

the Corporation. The sum expended on the Manchester Museum, including special donations, is only 2785*l.*, whilst the neighbouring city of Liverpool spends 5700*l.* Bearing this comparison in mind, the citizens of Manchester would do well to consider the following words of a recent American writer on the subject of museums referred to by Mr. Hoyle:—"It is not too much to assert that the level reached in intelligence and organisation by any community may be gauged most accurately by the attention and support afforded to its museums."

THE fifth edition of Mr. L. Cumming's "Electricity treated Experimentally" has just been published by Messrs. Longmans, Green, and Co. A few slight additions and alterations have been made to this useful little work, in order to bring it into touch with the present state of knowledge of the subjects surveyed in it.

THE May number of the *Journal of the Federated Institutes of Brewing* contains an interesting paper on the water supplies of Yorkshire, by Mr. Thomas Fairley. The great variety of waters existing in Yorkshire is remarkable, even when the size of the county is taken into consideration. Mr. Fairley classifies them in convenient tables, and makes useful comments on their origin and properties, both from the hygienic and technical point of view.

IN reference to recent discussions and decisions on the vaccination question, it will be of interest to note that Messrs. Macmillan and Co., Ltd., have now in the press, and will publish early in the autumn, the Milroy lectures on "Vaccination, with special reference to its natural history and pathology," by Dr. Monckton Copeman, Medical Inspector to the Local Government Board, whose name is so widely and favourably known in connection with the new glycerine treatment of vaccine, the use of which is prescribed in the Bill which has now been approved by both Houses of Parliament.

DR. W. GROSSE, of Bremen, has written a small book entitled "Der Aether und die Fernkraefte," compiled from various sources, as a short history of the more recent developments of the researches of Hertz and Roentgen. The remarkable stimulus to scientific investigators produced by the publication of Roentgen's great discovery is indicated by the fact that within a few months the *Beiblätter* was devoting no less than eighty pages per volume to X-rays. "Telegraphy without wires" is treated of by Dr. Grosse with a brave attempt to do equal justice to all who have, or think they have, priority.

"ASTRONOMY for the Young" (London: G. Stoneman, 1898) is the title of a small book of sixty-two pages by Mr. Thynne Lynn. The author describes in very popular and elementary language a few general notions about the earth, her satellite the moon, the sun, the planets, comets and meteors, and lastly the stars, giving the young reader a general notion, in a few words, of the bodies which we see in the heavens by day and night. The book is simply written, and few, if any, technical terms are used, so that it is well adapted to the readers for whom it is intended. Perhaps it might have been better to have omitted the illustration on p. 31, displaying the "phenomena of the heavens;" as a rainbow, halo, aurora, waterspout, a lightning flash, &c., are all jumbled up together, and are more inclined to puzzle than enlighten a young reader.

MR. A. H. EVANS'S volume on "Birds," for the Cambridge Natural History, is now so well advanced that Messrs. Macmillan and Co. hope to publish it in the course of September. With few exceptions the illustrations have all been specially drawn for the book by Mr. Lodge, and engraved on wood by O. Lacour. The treatment of the subject throughout is systematic, and the author has taken special pains to describe

each bird so minutely that a naturalist or sportsman in the field will have no difficulty in identifying any specimen. The next volume to appear will be the completion of Dr. Sharp's admirable treatise on insects. This may be looked for not later than January.

THE *Revue Scientifique* for July 30 contains a summary of M. Berthelot's recent researches on the relations existing between the energy of light and chemical energy. M. Berthelot's leading idea is that the true chemical equivalent of light energy can only be measured by means of an endothermic irreversible reaction—that is to say, by a reaction which progresses with absorption of energy, and with the formation of products which cannot re-combine spontaneously under the circumstances of the experiment. These conditions exclude many actinometric methods hitherto used. Thus a mixture of hydrogen and chlorine cannot be employed, for in this case the action induced by light is exothermic; the energy liberated is not that which has been received as light, but is almost wholly due to the chemical energy pre-existing in the uncombined hydrogen and chlorine. Photographic actinometers are also excluded for the same kind of reason, as well as from the fact that in some cases the products of the reaction tend to re-combine. Thus metallic silver or silver subchloride and free chlorine produced by the action of light on silver chloride can re-combine spontaneously. The reactions studied by M. Berthelot are the decomposition of nitric acid into nitrogen peroxide, oxygen and water, and the decomposition of iodic acid, hydriodic acid, and oxide of mercury respectively into their elements. It was observed incidentally that the more refrangible rays only are effective in the cases of nitric and hydriodic acid, and that in the decomposition of hydriodic acid a periodide of hydrogen is formed intermediately. Carbon dioxide, and a mixture of carbon monoxide and oxygen were not affected by exposure to sunlight. M. Berthelot is engaged in a deeper study of the energy relationships.

