

Kleist, got Captain Petersen, of the whaler *Herman*, to take him to St. Michael. A gasoline schooner, *King and Wing*, of Seattle, relieved the Wrangell Island party, which was afterwards transhipped to the *Bear*. Stefánsson and two men started north from Martin Point on March 22, 1914, and on April 16 were to have returned after fifteen days. Stefánsson and his men have not been heard of since. He believed currents might drive them towards Banks Land, but on this coast, though searched, no trace of them has been found. The drift of the *Karluk* makes it unlikely that he has reached Banks Land.

#### BRITISH SUPPLY OF SYNTHETIC COLOURS.

THE Board of Trade has had under consideration the question of the supply of dye stuffs and colours, the shortage of which at the present time, owing to the cessation of imports from Germany, is causing apprehension in the textile trades and in other important British industries.

After consultation with the Committee on Chemical Manufactures, appointed in August last under the chairmanship of the Lord Chancellor, it appeared to the Board advisable to take such steps as were possible to develop the immediately available sources of supply, and also to encourage the permanent manufacture of dye stuffs and colours in the United Kingdom on a large scale, so as to guard against any recurrence of the present difficulty. As regards interim steps, arrangements have been made to encourage the immediate expansion of the various existing sources of supply.

As to the permanent supply, after preliminary consultations with representatives of some of the principal bodies of consumers, a meeting was held at the offices of the Board of Trade on November 10, and was attended by the representatives of twenty-two important associations and firms engaged in the colouring industries. There was laid before the meeting a scheme for the formation of a limited company with a large capital, of which the bulk would be subscribed by the consumers of dyestuffs and colours and others interested, the Government indicating their willingness, conditionally on this being done, to subscribe a certain proportion of the share capital and to guarantee the interest on a large debenture issue for a term of years. Precautions would be taken to preserve the British control of the enterprise and to prevent undue encroachment on other branches of the chemical trades.

The meeting was informed that preliminary arrangements had been made enabling his Majesty's Government to acquire important dye-producing works in this country for the purposes of the new company if established, and that the Government would be prepared to take all necessary steps to secure the acquisition of any other concerns in the United Kingdom, the transfer of which to the new company might be desirable.

The meeting unanimously adopted a resolution approving in principle of a national effort being made by the trade to increase the British supply of synthetic colours and welcoming the assistance of his Majesty's Government for that purpose. A small committee representing the trades concerned was appointed to confer with the Board of Trade with a view to the elaboration of a scheme on the lines discussed at the meeting. The first meeting of this committee was held later in the afternoon. A further announcement as to the proposed company will be made at an early date.

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#### METALLURGY AT THE ROYAL MINT.

ONE of the most interesting features of the forty-fourth annual report of the Deputy-Master and Comptroller of the Mint just received is the comparison of the melting costs according as coke or coal-gas is used as the fuel. The former was used up to the year 1909, but has since been replaced by the latter. Although the gross out-turn was 1197.7 tons in 1909, as against 1957.9 tons in 1913, the records are comparable, since the proportion of bronze and nickel-bronze—which require higher temperatures for melting than gold and silver—was nearly the same, viz., 56.3 per cent. in the earlier and 55 per cent. in the later year. The comparison is remarkably in favour of coal-gas firing, since there is a gross saving of 22.44 shillings per ton of bars, or 27.3 per cent. of the total charge in 1909. Moreover there is a saving under each item of expense, viz., fuel, crucibles, and wages. It is stated that "side by side with this economy there has been a marked increase in efficiency both in regard to the output per furnace and per man, as well as many minor economies, such as the disposal of ashes, handling of fuel, and a great reduction in the weight of sweep to be dealt with."

Sir Thomas Rose's experiments on the effect of impurities on the temperature at which gold is softened by annealing have been confirmed and extended by Mr. Phelps. The presence of two parts of hydrogen per 100,000 raises this temperature from 130° C. to at least 300° C. Silver has a similar, though less, effect. It has now been found that the relative purity of two samples of "proof" gold "can be more readily determined by heating hard-rolled test-pieces at 130–150° for half an hour than by ordinary methods of assay." The degree of softening is either measured in some form of hardness tester or is judged by the extent of recrystallisation of the metal. Sir Thomas Rose's experiments on the mode of recrystallisation of gold in various stages of annealing are of great importance, and bear directly on cases of failure of metal tubes and rods which are subjected to partial annealing conditions spread over lengthened periods of time.

