion closed with some account of the educational work done by the Westinghouse Co. for its younger employees.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The fifth edition of the War List of the University was published by the *Cambridge Review* on November 15, and is an impressive quarto volume. It consists of 90 pp. and cover, and contains more than 11,000 names. Trinity College has 2500; Pembroke 1052, Gonville and Caius 952; Clare 750; Emmanuel 648; Trinity Hall 603; Jesus 559; King's 556; Christ's 540; and St. John's 513. The other colleges also show a great increase in numbers. The list not only contains the names of past and present members of the University who are serving in every branch of both Services, but, so far as is known, after each name appears the honours awarded for distinguished service; also, alas! the large number of both killed and wounded. It is a record of which the University may well be proud, showing, as it does, Cambridge University's fine spirit. There are 614 killed, nearly 900 wounded, and 123 prisoners and missing. The distinctions comprise:—Mentioned in Despatches, 241; V.C., 3; D.S.C., 1; D.S.O., 36; Military Cross, 48; D.C.M., 4; K.C.B., 1; C.B., 2; C.M.G., 6; Medaille Militaire, 4; Croix de Chevalier, 10; Croix de Guerre, 4; Russian Orders, 5; Serbian Order, 1.

THE Long Fox lecture will be delivered by Dr. Richardson Cross, at the University of Bristol, on Wednesday, December 1. The subject will be "The Evolution of the Sense of Sight."