THE additions to the Zoological Society's Gardens during the past week include a Bonnet Monkey (*Macacus sinicus*, ♀) from India, presented by Mr. H. Page; a Rhesus Monkey (*Macacus rhesus*, ♀) from India, presented by Mr. C. E. Bashall; a Common Chameleon (*Chamaleon vulgaris*) from North Africa, presented by Mr. M. Titford; a Smooth-bellied Snake (*Homalosoma lutrix*), a Rufescent Snake (*Leptodira hotambata*), two Rhomb-marked Snakes (*Trimerorhinus rhombatus*), five Crossed Snakes (*Psammophis crucifer*), three Puff Adders (*Bitis arietans*) from South Africa, presented by Mr. J. E. Matcham; two Pinche Monkeys (*Midas adipus*) from Columbia; a Grey Parrot (*Psittacus erithacus*) from West Africa, deposited; two Three-toed Sloths (*Bradypus tridactylus*) from British Guiana, purchased; an Humboldt's Lagothrix (*Lagothrix humboldti*) from the Upper Amazons, a Red-backed Saki (*Pithecia chiropotes*) from Guiana, received in exchange.

OUR ASTRONOMICAL COLUMN.

WOLF'S COMET.—The following is a continued ephemeris for this comet, the positions being stated for Berlin midnight:—

	R.A.	Decl.	Br.
	h. m. s.		
August 18 ...	5 13 12 ...	+15 20 ...	2.49
22 ...	22 52 ...	14 29 ...	2.50
26 ...	32 13 ...	13 36 ...	2.53
30 ...	5 41 13 ...	+12 39 ...	2.55

On June 18, Prof. Hussey, who rediscovered the comet on the previous day with the Lick 36-inch refractor, found the comet an easy object with the 12-inch telescope (*Ast. Jour.*, 439).

FALL OF A METEORITE IN BOSNIA.—A correspondent has sent us the following extract from the *Foreign Office Annual*, 1898 (No. 2167, "Trade of Bosnia and the Herzegovina for the

year 1897," p. 7):—It may be interesting to mention that shortly before noon on August 1 last year a large meteorite fell at Zavid near Rožanj, in the district of Zvornik. Unfortunately, as soon as it cooled, peasants of the neighbourhood knocked off pieces of it, but about 80 per cent. of the mass remained. It buried itself a yard deep in the ground, with the so-called breast uppermost. Eye-witnesses of its fall say that it was accompanied by a noise like thunder, lasting several minutes and audible a long way off. It left a fiery streak behind, which a short way above the horizon divided in two, and above this streak or tail was a thick cloud of smoke. This meteorite is now in the museum of this town, and measures 55 by 35 by 28 centims. It was broken by the fall in several pieces, but has been joined together again. This is the first aerolite which has been found in Bosnia.

THE NEW OBSERVATORY AT HEIDELBERG.—The opening of the new observatory at Heidelberg, on June 20, is an event of no little importance, more especially as the instrumental equipment is designed for the pursuit of both of the great branches of astronomy. The astrometric department is in the capable hands of Prof. Valentin, who, in addition to more purely scientific problems, is charged with the determination of time and its communication to the railways and various other establishments. The most important instrument is a meridian circle by Repsold, of 6 inches aperture.

Prof. Max Wolf, who has achieved such brilliant success in celestial photography, is in charge of the astrophysical work of the observatory, and we are glad to know that the buildings have been specially arranged to facilitate the continuation of his researches. The equatorial, which has served Prof. Wolf so well, is placed under a dome of nearly 18 feet diameter, the construction of which is so perfect that it can be turned completely round in 8 seconds. Another dome of nearly 20 feet diameter will shelter the astrophotographic instrument, which the observatory will owe to the generosity of Miss Bruce. The lenses for this instrument are being made by Brashear.

