

90·17 inches, most of which falls between May and September. Dr. Doberck states that there is apparently a little more rain when there are many spots on the sun, but the difference is too slight to be of any practical importance. The east wind is most prevalent at all seasons, the colony being within the region of the trade wind; about 59 per cent. of all winds blow from this quarter, but from June till September there is also a southerly maximum, caused by the monsoon. In winter the temperature is highest with south, and lowest with north wind, and in summer it is highest with south-west, and lowest with east winds. During the year, 213 ships' log-books have been examined for data relating to typhoons, and registers have been regularly kept at about forty stations.

THE additions to the Zoological Society's Gardens during the past week include two Macaque Monkeys (*Macacus cynomolgus*, ♂♂) from India, presented respectively by Lieutenant H. S. Wilson and Mrs. Dunnington Jefferson; a Ring-tailed Coati (*Nasua rufa*) from South America, presented by Mr. C. Carrington; an Angolan Vulture (*Gypohierax angolensis*, juv.), a Buzzard (*Buteo* —) from West Africa, presented by Dr. Ferrier; a Spiny-tailed Mastigure (*Uromastix acanthinurus*) from Algeria, presented by Lady Sebright; a Black-headed Caique (*Caique melanocephala*) from Demerara, two Spiny-tailed Mastigures (*Uromastix acanthinurus*) from Algeria, deposited; three Short-headed Phalangers (*Belidens breviceps*) from Australia, a Hairy Armadillo (*Dasypus villosus*, ♂) from La Plata, a White-throated Capuchin (*Celeus hypoleucus*, ♀) from Central America, four Scarlet Ibises (*Eudocimus ruber*) from Para, purchased; a Testaceous Snake (*Ptyas testacea*) from California, received in exchange.

#### OUR ASTRONOMICAL COLUMN.

NATAL OBSERVATORY.—The superintendent of the Nata Observatory, in his report for the year 1890-91, tenders his obligations to no less than seven ladies, without whose zealous assistance, he says, the greater part of the numerous astronomical computations, &c., would not have been carried out. Although lacking such aid as is consistent with the proper working of an Observatory, a great amount of very useful work has been accomplished. For instance, the entire mass of meridian observations of the moon made at Greenwich during the period 1851-1861 have been reduced and compared with the theoretical basis of Hansen's Lunar Tables, thus completing the whole number of lunar observations up to the year 1890. The work with the transit, magnetic transit, and equatorial have been continued as usual. For the determination of the latitude of the Observatory 1022 observations of thirty-five pairs of stars have been obtained. Owing to the close proximity of the equatorial and transit instruments, we are informed that it is impossible to use them both at the same time; this should be at once remedied, for the Observatory does not seem to be supplied with many surplus instruments.

The meteorological observations have been made regularly throughout the year. We hope, now that provision has been made for supplying a rain gauge and set of thermometers for each of the coast magistracies, that the Observatory will still continue to urge the necessity of maintaining and extending the system of weather reports, in the interests of the Colony, for, as is now well known, the value of such observations is only maintained when the stations are numerous and well distributed.

GEODETIC SURVEY OF SOUTH AFRICA.—Since the issue of the last (Jan. 1891) report by H. M. Astronomer, Dr. Gill, on the Geodetic Survey carried on in South Africa, the work has been progressing very successfully and swiftly, an average of five principal stations being occupied and completed every month by a single observer. On May 31, 1891, the field work as far as Modder River was completed, the site for the base line being reached the following day. Some difficulty was here encountered with regard to the selection of the position for the base, but it was eventually fixed near Kimberley, the permanent camp being fixed about eight miles from this place. The total length of the measured base was 6000 feet, and it was divided into

sections of 500 feet, since this seemed "a convenient length for a forward and backward measurement in one day." The figures given in this report, although uncorrected for sea-level, &c., speak well for the accuracy of the undertaking, as will be seen from the following table. Each length of 500 feet was measured both forward and backward, and it is the differences of these measurements that are here shown:—

Section.	F - B in feet.	Section.	F - B in feet.
I. ...	+ 0'0025 ..	VII. ...	+ 0'0014
II. ...	- 0'0020 ...	VIII. ...	+ 0'0011
III. ...	- 0'0006 ...	IX. ...	+ 0'0014
IV. ...	- 0'0040 ...	X. ...	+ 0'0009
V. ...	+ 0'0019 ...	XI. ...	+ 0'0028
VI. ...	- 0'0019 ...	XII. ...	+ 0'0015

The probable error of the whole base was  $\pm 0'028$  inches. The lengths of the two sections came out as—

$$M_1 = 2999'4445 \text{ feet}$$

$$M_{11} = 2999'7545 \text{ ,,}$$

The differences between the measured and the computed lengths of Section II. through the triangulation were: by the eastern triangles  $M - C_1 + 0'0035$  feet; by the western triangles  $M - C_1 - 0'0083$  feet.

