

and habits had been entirely altered by accidents to the brain, and said that while Newton was physically weak, Young, who was his superior even in mental capacity, was a circus rider, and could perform almost any bodily feat.

Sir Lauder Brunton spoke of the need to train the higher inhibitory nerve centres, and of the possibility of keeping in order involuntary movements. He said that children could not do physical exercises unless they were properly fed, and urged that no damage must be done by over-exertion. Medical inspection was desirable, but teachers, he thought, could easily learn to recognise the signs of danger.

Dr. Kerr (medical adviser to the London County Council Education Committee) took as his subject the position of physical exercises in the infant department of the elementary school. He pointed out that while certain of the nerve cells in the infant were quickly matured, and this was especially so with those dealing with behaviour that has been hereditary for long periods, other nerve cells were still capable of being acted upon for a considerable time. In this state they were very susceptible to fatigue, and frequent periods of rest were needed in which the waste products from action could be removed. He advised the use of physical exercises for infants, and maintained that no great perfection of detail ought to be looked for.

Of a different character was Mrs. Kimmins's paper on the educational value of organised play, for it was a graphic account of the way in which most of the benefits claimed as coming from physical training could be gained out of school, and in the particular case described, away from it.

All the speakers upon physical exercises agreed that these were only complementary to games; and in the last paper of the day Miss Kingston (organising instructor of physical exercises of the London County Council) discussed the interrelation of drill and organised play.

It should be pointed out that all concerned were most anxious that the word drill should not be used, as it called up in the mind military drill, something quite different from the exercises and unfitted for children. There was also considerable unanimity as regards the need for the pupils to do the work for its own sake and as a pleasure, and not as a task. Sir Lauder Brunton was most emphatic on this point, as was also Dr. Kerr. The Rev. Stuart Headlam, a member of the old School Board, in the discussion objected to things being made too pleasant, but it had been pointed out that even games pall if they are too much organised, and their interest and freshness thus lost.

There is no doubt but that as true nature-study should properly put the child so far as possible into the same mental relation with its surroundings that primitive man enjoyed, so physical exercises adopted in a pleasurable way should counteract the baneful effects of civilisation, as Dr. Kerr pointed out on Thursday, and, one may add, give our young people the bodily advantages of their remote ancestors.

As on previous occasions, Mr. C. A. Buckmaster and Dr. Kimmins (chief inspectors, respectively, to the Board of Education and the London County Council, education committee) organised the conference in a remarkably successful manner.

WILFRED MARK WEBB.

COLOUR VISION IN THE PERIPHERAL RETINA.¹

THE results of a research into the nature of colour vision in the peripheral portions of the retina, carried on by Mr. Baird during the years 1903 and 1904 in the psychological laboratory of Cornell University, have lately been published in a pamphlet. The work so carefully done by Hess and the numerous papers by him on this subject have received fairly general acceptance, and in the present work Mr. Baird confirms most of Hess's conclusions. The reason he gives for the publication of a pamphlet which contains little new work of any great value is that Hellpach, in his research on the nature of colour sensation in the peripheral retina, had arrived at conclusions which

¹ "The Colour Sensitivity of the Peripheral Retina." By John Wallace Baird. Pp. 80. (Published by the Carnegie Institution of Washington, 1905.)

controverted many of the statements of earlier observers, and it was deemed advisable to repeat Hellpach's work in order to see whether there might not be some fallacy in the method. Mr. Baird's work practically in every respect confirms that of Hess, and we think there is little doubt that his explanation of the confusing results obtained by Hellpach is correct, that Hellpach did not allow sufficient time to elapse between successive stimulations, and consequently the colour sensation due to the immediate stimulation was partly modified by a latent after image of the preceding stimulus.

In standardising his colours, Mr. Baird arrived at practically the same results as Hess. The red used transmitted no part of the visible spectrum, and Hess, in order to get a stable red, had to mix it with a certain amount of blue. The yellow, green, and blue used corresponded fairly exactly with Hess's stable colours.

It is when we come to the problem of equating the white values of the different colours that the greatest difficulty is met with. We must confess to a strong suspicion of the value of Mr. Baird's method. He is engaged on a research on the nature of colour vision in the peripheral retina, and in the determination of his standards he utilises the very portion of the retina which he is subsequently going to investigate. We quite allow that there is no satisfactory method of equating white values at present known, but we certainly think that Mr. Baird has chosen the least satisfactory of all. Probably the best method of photometry available at present depends on the flicker phenomenon, and for Mr. Baird's purpose we feel sure it would have been much more suitable and much more scientific than the method he did adopt.

