fluence on the effectiveness of the cooling. The investigations of cooling velocities were made with an automatic quenching apparatus and temperature calibration device, with a string galvanometer, calibration of which instrument has been investigated. The cooling velocity is considerably lowered with increasing carbon content, and possibly silicon has a similar effect. Results are given confirming the theory that troostite is a solid colloid solution of cementite in iron, or, in other words, a pearlite having ultra-microscopic particles of cementite. The last section of the report is devoted to the study of austenite, for which a new etching medium, 5 per cent. alcoholic solution of metanitrobenzolsulphonic acid, was found to be of use. Austenite was observed to be more liable to rusting than martensite. The most important fact found concerning the preservation of austenite in carbon steel is that it requires a high mechanical pressure. Austenite never occurs in the outer layer of a hardened specimen, but it is entirely erroneous to ascribe this to oxidation; it has been shown to depend on the lack of the necessary pressure.

The annual dinner of the institute was held on May 14, with Sir Hugh Bell in the chair. Four hundred members and visitors were present, the principal speakers being Sir Edward Grey, Secretary of State for Foreign Affairs, Sir W. H. White, K.C.B., the Right Hon. J. L. Wharton, Sir Walter Runciman, Mr. R. A. Hadfield, Viscount Ridley, and General Baden-Powell.

SCIENTIFIC AID TO EGYPTIAN AGRICULTURE.[1]

FEW of the changes effected during the past decade in our management of the Crown colonies, India, and Egypt will be of more lasting benefit than the establishment in them of scientific, as distinct from the ordinary administrative, departments of agriculture. Although they have only been working a short time, some of them have already rendered very useful service, and give promise of even better things in the future; indeed, in this respect these countries are usually better off than the self-governing colonies—one might almost add than ourselves; in proof it is only necessary to refer to the admirable work accomplished in Jamaica and in the Transvaal, where, on the advent of self-government, it was decided to maintain the scientific department.

The volume before us contains an account of the work done by the scientific staff of the Khedivial Agricultural Society. More than half of it is devoted to cotton, the staple Egyptian crop.

Mr. Willcocks gives some notes on the Egyptian cotton-bug or cotton-stainer (*Oxycarenus hyalinipennis*), an insect which receives its name from the fact that it stains the fibre either with its excrements or with the juices of its body, but which in addition inflicts other damage by sucking the juices from the bolls and the seeds. Once the pest has invaded a cotton field there appears to be no way of getting rid of it, but various suggestions are given for keeping it down. Mr. Willcocks has worked out the life-history, and the stages in its development are shown in a beautiful coloured plate by Miss Connie Beard.

This is followed by a long paper, or rather a collection of papers, by Mr. Lawrence Balls, dealing mainly with heredity in cotton. The cotton plant follows Mendel's laws of gametic segregation in certain of its characters, but the practical problems involved are likely to prove difficult of solution. The history of cotton in Egypt has not yet been worked out; the crop is undoubtedly of great antiquity, and some indigenous culture still exists in the Soudan. But the modern crop is not indigenous; it is closely related to Sea Island cotton, from which, indeed, it has probably sprung, since Sea Island cotton was certainly imported into Egypt in 1822. It is not, however, a pure type. Mr. Balls shows that cross-fertilisation takes place to a certain extent under field conditions, and the accumulated effect of this has been to convert the crop into a mass of hybrids. This is no doubt of prime importance in studying two of the most pressing practical problems, the deterioration of the crop in yield and quality and the multiplication of a weed cotton in the fields. Much can be done by selection to get rid of the weed cotton, but selection alone cannot solve the problem, since there will always remain the splitting forms arising from natural crosses between the wild and cultivated varieties. The only permanent solution is to breed pure types, and though Mr. Balls is aware of the special difficulties involved (notably the fact that many of the characters of importance to the manufacturer and cultivator are dominant), he is quite hopeful of the result.

Cotton is not the only hope of the scientific staff. The Nile Valley is well adapted to wheat cultivation, and was in Roman times a great wheat-producing district. To-day wheat is actually imported, but it is pointed out that the crop might very well come into the rotation with cotton, so that Egypt could once again take a place among the wheat-producing countries of the world.