During the triangulation work several observations for latitude were made at Tafelberg, Hanover, De Put, and Kimberley Camp, the results showing, as Dr. Gill points out, "that the abnormal deviation of the plumb line found along the coast in the neighbourhood of Port Elizabeth had disappeared." The report concludes with the determinations of the observers' personal equations and two diagrams of the triangulation.

#### THE INTERNATIONAL CONGRESS OF EXPERIMENTAL PSYCHOLOGY.

WHEN the first Congress on this subject met in Paris in 1889 under the presidency of Prof. Ribot, and with Prof. Charles Richet for its secretary, it proved a vigorous and most successful attempt to gather together from all parts of the world the students of a difficult branch of learning in which some methods of modern physics are being used in psychology, and these methods, or at least their results, are invading the province of what our ancestors would have preferred to call metaphysics. In the opinion of many of the most thoughtful students of the subject it has been considered an important point to keep up the connection between the physiological and the psychological sides of the questions under discussion, and the present Congress under the careful and admirable presidency of Prof. Henry Sidgwick, has proved very successful on this point, and has led to much pleasant acquaintanceship between those whose general work lies in different branches of learning. At Paris the full number at the Congress was about 150, and very little notice was taken of it in England; but at this recent Congress in London there have been nearly twice as many members, and it has received 70 or 80 visitors from all parts of Europe and from the United States and Canada. The vice-presidents have been Prof. A. Bain, Prof. Baldwin, Prof. Bernheim, Prof. Ebbinghaus, Prof. Ferrier, Prof. Preyer, Prof. Delboeuf, Prof. Liégeois, Prof. Preyer, Prof. Richet, and Prof. Schäfer. Among the other well-known names of the visitors there were those of Helmholtz, Binet, Ribot, Henschen (Upsala), Münsterburg (Freiburg), and among the English names Herbert Spencer, Francis Galton, Prof. Oliver Lodge, Prof. Victor Horsley, Dr. Lauder Brunton, and Dr. Hughlings Jackson. The honorary secretaries were Prof. James Sully and Mr. F. W. H. Myers. The rooms of University College were kindly lent to the Congress by Mr. Erichsen for its use during the four days of the meeting (Aug. 1-4). Prof. Sidgwick's address attracted a large audience. He expressed himself as feeling it his first duty to apologize for the choice of England as the place of meeting, inasmuch as England could not be said to be the country which had done most for experimental psychology which, in the common meaning of the terms, had been most advanced in German and French laboratories, and was making recent and rapid progress in America. However, in a slightly different sense of the word the English school of psychologists from Locke and Hume down to Bain and Herbert Spencer had been for the most part experimentalists or at least empiricists. They had before them at this Congress a very wide range of subjects, too extensive he thought on the whole to be covered

by the term "Psychologie Physiologique," which had been used at Paris as the name of their first Congress, and he thought "Experimental Psychology" more appropriate. In laboratory work the leadership was taken by Germany; in hypnotism France was our master and Germany our colleague. He was glad to see some of the leaders of the Nancy School with them that day, as he thought they were taking the broader lines in the subject, and that Europe was certainly not inclined on the whole to narrow the subject. He would not attempt to discuss the larger questions at that time, but would confine himself to the harmless task of explaining the arrangements that were proposed. In the morning meetings the Congress would be divided into two sections, of which Section A would be devoted to neurology and psycho-physics, and Section B to hypnotism and cognate questions; in the afternoon there would be general meetings.