In other respects the work has evidently been carefully done, and though, as we have said, it adds little that is new to our stock of knowledge, it is of value in that it confirms much of the work of previous observers.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

DR. R. A. LEHFELDT, professor of physics at the East London College, has been appointed to the chair of physics in the Transvaal Technical Institute, Johannesburg.

THE Corporation of Glasgow has resolved to make a grant of 10,000*l.* to the building fund of the Glasgow and West of Scotland Technical College, from the common good of the city.

It is satisfactory to find a committee of the Classical Association reporting that "in view of the legitimate claims of other subjects the amount of time devoted to the classics on the classical side of boys' public schools is as great as can reasonably be expected." From the report which was presented at a meeting of the association on Saturday last, it appears that in the highest form on the classical side in the larger public schools a considerable amount of specialisation is allowed to many boys. In the other forms the time devoted to Greek and Latin together generally amounts to about one-half of the whole number of school hours. In the smaller public schools there is less specialisation in the highest form. The proportion of time given in school to classics increases from somewhat less than one-third in the lowest form in which both Greek and Latin are studied to slightly less than two-thirds in the highest form. The committee suggested that time and effort might be saved and better results obtained by certain changes in the method of teaching Greek; and in the discussion upon the resolutions put forward with this end in view, we are glad to see that Canon Lyttelton, headmaster of Eton, pointed out that the time gained by the adoption of the plan proposed "might well be given to instruction in some of the elements of scientific knowledge rather than to history and archaeology. Let them hold out a helping hand to their scientific colleagues and meet them half-way. There had been too little conciliation between the two sections of teachers. Then we might hope to correlate these great subjects, which were too important to abandon, but which we had not yet enabled to live in amity together."

THE organisers of the North of England Education Conference, held this year at Newcastle-upon-Tyne on January 5 and 6, had to struggle with the fact that almost all persons and bodies who were desirous of conferring together had their hands full with the difficulties of primary education and its immediate continuations. The conference was well attended by between two and three hundred members drawn chiefly from the education committees of the county councils, the permanent officials of such committees, and schoolmasters and mistresses, and their interest was almost entirely directed to the problems called into existence by the duties now thrown upon the education committees. Not a word was said as to higher education, very little as to secondary education in any form, and, it may be added, scarcely a word as to the religious difficulty. The tone of the conference was distinctly optimistic, and it was the general opinion that if the councils were less encumbered by intervention of the Board of Education, and deputed more of their own work to persons in each locality, the difficulties that have declared themselves would work themselves out. It was encouraging to see so much determination to cope with the questions, in spite of the heavy tax of time thrown upon the education committees, and it is very clear from the local patriotism exhibited that the councils will not ultimately rest content with perfecting a primary system. It is, however, a question of pounds, shillings, and pence, and so long as the councils are left without other resources than the rates it is clear that improvements must wait a long time.

THE December, 1905, issue of the *Bulletin of the Massachusetts Institute of Technology* comprises, as usual, a list of the staff and students of the institute, with a statement of the requirements for admission, a full description of the courses of instruction, and an account of the Lowell School for Industrial Foremen. It is interesting to note that the institute offers summer instruction during the months of June and July, supplementing the work of the regular school year. Summer courses are undertaken primarily for the benefit, first, of those who wish to distribute their work over a larger portion of the year, or to gain more time for advanced work; and, secondly, of those who, through illness or other causes, have deficiencies to make up. Moreover, to bring students into closer relations with the practical side of their professions, professional summer schools are held in the departments of civil engineering, mining engineering and metallurgy, architecture, chemistry, and geology. The students, accompanied by instructors, give their time to field-work, or visit and report on mines and industrial establishments. The Lowell School for Industrial Foremen is a free evening school which includes, at present, mechanical and electrical courses extending over two years. These courses are intended to bring the systematic study of applied science within the reach of young men who are following industrial pursuits and desire to fit themselves for higher positions, but are unable to attend courses during the day. This number of the *Bulletin*, with its 408 pages, provides abundant evidence of the excellent work being accomplished by this widely known institute.