The three countries—Austria, France, and Turkey—use pure nickel as a coinage metal. In the first-named this metal has been coined and issued regularly since 1892. In France it was adopted for 25 centimes only in 1903, but a new law passed on August 4, 1913, provides for the withdrawal of this issue and of the present bronze currency, and their gradual replacement by 25, 10, and 5 centime pieces, all of pure metal. The new issue will be spread over a period of ten years, and will amount to 780 million pieces. The French Government has signed a contract with a French nickel company for twenty years to purchase the requisite metal at 141*l.* a ton, the present price in the London market being about 171*l.* a ton.

Thirty-four countries use a 75 per cent. copper and 25 per cent. nickel coinage alloy, while Germany and Switzerland coin both pure nickel and the above-mentioned alloy.

H. C. H. C.

#### PHYSIOLOGY AT THE BRITISH ASSOCIATION.

THE physiological section of the British Association began its programme for the Australian meeting in Melbourne. Considerable alterations had to be made at the last moment owing to the unavoidable absence of members who were expected to contribute to a general discussion upon climate from a physiological point of view. This is a subject to

which considerable attention has been paid in Australia, and very complete meteorological statistics from all parts of the country are available. Wet- and dry-bulb records of temperature, rainfall, and other particulars were furnished by the authorities, and the climatic conditions of Northern Australia in particular have already been analysed locally with a view to determine the possibility of the settling of these regions by a white population. Australians are determined to people their country with none but a white population, and one of the problems of the country is how to bring this about successfully under the diverse conditions which prevail in the large tropical areas of the north.

The time at the disposal of the section was reduced by alterations in the train arrangements between Melbourne and Sydney, and Sydney and Brisbane, and by the numerous interesting excursions and hospitalities so lavishly provided by the local committees. The conditions created by the war, too, naturally deprived the meetings of the interest which they would otherwise have occasioned. In spite of this the meetings were very successful, especially in Melbourne, and it was only towards the close in Sydney that interest in the business of the section slackened.

A very full programme was presented and carried out in Melbourne. Prof. B. Moore opened the proceedings of the section by an address upon the value of research in the development of national health, and put in a strong plea for the wider application of modern scientific discoveries to the promotion of the health of the race. Sir Edward Schäfer exhibited a number of lantern slides of sections of the mammary gland, and pointed out the presence around the alveoli of non-stripped muscle fibres. It is to the contraction of these fibres that he ascribes the lactagogue effect of injections of pituitrin. Prof. Halliburton, in collaboration with Dr. W. E. Dixon, gave an account of their recent investigations into the physiology of the cerebro-spinal fluid. Numerous lantern slides were shown illustrative of the response to intravenous injections of various extracts by the production and pressure of the cerebro-spinal fluid. They find extracts of dried choroid plexus to be especially active in increasing its production. Certain anæsthetics, and excess of  $\text{CO}_2$  in the blood particularly, are also powerful stimulating agents. Evidence was adduced to prove that cerebro-spinal fluid is a true secretion, and that it is largely formed by the cells of the choroid plexus. The hormone may be a product of nervous metabolism, and the cerebro-spinal fluid may be an important agent in the rapid elimination of  $\text{CO}_2$ . A number of interesting observations upon the changes of cerebro-spinal pressure relative to the arterial and venous pressures were illustrated, a full account of which is given by the authors in recent numbers of the *Journal of Physiology*.

Prof. W. A. Osborne described experiments performed by himself, and in conjunction with Mr. Basil Kilvington, in Melbourne, upon pseudo-motor action, recurrent sensibility, and central neural response. Mr. Basil Kilvington also reported an experimental method of bringing about a successful collateralisation after occlusion of the abdominal aorta, a procedure which might be useful in surgery. Dr. E. H. Embley contributed a paper upon evidence of co-ordinate action in the circulatory system.