The address was very warmly received, and Prof. A. Bain, in reading the first paper took the opportunity of expressing his gratitude to Prof. Sidgwick and the secretaries for the energy they had shown in bringing together such a large group of men who were glad to make each other's acquaintance. He went on to read an interesting paper on the advantages in psychology of introspection on the one side and experiment on the other, and the ways in which one could help the other. Prof. Charles Richet went on to discuss some of the possible prospects of psychology, and to express a hope that some of the most difficult subjects, such as thought-transference and clairvoyance, might be helped by the minute study of the process of development of the human mind. Prof. Gruber (of Roumania) then gave a very vivid sketch of the remarkable association of colour with sound, which he had spent many years in observing. To a very small number among his best educated patients the sound of the vowel "e" was accompanied by a sensation of yellow colour, of "i" by blue, of "o" by black, and so on through the long list of the Roumanian vowels and diphthongs, and also to some extent with numbers. The same colour was not always induced by the same sound in different patients, but the observations had been carefully tested. Prof. Pierre Janet related in detail a long case of complete loss of memory for present events and complete incapacity for any decision (*l'abolition*) which had been suddenly brought about by the foolish jest (on August 28, 1891) of telling her what was not true, viz. that her husband was dead. The most curious points were that the loss of memory extended backwards as far as July 14, 1891, *i.e.* of what had happened during the six weeks before the accident, though the natural memory was complete up to July 14, and the patient's sub-conscious memory of all that had happened after that could be easily demonstrated by her automatic writing and by unconscious speech in a normal or hypnotic sleep. Prof. Ebbinghaus, in criticizing the paper, remarked that the woman's state seemed best explained as a condition of such complete distraction by things without that she had no power to attend to things within. Mr. Myers cited a case described by the elder Despine in 1830, in which there was a description of double memory and double personality such that the woman in the second state could eat and drink like a drayman, but soon reverted with no memory to her first state, and asked pitifully for her usual four teaspoonfuls of arrowroot.

Next day Section A and Section B went to work separately. In Section A Prof. Henschen (Upsala) read a paper which attracted considerable attention and consisted in a very careful examination of the exact tract of the visual path in man through the brain from the eye to the visual centre in the cortex of the calcarine fissure. It was admitted that it was not in accordance with the results of physiological experiments on animals; but the arguments for its proof in man were considered quite sufficient. Prof. Horsley followed with a paper on the degree of Localization of movements and correlative sensations, which roused some discussion; and then Prof. Schäfer brought forward careful experiments to show that there was no valid reason to attribute any intellectual powers to the prefrontal lobes of the brain; and Dr. Waller ended the work of the morning by illustrating the difficulties of accurately defining the functional attributes of the cerebral cortex.

In Section B Prof. Liégeois read a paper which M. Liébeault, of Nancy, had written along with him describing a case of suicidal monomania, which they had succeeded in curing by hypnotic suggestion. The President expressed himself much interested in the paper, and regretted that they could not see Liébeault among them, for he was a man who, after twenty-five years of contempt, had succeeded in making the world realize

some new methods. Dr. Frederic van Eeden (Amsterdam) read a careful report of his five years' experience of the medical cases of hypnotism along with Van Renterghem in Amsterdam. He laid stress on the care which should be taken to avoid the distrust and prejudice caused by the abnormal facts of hypnotism in public exhibitions. With the upper classes he thought hypnotism more difficult than with the lower, for they objected, rightly, to a tone of command. Psycho-therapy with them must guide and support, but not command, and that it would do so even to the extent of curing some organic disease he regarded as well proved. Virchow's cellular pathology had neglected the psychical forces of the living cell. Now that these were acknowledged some principles of the old vitalism must revive. Prof. Bernheim read another more technical paper on hysterical amaurosis, explaining it as a purely psychical state brought about by suggestion, with which Dr. Bérillon could not agree, but Prof. Bernheim replied that there was nothing abnormal in hypnotism; there was no difference between normal and hypnotic sleep, though the two states were produced by different means. Further, there was not necessarily any sleep in hypnosis. It was a pity for that reason that the word had been chosen, for hypnotism meant simply suggestibility. Prof. Delboeuf took a similar view; to hypnotize a man was only to persuade him that he could do something that he thought he could not do. Supposing the man thought he had a pain, to hypnotize him was to make him sure he had not. Dr. Bérillon preferred to define hypnotism as the psychical state in which the cerebral control had been taken away artificially, and the patient became an automaton for any use. Such automatism was not in any way necessarily injurious to the subject, and was certainly useful in some diseases.

In the general afternoon meeting there were elaborate theories of colour perception well explained to the Congress both by Prof. Ebbinghaus and by Mrs. C. L. Franklin; and Prof. Lloyd Morgan attempted the difficult task of defining the limits of animal intelligence, chiefly as shown by the dog, whom he was sorry not to be able to credit with as much power of introspection as many of his friends. After some slight discussion on this, Dr. Bramwell (of Goole) brought forward four subjects from Yorkshire, on whom he showed some of the common phenomena of hypnotism and related some of his experiences in recent medical practice, which he had been able to show to doctors in Leeds and elsewhere, *e.g.* that he had been able in a few cases to produce by hypnotism, at a time when the patient seemed fully awake and normal, a state of local anæsthesia to allow a dentist to extract seven double teeth without any pain to the patient.