Mr. Hughes contributes some notes on Egyptian and Soudan soils. Generally speaking, the Nile soils do not contain much organic matter, and the "total" phosphoric acid is not high, but a large proportion is "available," so that Dyer's method may show 0·02 per cent. to 0·08 per cent. In spite of this, however, application of superphosphate has been found beneficial. We may expect some very interesting and important results when the manurial requirements of these soils, as ascertained by field trials, are compared with their chemical composition. It would also be desirable to get out the full mechanical composition of some of the typical soils of known history. Mr. Burns gives an interesting series of analyses of the solids dissolved in the Nile water, samples having been taken for this purpose every month during 1906. The results will be of great value to students of the Nile flood.

Altogether, the work is very satisfactory, and is full of promise for the welfare of Egypt. E. J. R.

[1] "Year-book of the Khedivial Agricultural Society, Cairo, 1906." Pp. 219. (Cairo: National Printing Department, 1907.)

THE PIGMENTATION SURVEY OF SCOTLAND.

THE last half-yearly number of the Journal of the Royal Anthropological Institute contains an important memoir, prepared by two enthusiastic Scotch anthropologists, Messrs. Gray and Tocher, on the pigmentation of hair and eyes among the school children of Scotland. In one respect the methods employed fail to secure that precision which is necessary to an investigation of this kind. Attempts were made to furnish the correspondents with standard colour cards produced by the three-colour lithographic process, but English manufacturers have up to the present been unable to provide them. There seems, however, to be a prospect of overcoming this difficulty by the adaptation of Lovibond's tintometer to anthropological work. The new instrument is described by Mr. Gray in the April number of *Man*.

Even with these imperfect methods the results are valuable. In the first place, the percentage (24·9) of Scotch boys with fair hair is unexpectedly low. The obvious inference is that the pure Norse or English element in the population is by no means predominant, and that there is a dark or brunette element at least equal, and probably greater. The highest density of fair hair is to be found in the great river valleys opening on the German Ocean and in the Western Isles. In the former case this probably points to invasions of a blonde race into those regions. Similarly, the higher percentage of fair hair in the Spey valley and in the Western Isles implies inroads of the Vikings or Norsemen. It is perhaps pushing the evidence too far when the writers suggest that the high percentage of fair-haired girls in the neighbourhood of Dunfermline is due to the train of blonde damsels who are supposed to have accompanied the Saxon princess Margaret, who about the time of the Norman Conquest became Queen of Malcolm Canmore.

The survey appears to corroborate the conclusions of Dr. Shrubsall in regard to London slum districts, that the percentage of fair-haired people in industrial towns is very low. For some reason as yet obscure, whether from alien invasion or the influence of environment, in towns like Glasgow and Dundee the conditions are specially unfavourable to the survival of blonde men, while the reverse is

the case with women. Another important conclusion seems fairly well established, that improvements in communication do not, as might naturally be expected, tend to homogeneity of type; on the contrary, owing to selection centres or to some obscure influence of environment, all improvements in transport apparently tend to make the race more heterogeneous.

The part of the country in which dark hair specially prevails is the extreme west. "If," write the authors of the memoir, "we assume for reasons given above that the pigmentation of girls represents more nearly the pre-Norse inhabitants, this native type has crowded into the Isle of Skye and the opposite coasts of the mainland. If the Dalriadic Scots, who invaded Argyllshire in the fifth century, were a dark race, and the invaders who settled there were men only, that would account for the darkest region in the boys' map being in Argyllshire. The Hebrides have been so much affected by the Viking and Norse invasions from Scandinavia which have passed round the coast of Scotland that they have a much smaller percentage of dark type than the islands and mainland lying further east. The Isle of Lewis has a higher percentage of dark girls than boys, indicating the presence of a pre-Norse dark native population. The south-west corner of Scotland in both the boys' and girls' map is darker than the average; and since, in historical times, the Picts inhabited this region, this evidence points to the conclusion that the Picts were a dark race."

Such wide-reaching conclusions, in the present state of our knowledge, are obviously premature, and too much stress is laid upon pigmentation as a test of race. But the results of this imperfect investigation are sufficiently instructive to justify the demand for a national anthropometrical survey, which was pressed on the late Prime Minister by an influential deputation, the proceedings being reported in the same number of the journal.

ACOUSTIC OSCILLOGRAPHS.