The second day's meeting in Melbourne was begun by a general discussion upon anæsthetics. Prof. A. D. Waller demonstrated a portable apparatus for the administration of chloroform, and dwelt upon the chief dangers to be feared in anæsthesia, and upon the question as to what are the real causes of danger. Dr. E. H. Embley, whose work in Melbourne upon

anæsthetics is so well known, discussed the causes and treatment of syncope, excessive intoxication, shock, and various accidental conditions. Prevention of syncope and shock he believes to be best attained by the pre-anæsthetic injection of morphine and atropine, and by the use of ether, or ether and oxygen, instead of chloroform. Dread of operation by the patient is also largely mitigated by the preliminary use of morphine. Prof. Osborne and Prof. Milroy continued the discussion, the latter describing the effect of anæsthetics upon the electro-cardiogram. Prof. R. F. C. Leith showed lantern slides of the pathological changes in a case of delayed chloroform poisoning, and Prof. Waller summed up the discussion.

Dr. J. W. Barrett then contributed an important paper upon the vision of persons engaged in navigation and railway services. He strongly advocated the thorough testing at the earliest possible time of the eyesight of all who contemplate entering either service, so that if the candidates are unsuitable rejection will take place before they have spent time and money in their training. Legislation is required for the purpose. Dr. Barrett instanced a series of accidents which were clearly due to defective vision, and which would have been avoided if a thorough examination of the sight of the men in charge had been carried out. The committee of the section passed a resolution recommending the Council of the Association to print Dr. Barrett's paper *in extenso*.

Miss Kincaid read a paper upon the biochemical significance of phosphorus, and claimed to have shown by analysis that there is a general deficiency of phosphorus in the soil and flora of Australia. Further work upon this question is to be done and reported to the Association.

Dr. S. Sewell contributed a paper upon the mechanism of micturition control in human beings.

The reports of several research committees were presented. Very little discussion of the individual contributions was possible owing to the shortness of time at disposal.

The work of the section was continued at Sydney. Sir Thomas Anderson Stewart demonstrated a number of interesting models illustrating physiological processes, *e.g.*, the functions of the corpora Arantii, the nature of sound waves in air, the action of the stapedius muscle, and the effect of simultaneous contraction of the intercostal muscles. A cyclograph, or apparatus for quickly marking microscopical slides for the identification of any part under the microscope, was also shown.

Prof. W. A. Osborne was to have opened a discussion upon climate, but as there were no other speakers on the subject he confined his observations to a consideration of the methods of taking temperature by wet-bulb thermometers. The ordinary wet-bulb thermometer is not so sensitive to changes in wind velocity as the human body, and Prof. Osborne described a method of jacketing wet-bulb thermometers so as to render them much more sensitive to changes in air currents. He also emphasised the importance of wet-bulb temperature records from a physiological point of view.

Prof. B. Moore gave the section the results of his repetition of some of the experiments of Dr. Bastian on inorganic colloids. He showed numerous slides illustrating the appearance of branching networks and hyphæ. There were no micrococci or other signs of life. Prof. Moore believes that the appearances are merely precipitation forms, the solutions are iso-electric, and give no signs of life. Considerable discussion followed, especially upon the question of infection of the solutions, and upon the methods of

determining the presence of any vital activity in them. Other communications by Prof. Moore dealt with the action of ultra-violet light upon solutions of organic substances, and with the presence of iron salts in the colourless portion of the chloroplast, and the mechanism of photo-synthesis by iron salts. Mr. Halcro Wardlaw, a science research scholar of Sydney University, described the results of a series of analyses of the deposit obtained from milk by spinning it in a centrifuge, and Dr. Burton Bradley contributed some notes on the symbiotic activities of coliform and other organisms on media containing carbohydrates.

The last day's proceedings of the section in Sydney embraced a lengthy programme, but most of the papers were taken as read, and the section thereafter joined those of chemistry and agriculture in a discussion upon metabolism. Among the subjects brought before the section, and of which abstracts were printed, were papers by Prof. T. H. Milroy on changes in the reaction of milk under different conditions as determined by the estimation of hydrogen-ion concentration by the electrometric method, and measurements of the variations of the hydrogen-ion concentration of the blood. Prof. P. T. Herring contributed papers upon the relative activity of the pars intermedia and pars nervosa of the ox pituitary, and upon the influence of the thyroid upon the activity of the suprarenals and pituitary body. In the latter communication the chief point of interest was the loss of chromaffine-substance, and corresponding diminution of activity, of the medulla of the suprarenals which rapidly follow thyroidectomy; thyroid-feeding, on the other hand, though pushed to an extreme, has no such effect. Dr. H. G. Chapman presented a paper on the freezing point of the laked red blood corpuscles of man and some domesticated animals, and Dr. C. Shellshear a paper on precipitin reactions in pathological human urines.

