

necessary absence of verification, no science of comparative psychology, except such as is restricted to "objective psychology," is possible.

2. Of the four views of the place of consciousness in the animal world only one—that of *free will*—renders the study of the actions of animals incapable of scientific treatment. Of the other three I believe *determinism* to be the most satisfactory. According to this view both neuroses and psychoses are subject to law. But from our necessarily ejective knowledge of psychoses, we are forced to confine our attention (from the scientific point of view) to the objective phenomena of neurosis, especially as manifested in conduct. Of the psychoses we can know nothing with certainty; of the neuroses we may learn a little; of conduct we may learn much.

3. From the principle of the lapse of consciousness certain corollaries may be drawn—(a) that it is difficult or impossible to say what amount of consciousness, if any, an action performed by my neighbour involves; (b) that it would seem probable that the lapse of consciousness in the individual is paralleled by a lapse of consciousness in the species; and (c) that the hypothesis that instinctive actions are unconscious is incapable of disproof.

4. On the general grounds given in 1, and on the special grounds given in 3, I see grave difficulties in accepting the psychological theory of instinct—that instinct is reflex action into which is imported the element of consciousness.

5. In accordance with the principle thus advocated a physiological definition of instinct must be sought. Some such definition as this may be proposed: *Instinctive actions* are actions performed by the individual in virtue of his possession of a special type of nervous organisation, that is, a type of organisation common to his species.

6. The question of the origin and development of instincts thus becomes a question as to how this special type of structure has been evolved. It takes its place as part of the general question of the evolution of structures—the actions being the external manifestations of internal structures. To the question as to the relative importance of direct and indirect equilibration I could give no definite answer within the limits of this article, and therefore gave quotations from Darwin and Herbert Spencer.

C. LLOYD MORGAN

A NEW OBSERVATORY FOR PARIS

THE last number of the *Comptes Rendus* of the Paris Academy of Sciences contains a memoir by Admiral Mouchez, urging the necessity of removing to a separate establishment beyond the city the chief departments of the Paris Observatory. When the building was originally erected by Perrault about a mile to the south of the Luxembourg, the city scarcely reached beyond that point. But since then it has spread in every direction, completely surrounding the Observatory with lofty edifices, and charging the atmosphere with all sorts of gases, smoke, and other impurities. These altered conditions are all the more injurious that, thanks to the progress of astronomical studies, the power and accuracy of the instruments have to be continually increased, while a clear and still atmosphere is more than ever needed for taking observations. The vicinity of the Catacombs and of busy streets has also rendered the ground less firm than formerly.

In 1854, and again in 1868, these adverse conditions were brought before the Government, and discussed in the Academy. After a careful study of the situation, the Commission appointed by the Academy to inquire into the matter unanimously reported in 1869 in favour of a branch establishment outside of Paris; but this suggestion, although fully approved of by the Academy, was for various reasons allowed to fall into abeyance.

Since then the evils complained of have been aggravated, in spite of all the improvements introduced for the purpose of modifying them. Hence it becomes more than ever indispensable to carry out the project forthwith, if the Observatory wishes to maintain its efficiency and keep pace with similar establishments abroad. The most serious obstacles to its legitimate development are the disturbed and clouded state of the atmosphere in the centre of a large city, the constant vibrations of the ground, and the impossibility of accommodating the astronomers in the building, as is done in all foreign observatories. Hence arises an insurmountable obstacle to the proper organisation of the night service, while extreme difficulty is felt in improving the existing plant and obtaining other much needed instruments, for which no suitable position can be found.

Merely to erect the long-contemplated tower and cupola of the great telescope there would be required a Government grant of from 20,000*l.* to 24,000*l.*, besides at least an equal sum to prevent the erection of lofty houses in front of the new grounds and to purchase the instruments still needed. But even were such grants obtained, the Observatory would continue to labour under the serious inconveniences above described. Without, however, imposing such a burden on the State, the difficulty might be met, and the old historical edifice of Louis XIV. preserved, by erecting in one of the public domains a new and magnificent observatory furnished with all the improvements and appliances of modern science. In order to effect this, it would suffice to alienate about 22,000 square metres of gardens and open spaces surrounding the present Observatory, and serving only to isolate it from the neighbouring houses. Sold at the moderate estimate of from 4*l.* to 6*l.* per metre, a sum of nearly 120,000*l.* might be raised, which would be more than sufficient for the purpose.

After sacrificing enough land for the construction of two new streets in continuation of the Avenue du Luxembourg, and isolating the Observatory on all sides, it would still retain the northern court and a garden on the south 70 to 80 metres long by 50 broad. The building would thus also retain the exact appearance that it presented when originally constructed by Perrault. Here might be preserved the Archives, the Bureau des Calculs, the Museum, and three or four instruments still capable of rendering some service if placed at the disposition of the Faculty of Sciences for the instruction of students.