THE annual meeting of the Geographical Association was held on January 5, when the report for 1905 was adopted. The report shows that the total membership of the association is 503, including teachers of every grade, school inspectors, and others interested in geographical education. An important advance was made during the year by the formation of local branches. This is a valuable expansion of the work of the association, enabling members to meet at more frequent intervals, to discuss the advantages presented by their own district for teaching geography, permitting combination in excursions and cooperation in the accumulation of lantern-slides and other materials necessary for good teaching. The geographical exhibits collected by the association in 1904 were on view during the year at Liverpool, Huddersfield, Bedford, and Oxford. Part of the exhibits were lent to Felsted School for a local exhibition. The exhibition is now being broken up, and exhibits lent to the association returned. Dr. G. R. Parkin, secretary of the Rhodes Scholarship Trust, who was in the chair, dealt in his address with

the general question of geography. In war, he said, geography is of the greatest importance. If our commanders at the battle of Colenso had possessed an elementary knowledge of the geography of the country thousands of precious lives might have been saved. In a nation like ours, which may any day find it necessary to send an expedition to a frontier place in India or to some corner of Africa, the intimate study of geography is an essential condition of national safety and honour. In commerce, too, geography is everything. Only last year the great cotton districts of Lancashire began to realise that the supplies of cotton were not sufficient for the demand, and Sir Alfred Jones organised a company to discover what places under the British flag are suitable for raising cotton. This is largely a geographical work which a great commercial country like ours should be carrying on as a Government measure. As the great workshop of the world, which almost requires the world from which to draw raw material and food, no nation ought to know so much about geography as ourselves, and yet up to the last eight or ten years hardly a subject has been shown so little consideration.

SOCIETIES AND ACADEMIES.

LONDON.

Zoological Society, December 12, 1905.—Mr. Howard Saunders, vice-president, in the chair.—*Exhibitions.*—Twelve enlarged photographs of whales taken at the fin-whaling factories in east Finmarken in 1883–89: A. H. **Cocks**. The species represented were *Megaptera longimana*, *Balaenoptera sibbaldii*, *B. musculus*, and *B. borealis*.—The tail-vertebræ of a dormouse of the genus *Eliomys*, which showed the phenomenon, hitherto unrecorded among Mammalia, of the regeneration of a bony structure in case of accident: Oldfield **Thomas**. The caudal vertebra, in this case the twelfth, which had been originally broken across, had grown out into a slender styliiform appendix 15 mm. in length and rather less than 1 mm. in diameter, the normal vertebræ of this part of the tail measuring about 6×2 mm. On further search two other specimens exhibiting the same structure had been found, and it appeared, therefore, that dormice, like lizards, were able partly to regenerate their tails, when these important balancing-organs got accidentally broken.—Microscopic sections of the skeletal tube found in the restored tail of one of the dormice (*Graphiurus*) exhibited by Mr. Thomas: Dr. W. G. **Ridewood**. The wall was made up of close-set lamellæ, producing in a transverse section a fine concentric striation. Lacunæ with numerous branching canaliculi were disposed regularly in relation with the concentric striations, and the general effect was that presented by a transverse section of the humerus or femur of a frog. Internally to the bony layers, and contiguous with the central jelly, was a moderately thick layer, which was clear, homogeneous, and highly refractive. Dr. Ridewood also exhibited, by way of contrast, slides of the skeleton of the restored tail of an iguana lizard, the skeletal tube in this case being composed of calcified fibro-cartilage and not of bone.—*Papers.*—Observations and experiments on the habits and reactions of crabs bearing sea-anemones in their claws: Prof. J. E. **Duerden**.—Notes on a large collection of snakes made by Mr. Alan Owston in Japan and the Loo Choo Islands: Captain F. **Wall**.—A collection of South Australian spiders of the family Lycosidæ contained in the museum at Adelaide: H. R. **Hogg**. Thirteen species were remarked upon, ten of which were described as new.—A collection of mammals obtained by Colonel A. C. Bailward during a shooting trip through Persia and Armenia during the past summer, and presented to the National Museum: Oldfield **Thomas**. Thirty-one species were enumerated, and special attention was directed to the discovery of *Calomyscus*, a primitive murine, the only ally of which, amongst recent forms, was the North American *Peromyscus*.—The colour-variation of the beetle *Gonioctena variabilis*: L. **Doncaster**. The material on which the paper was based was collected almost entirely at Granada, and the author found that, although the insect was extraordinarily variable, when a large collection was examined the beetles could be classified into two chief