Several papers on psychological subjects appeared on the programme, but it was found impossible to take them. A feature of the sectional business in both Melbourne and Sydney was the large and varied contributions by local members, evincing evidence of the activity of the physiological departments in these universities.

#### AGRICULTURE AT THE BRITISH ASSOCIATION.

THE paramount importance of agriculture in Australia rendered the proceedings of Section M of special local interest, and the addresses and papers were arranged to deal with subjects of real significance in that country. The two addresses delivered by the president, Mr. A. D. Hall, attracted large audiences both at Adelaide and Brisbane. They were read at sessions of the whole association, and formed as valuable a contribution to Australia's needs as agricultural science and research could well have provided.

The meetings of the section at Melbourne were devoted to the subjects of irrigation, dry farming, animal breeding, and milk supply, all of which were selected in view of their importance to the Australian agriculturist. The papers on irrigation were read at a joint meeting with Section G (Engineering), and an account of the discussion has been given in the report of the proceedings of that section (November 5, p. 266).

An excellent paper by Dr. Lyman J. Briggs on dry farming investigations in the United States gave a *résumé* of the systematic work which has been carried on for many years in America on this subject. Dr. Briggs illustrated his paper with maps and diagrams, and pointed out the differences

which exist between the problems in America and those in Australia. Differences in the distribution and amount of the rainfall and in the nature of the soil indicate the necessity for much investigation into the special problems of each district. A more restricted problem of special Australian interest, "The Ten-inch Line of Rainfall," was discussed by Dr. T. Cherry, who pointed out that the rainfall throughout the southern third of the continent is almost exclusively of the winter type, and that the winter temperatures are high enough to keep the ordinary cereals growing during these months. The chief problem which in this instance has now to be solved is to devise methods by which sheep and cattle can also be profitably kept on the wheat farms in the 10-in. line of rainfall, the area already having been proved very suitable for wheat.

The very high evaporation factor, which in Western Australia is four to six times greater than the rainfall, adds to the difficulty of maintaining the soil moisture. Prof. J. W. Paterson contrasted this evaporation with that in England, which is only about one-half of the annual rainfall. He also stated that the sandy soils in these dry districts are an advantage, as they are able to absorb all the rain which falls and can yield up the retained moisture more completely to the plant than more absorbent clay soils. The movement of air and water within the soil is dependent on the sizes and distribution of the free spaces between the particles, a subject dealt with by Dr. Heber Green, who spoke of the capillary power of soils and of the experiments and calculations which he had made on this subject.

Perhaps no branch of scientific research is likely to be of more direct practical value than the investigations into the laws of inheritance. In the field of animal breeding Mr. P. G. Bailey represented the Cambridge school, and reported the progress of experiments conducted on the inheritance of wool characters in a cross made between two Merino rams from Western Australia and twenty Shropshire ewes at Cambridge. He also contributed a paper on size inheritance in poultry, a subject which bids fair to yield results of practical importance to an industry which is assuming large proportions in Australia.

The improvement of the quantity and quality of milk yield has received a great impetus in late years by the keeping of milk records and the gradual elimination of the less productive cows from herds. The development of this work in England, Scotland, and Ireland was reviewed by Dr. A. Lauder. Dr. S. S. Cameron and Mr. O'Callaghan spoke of developments in this direction in Australia.

The high cost and scarcity of labour in Australia has forced the development of milking machines. Mr. Archer estimated that in Victoria alone 2000 farmers had been supplied with milking machines, and that about fourteen different makes were in use. The principal local feature is the conduit system, in which the milk is conveyed through metal pipes to a tank in the dairy, thus saving the labour of carrying the milk.

The scientific comparison of the bacteriological purity and keeping qualities of milk obtained from eleven different types of machine at trials arranged by the Royal Agricultural Society of England formed the subject of a paper by Dr. R. Stenhouse Williams, Mr. J. Golding, and Mr. J. Mackintosh. The difficulties in cleaning many of the machines, especially those fitted with long rubber tubes, is one of the chief drawbacks to their employment under existing conditions on many farms.

A visit to the State experimental farms in Australia is sufficient to show the very great importance attached to the subject of cereal breeding. Not only is a large