All the plans of some such project as is here proposed have already been prepared with the greatest care by the able architect, M. Deharme. They include accommodation for thirty astronomers and assistants with their families, all the instrumental and service rooms, the halls, and an underground gallery, a structure 300 metres high for the study of the atmosphere, gas works, a covered gallery connecting all the instruments with the apartments of the astronomers; lastly, the great cupola for the 16m. telescope, at a total cost of 98,350*l.* Including the price of the new instruments, fittings, and inclosing wall, this sum would be raised to 108,000*l.*, which might be obtained by the proposed sale of lands.

The Council has unanimously adopted this project, demanding that it be referred to the Academy and to the Bureau of Longitudes, which bodies had already pronounced favourably on some such scheme in 1854 and 1868. Thus no serious objections seem to stand in the way of a project by which alone the present adverse conditions may be removed, and France endowed with the most complete and finest observatory of modern times.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

OXFORD.—The Sherardian Botanical Chair at Oxford has at length been filled up by the election of Mr. Bayley Balfour, Professor of Botany at Glasgow. Mr. Balfour has had a distinguished career. Passing his student life at Edinburgh, he finally graduated as a Doctor of Medicine, receiving the University Gold Medal for his thesis, having previously carried off first class honours as Doctor of Science in Botany. Two years were spent in acquiring a practical knowledge of the methods of morphological and physiological research in the botanical laboratories of France and Germany under Profs. De Bary and Sachs. We next find him assisting his father, the Regius Professor of Medicine and Botany in the University of Edinburgh, in conducting his classes alike in the lecture-room, in the laboratory, in the herbarium, and in practical field work. For four years he was assistant to the Regius Professor of Natural History in the University of Edinburgh, and for six years he lectured on botany to the students of the Royal Veterinary College, until finally he was appointed Crown Professor of Botany in the University of Glasgow. Of good scientific work done there is an ample record. A valuable paper published in the *Philosophical Transactions* gives the result of his labours at Rodriguez, where he was sent by the Royal Society in 1874 as botanist and zoologist to the Transit of Venus Expedition. In 1880 we find him making a scientific exploration of the Island of Socotra, the results of which have been published in various periodicals, the final report on the botany of the island being now in course of publication by the Royal Society of Edinburgh. Prof. Balfour's wide experience in field, laboratory, and herbarium, will make him a valuable addition to the Natural

Science Staff of Professors in Oxford. As Magdalen College has under its new statutes added a Fellowship to the endowments of the Chair, we may congratulate the College on gaining another addition to its already long list of distinguished Natural Science Professors who are members of the Society. Profs. Westwood, Burdon Sanderson, Odling, Lawson, Balfour, Daubeny, Phillips, Brodie (now dead), were all members of the College.

On May 6 an examination will be held at New College to elect an Exhibitioner in Natural Science. The Exhibition will be given for proficiency in Chemistry and Biology.

At Magdalen College an open Demyship will be offered for Natural Science in June next.

THE University College (London) School "Old Boys" annual dinner will be held this year at the Holborn Restaurant, on Tuesday, February 19, at 7 p.m.; George Buchanan, M.D., F.R.S., in the chair.

THE Central Institution of the City and Guilds of London Institute in Exhibition Road is now approaching completion, and the Executive Committee are proceeding to appoint, in the first instance, four professors to the chairs of Chemistry, of Engineering, of Physics, and of Mechanics and Mathematics respectively. The salary attached to each professorship will be 1000*l.* per annum, with a prospect of increase depending upon the number of students in attendance. It is expected that the appointments will be made during the next few weeks. The Council of the Institute, at the request of the Duke of Buckingham and Chandos, have consented to lend, during the summer months, and pending the preparation of the fittings, a portion of the Central Institution to the Commissioners of the International Health Exhibition for the display of appliances for scientific and technical instruction and of the work done in technical schools here and abroad.

SCIENTIFIC SERIALS

THE *Journal of Physiology*, vol. iv. Nos. 4 and 5, December, 1883, contains:—An account of the discussion which took place in the Physiological Section of the International Medical Congress held in London, 1881, on the localisation of function in the cortex cerebri. Prof. Goltz of Strasburg, it will be remembered, exhibited a dog, and Profs. Ferrier and Yeo a monkey. The brains of these animals were handed over to a Committee, consisting of Dr. Klein, Mr. Langley, and Prof. Schäfer. The report of this Committee is preceded by a memoir on the normal structure of the dog's brain, by J. N. Langley (plates 7 and 8), and the report consists of a report on the parts destroyed on the right side of the brain of the dog operated on by Prof. Goltz, by J. N. Langley (plates 9 and 10); of a report on the parts destroyed on the left side of the brain of the same dog, by E. Klein (plate 11); and of a report on the lesions primary and secondary in the brain and spinal cord of the Macaque monkey exhibited by Profs. Ferrier and Yeo, by E. A. Schäfer (plate 12).