On Wednesday morning, in Section A, Prof. Heynaus (of Copenhagen) read a paper on the relation of Weber's law to the phenomena of the inhibition of presentations; Dr. Mendelssohn (St. Petersburg) on the parallel law of Fechner; Dr. Verrist (Louvain) on the physiological basis of rhythmic speech; and M. Binet (Paris) on the psychology of insects, showing that in the Coleoptera the dorsal nervous centres were motor and the ventral sensory. In Section B Prof. Delboeuf pointed out the remarkable power of the somnambulist in judging of the length of passing time without any watch or instrument. He had found some simple Belgian countrywomen when hypnotized able to carry out suggestions at any time he liked to name from 300 to 3000 minutes, and he thought the subject deserved further inquiry. Prof. Hitzig (Berlin) brought forward a minute and careful physiological study of some attacks of sleep which had some resemblance to hypnotic conditions.—Mr. F. W. H. Myers showed from the reports drawn up by Mr. Kenlemans, Mrs. Verrall, and two other experimenters of some experience that in some cases, though probably only in a few, it was possible to induce hallucinations by such an experiment as crystal vision, *i.e.* the purely empirical process of looking steadily into a crystal or other clear depth or at a polished surface. These externalized images or quasi-percepts illustrated some little known points in conscious and sub-conscious memory. Prof. Pierre Janet corroborated Mr. Myers's results by some of his own, in which, for instance, dreams which had been manifest to the onlooker but unknown to the sleeper were brought within the sleeper's knowledge by gazing on a bright surface or by the essentially similar process of automatic writing. In the afternoon the President presented a very long report of careful detail of a census of hallucinations which had been agreed upon at the Congress in Paris in 1889, and which had been carried out in England by himself, in America by Professor William James, and in France

by M. Marillier. The question asked in England had been, "Have you ever, while in good health, and believing yourself to be awake, seen the figure of a person or heard a voice which was not in your view referable to any external cause?" In England 17,000 answers had been obtained, and about 1 in 10 persons (taken at random) who had answered had had some such hallucination in their lives. The great majority of these hallucinations consisted of realistic appearances of living men, a small minority of dead persons, and a still smaller group of grotesque objects. A remarkable class was that of hallucinations of several persons at one time—collective hallucinations; and a still more remarkable class was of those coincidental with some distant event unknown to the percipient, such as the death of the person whose figure appeared. The President came to the conclusion that after careful allowance for all sources of error, the probability against these coincidences being chance was enormous, and if the hypothesis that they were not casual was to be accepted, the assumption of the inaccuracy of the informants and inquirers must be strained to an extreme pitch. M. Marillier explained that it had been very difficult to get any large number of answers in France because of the dislike shown by the French to answer any psychological questions about themselves.

On Thursday morning, in Section A, Dr. Donaldson gave an interesting account of the minute investigation of the brain of Laura Bridgeman, the well-known blind deaf mute, who died in 1889 in Boston. There was depression of the motor speech centre, with slender sensory nerves and somewhat thin cortex over the areas of the defective senses. In Section B Dr. Berillon raised a lively debate by describing the good effects he had brought about by hypnotism in the education of about 250 children, who were suffering from many childish discomforts, such as night-terrors, insomnia, somnambulism, or faults, such as kleptomania, idleness, cowardice, &c. After this Mrs. H. Sidgwick gave a summary of some experiments in thought-transference she had made, with the help of Miss A. Johnson and Mr. G. A. Smith as hypnotiser. By thought-transference she meant the communication from one person whom they called the agent to another, whom they called the percipient, otherwise than through the recognized channels of sense. The successful percipients were seven in number, and had generally been hypnotised. They had succeeded in transferring numbers, mental pictures, *i.e.* mental pictures in the agent's mind, and induced hallucinations given by verbal suggestion to one hypnotic subject, and transferred by him to another. In the total number of experiments the number of failures was much larger than of successes, but as the antecedent probability could in most cases be accurately determined, the proportion of successes was amply sufficient to show that the result was not due to chance. The many precautions necessary to such experiments were described in detail. One percipient succeeded in the experiments with numbers when divided from the agent by a closed door at a distance of about 17 feet. Attention was called to the great variability of results with the same percipients and agents for which they had not been able to discover any reason. An account was added of some experiments in producing local anaesthesia under conditions apparently excluding all suggestion other than mental. The President wished to remark that he thought it important in such experiments that all the failures should be recorded as well as the successes. In the afternoon, after papers by Dr. Lightnar Witmer, Dr. Wallaschek, and Prof. von Tschisch, the President put several questions to the vote as to matters of future organization, and it was decided to hold the next international Congress in Munich in 1896, with Prof. Stumpf as President and Baron von Schrenck as secretary. A suggestion was also made that there should be an extraordinary meeting in America next year, and a small American committee was appointed to consider this. After a hearty vote of thanks to the President and Secretaries, and a brief reply, the Congress was dissolved.