AN interesting addition to the phonograph or the gramophone has been designed and made by Mr. Bowron, of 57 Edgware Road. It is well known that the action of a gramophone depends on a spiral line cut in the record disc. When this line is examined with a magnifying glass, it is seen to consist of numerous small oscillatory curves; as the disc rotates the needle that follows these curves actuates a diaphragm, and thus the sounds are reproduced. In other words, the curve cut on the disc is a graph of the various sounds produced by the instrument. Several years ago Prof. Ewing studied the analysis of vowel sounds by examining the corresponding curves cut on a phonograph record. Mr. Bowron has undertaken the task of reproducing on a large scale the curves to be found on a gramophone record: he has accomplished this by means of a small mirror, which is mounted so that it oscillates with the diaphragm of the instrument; a beam of light is reflected from this oscillating mirror and from another mirror which rotates uniformly, with the result that a luminous curve of about three feet amplitude can be thrown on a white screen, and so made visible to a large audience. The variations in this luminous curve can be watched while the corresponding sounds are heard; thus the nature of the oscillations produced in the course of a song or the peformance of an orchestra can be most instructively studied.

It would, no doubt, be possible to obtain gramophone records of the various vowel sounds, and to study the corresponding oscillations in a similar manner. In teaching the elements of harmony, it would be interesting and instructive to project on a screen curves showing the characteristics of the various harmonious and dissonant intervals, while the corresponding sounds are rendered audible; and this also could be done by the aid of Mr. Bowron's invention.

Of course, for the curves to correspond exactly to the sounds, it is imperative that the oscillating mirror shall have a very small period of vibration—a period much smaller than that of any of the oscillations which it is necessary to reproduce. Hence the mirror and the mechanism by which it is actuated must be made as light as possible. Some difficulty has been found in obtaining an oscillating mirror large enough to reflect sufficient light to produce curves visible to a large audience, and at the same time light enough to have a period as small as is required; but the progress already made indicates that complete success may ultimately be obtained.

Mr. Bowron has also adapted a Koenig's manometric flame to indicate the acoustic oscillations produced by a gramophone; were it not for the fact that the variations in the shape of the flame must be interpreted before the precise character of the oscillations can be known, this method would be the preferable one. Mr. Bowron's inventions are certain to be appreciated, not only as an educational aid, but also as affording an interesting spectacular display for public entertainments. E. E.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

ST. ANDREWS.—In order to remove misapprehensions which have apparently arisen upon the subject, announcement is made that the University Court—the patrons of the Chandos chair of physiology in the United College, St. Andrews, now vacant—has resolved that the appointment should be open, and that the person to be elected should be the person deemed to be the best candidate, whatever may have been his previous sphere of work. The Court is not pledged to any one candidate, and the election is not a foregone conclusion.

CAMBRIDGE.—The election of a professor of biology will take place on Monday, June 8. Candidates are requested to communicate with the Vice-Chancellor on or before Saturday, May 30.

Mr. C. Shearer, of Trinity College, has been nominated to use the University table at Naples for five months from May 1, 1908.

The professor of botany gives notice that the botany school will be open for practical work during the long vacation. A practical course in elementary systematic botany (flowering plants) will be given in the elementary laboratory on Tuesdays and Saturdays at 9 a.m., beginning Tuesday, July 7. Fee, 1*l.* 1*s.* A series of botanical excursions will be arranged.

Prof. Larmor has been appointed a member of the board of electors to the professorship of chemistry until February 20, 1910, in succession to Lord Rayleigh, who has resigned his place on the board.

The general board of studies, acting on a memorandum received from the board of geographical studies, recommends a re-construction in the staff engaged in teaching geography in the University. It is proposed that the readership of geography, which becomes vacant in the Michaelmas term of this year, be suppressed, and to establish in its place three lectureships in geography. One of these lectureships will be on historic and economic geography, and will be in connection with the special board for history and archæology. The second will be in regional and physical geography, and it is proposed to connect this with the special board for biology and geology. The third will be a lectureship of surveying and cartography in connection with the special board for mathematics. The salary of each of the first two mentioned lectureships will be 150*l.* per annum, and that of the last 50*l.* per annum. The last two named will be known as the Royal Geographical Society lectureships in their respective subjects. The council of the Royal Geographical Society has offered to contribute 200*l.* a year for three years to the geographical education fund. This offer the board recommends should be gratefully accepted. The University will pay a like sum to the same fund.

THE second annual conference of the Association of Teachers in Technical Institutions will be held in London at Whitsuntide, on June 6, 8, 9, and 10. The delegates will meet on Saturday, June 6, and in the evening there will be a conversazione at St. Bride's Institute, E.C. On Monday, June 8, the president, Mr. C. Harrap, will deliver an address, and there will be papers on:—(*a*) Group courses and continuation schools; (*b*) homework and tutorial classes; (*c*) commercialism, the schools, and the decorative arts; (*d*) modern education—the technical phase. On