THE *Journal of the Royal Microscopical Society* for December, 1883, contains:—On some new Cladocera of the English lakes, by Conrad Beck (plates 11 and 12).—On an improved method of preparing embryological and other delicate organisms for microscopical examination, by Edward Lovett.—On the relation of aperture and power in the microscope, by Prof. E. Abbe.—On a new camera lucida, by Dr. Hugo Schröder.—On optical tube length, an unconsidered element in the theory of the microscope, by Frank Crisp.—Also the usual summary of current researches relating to zoology, botany, and microscopy.

THE *American Naturalist* for December, 1883, contains:—On the development of a dandelion flower, by John M. Coulter.—Notes on *Chaetonotus larus*, by C. A. Fernald.—Notes on the aborigines of Cooper's Creek, Australia, by E. B. Sanger.—Zoological gardens, a critical essay by Theodore Link.—The Copperhead, by Dr. R. E. Kunze.—Experiments with the antennæ of insects, by C. J. A. Porter.—On the position of the Compositeæ and Orchideæ in the natural system, by J. F. James.—On the habits of certain sunfish, by C. O. Abbott.—Recent literature, and general notes.

Revue Internationale des Sciences Biologiques, October 15, 1883, contains:—Translations of Mr. W. S. Duncan's—Probable region of man's evolution, and of Prof. Huxley's—Living beings and the method of studying them; Dr. Hubrecht—on the

ancestral form of the Chordata; and Dr. W. G. Parker—on the people and language of Madagascar.

The number for November 15, 1883, contains:—An essay by Dr. Lanessan, on Buffon: his ideas, his rôle in the history of science, his work, and on the development of the natural sciences since his epoch, which essay is to serve as an introduction to a complete edition of Buffon's works, including his correspondence, to be shortly published by Le Vasseur, Paris.

Rendiconti del Reale Istituto Lombardo, Milan, December 29, 1883.—Reports on the work of the various physical, literary, ethical, mathematical, and political sections of the Institute during the year 1883, by the Secretary.—Meteorological observations made at the Brera Observatory, Milan, during the month of December, 1883.

Nachrichten von der K. Gesellschaft der Wissenschaften und der Universität zu Göttingen, December 1, 1883.—On the formation of isomeric derivatives of toluol, by Paul Jannasch.—On the irreducibility of linear differential equations, by Leo Königsberger.—On the polar repulsion, the coefficient of induction, and temperature of a magnet, and on the determination of the moments of inertia through bifilar suspension, by F. Kohlrausch.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, January 10.—"Extracts from a Report on the Volcanic Eruption in Sunda Strait by Commander the Hon. F. C. P. Vereker, H.M.S. *Magpie*, dated Singapore, October 22, 1883." Communicated by Sir Frederick Evans, K.C.B., F.R.S.

... On the 18th inst. I entered Sunda Strait, passing east of Thwart-way Island. This island had been reported to be split by the eruption into several portions. This is incorrect.

The island is intersected by low valleys in several places; these being covered with tall trees did not show so prominently formerly as they do now. The whole of the vegetation having been swept away by the tidal wave, the island at a short distance off is apparently divided, the low necks joining the higher portions being only visible on close approach.

The surface of the Strait in this neighbourhood is covered with extensive fields of floating pumice-stone, often in one to two foot cubes, through which the ship easily forced her way. . . .

I inclose sketches which I trust will convey the general appearance better than a written description. The whole of the neighbourhood is covered with greenish yellow mud, and all traces of vegetation everywhere destroyed.

I communicated personally with the captain of the Netherlands frigate *Queen Emma* stationed on the spot, and was informed by him that the changes are considerably more extensive than was at first thought, and that Verlaten Island is still in a state of activity as well as Krakatoa itself.

From observation he thinks that another eruption is impending, but that Verlaten Island will be the centre of disturbance.

The Netherlands Government vessel *Hydrograaf* obtained a sounding of 100 fathoms without reaching bottom, in the centre of the group and off the cliff falling from Krakatoa Peak.

The two new islands are low mud and pumice banks, their configuration is continually altering, and I was informed that they are gradually subsiding. . . .

It is still impossible to examine Lampong Bay, but the pumice-stone is now beginning to float out.

The light on Fourth Point (Java) has been temporarily replaced by one of the 6th order, visible five miles, but beside this there are no signs of life on the Java shore. The whole coast is covered with the debris of trees, &c., demolished by the earthquake sea-wave, and over all lies a thick incrustation of volcanic mud.

During the height of the eruption a terrific whirlwind and a fierce south-westerly gale, apparently local, was experienced. . . .

Victoria Institute, February 4.—Mr. Ernest Budge, B.A., of the Oriental Department of the British Museum, read a paper upon a new and important inscription of Nebuchadnezzar the Great. Two copies of the same text had been brought to England by Mr. Rassam, one of which was much mutilated, but by a careful comparison of the texts Mr. Budge has succeeded in gaining a nearly perfect copy of the inscription. It related chiefly to the restoration of the fortifications of Babylon—the great walls, gates, and quays along the river bank, which had been thrown down by the conquering armies of Sowgon, Sennacherib, and Assurbanipal. It also stated the area of the citadel of Babylon