#### SOCIETIES AND ACADEMIES.

##### PARIS.

Academy of Sciences, August 1.—M. de Lacaze-Duthiers in the chair.—On boron pentasulphide, by M. Moissan. If the tri-iodide of boron, instead of being treated with sulphur in the dry way at a low red heat, as in the preparation of boron trisulphide, be mixed with sulphur and dissolved in carbon bisulphide at the ordinary temperature, boron pentasulphide is ob-

tained. It fuses at 390°, and does not pass through the pasty state. In contact with water it forms boric acid, sulphuretted hydrogen, and a precipitate of sulphur. Mercury and silver reduce it to the trisulphide, forming metallic sulphides. Heated to fusion in a vacuum it decomposes into sulphur and the trisulphide. Its density is 1.85. It is very difficult to obtain free from iodine, but in all the preparations the ratio between the boron and the sulphur has indicated the formula B<sub>2</sub>S<sub>5</sub>.—On the stripped plants of autumn, and their utilization as green manure, by M. P. P. Dehérain. It has been found that by planting the ground with vetch or mustard, and digging it in during the autumn, the amount of nitrogen retained in the soil was nearly doubled.—Remarks on alimentation in the Ophidia, by M. Léon Vaillant.—A report on the great anaconda of Central America kept in the reptile menagerie. Since 1885 the snake has eaten on the average five times per annum, its nourishment consisting of goats, three rabbits, and one goose. The interval between two meals was in one instance 204 days.—On symmetric tetrahedral curves, by M. Alphonse Dumoulin.—On Stokes' law, its verification, and interpretation, by M. G. Salet.—A spectrum, given by a spectroscope with quartz prisms, is received on the fluorescent substance contained in a Soret eye-piece. It is then projected transversally on to the slit of a second spectroscope. Through this the diagonal spectrum of Stokes' classical experiment is seen with perfect definition, no ray exceeding the theoretical limit. The law thus verified can also be deduced from thermodynamic considerations. According to Stokes' law, "the rays emitted by a fluorescent substance always have a smaller refrangibility than the exciting rays." If it were possible to transform yellow into violet light by fluorescence, many chemical reactions would become possible which only occur at the higher temperature at which violet appears in the spectrum. This would be equivalent to the passage of heat from a colder to a hotter body, in contradiction to the second law of thermodynamics.—Constitution of pyrogallol, by M. de Forcrand.—On Cascarine, by M. Leprince.—Physiological examination of four cyclists after a run of 397 km., by MM. Chibret et Huguet. This distance, which was covered by the youngest of the party, an Englishman of 18, in seventeen hours, was that between Paris and Clermont-Ferrand. It was found that the temperature was at the finish rather below than above the normal; that the coefficient of utilization of urinary nitrogen varied inversely as the degree of fatigue, and that therefore a decided waste of nitrogen is a concomitant of excessive fatigue. The nutrient taken during the course consisted of much alcohol, champagne, beef-tea, and Kola solution in the case of the Englishman. He and the next in speed both took Kola. The winner was extremely fatigued at the finish; the next man, a Frenchman of 28, not at all. His pulse was beating at 60, that of the former at 84. The coefficients of utilization of nitrogen were 76.32 and 58.27 per cent. respectively.—On the properties of the vapours of formol or formic aldehyde, by MM. F. Berlioz and A. Trillat.—Subcutaneous grafting of the pancreas: its importance in the study of pancreatic diabetes, by M. E. Hédon.—On the habits of *Clinius argentatus* Cuv. and Val., by M. Frédéric Guitel.—On a Permian Alga, with its structure preserved, found in the boghead of Autun: *Pila Bibractensis*, by MM. C. Eg. Bertrand and B. Renault.—The chalk of Chartres, by M. A. de Grossouvre.

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