AN ASTRONOMER'S REMINISCENCES.—In the first of a series of "Reminiscences of an Astronomer," which Prof. Simon Newcomb contributes to the August number of the *Atlantic Monthly*, several incidents and opinions of interest to astronomers are related. Referring to Cayley, Prof. Newcomb says: "His life was that of a man moved to investigation by an uncontrollable impulse; the only sort of man whose work is destined to be imperishable." After a short description of the work of Leverrier and Adams, which led to the discovery of Neptune, we read: "Adams's intellect was one of the keenest I ever knew. The most difficult problems of mathematical astronomy and the most recondite principles that underlie the theory of the celestial motions were to him but child's play." Airy is regarded as "the most commanding figure in the astronomy of our time. He owes this position not only to his early works in mathematical astronomy, but also to his ability as an organiser." Experience in the United States led Prof. Newcomb to anticipate a difficulty in getting the various telegraph stations between Gibraltar and Greenwich connected for longitude operations, and in discussing the work he asked Airy how the connections could be made from one end of the line to the other, at the same moment. "Nothing is simpler," replied Airy. "I set a moment, say eight o'clock Greenwich mean time, at which signals are to commence. Every intermediate office through which the signals are to pass is instructed to have its wires connected in both directions exactly at the given hour, and to leave them so connected for ten minutes, without asking any further instructions. At the end of the line the instruments must be prepared at the appointed hour to receive the signals. All I have to do here is to place my clock in the circuit and send on the signals for ten minutes commencing at eight o'clock. They are recorded at the other end of the line, without further trouble." This incident is a good lesson in astronomical method.

THE FORTHCOMING INTERNATIONAL CONGRESS OF ZOOLOGY.

THE following is the programme of the fourth International Congress of Zoology, which begins at Cambridge on Monday next, under the patronage of H.R.H. the Prince of Wales, and the presidency of the Right Hon. Sir John Lubbock, Bart., M.P., F.R.S. :—

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The Reception Room (Masonic Hall, Corn Exchange Street) will be open from 9 a.m. to 7 p.m. on Monday, August 22, and on the four following days; and from 9 a.m. to 1 p.m. on Saturday, August 27.

Monday, August 22, 9 p.m. to 11 p.m.—Reception at the Guildhall by the Mayor of Cambridge. Members of the University and of the Town Council are requested to wear gowns; Doctors and Aldermen, scarlet.

Proceedings of the Congress.

Tuesday, August 23, 10.30 a.m., at the Guildhall.—Opening of the Congress by the President. Election of officers. Receipt of reports of Committees appointed by the third Congress, and other business. 2 p.m.: Meetings of the Sections.

Note.—The Sections will be: (a) General Zoology, at the Guildhall (No. 1 on the plan of the museums on the members' tickets); (b) Vertebrata, in the Lecture Room of the Cavendish Laboratory (No. 2 on the plan); (c) Invertebrata (except the Arthropoda), in the Lecture Room of the Chemical Laboratory (No. 4 on the plan); (d) Arthropoda, in the Lecture Room of Comparative Anatomy (No. 6 on the plan). 5.50 p.m.: Organ recital in King's College Chapel. 9 p.m. to 11 p.m.: Reception by the Vice-Chancellor at Downing College.

Wednesday, August 24, 10.30 a.m., at the Guildhall.—General meeting of the Congress to discuss the position of sponges in the animal kingdom. The discussion will be opened by Prof. Yves Delage, of Paris, and Mr. Minchin, of Oxford.

Note.—There may also be meetings of the Sections. 2 p.m.: Meetings of the Sections. 9 p.m.: Conversazione in the Fitzwilliam Museum in conjunction with the International Congress of Physiologists.

Thursday August 25, 10.30 a.m., at the Guildhall.—General meeting of the Congress to discuss the origin of Mammals. The discussion will be opened by Prof. Seeley, of London, and Prof. H. F. Osborn, of New York.

Note.—There may also be meetings of the Sections. 2.15 p.m., at the Senate House: The conferring of honorary degrees. 4-6.30 p.m.: Garden party in the Botanic Garden of the University.

Friday, August 26, 13.30 a.m., at the Guildhall.—General meeting of the Congress to hear an address by Prof. Haeckel, "On our present knowledge of the Descent of Man." The Right Hon. Sir Herbert Maxwell, Bart., M.P., will afterwards read a paper "On recent Legislation on the Protection of Wild Birds in Britain."

Note.—There may also be meetings of the Sections. 2 p.m.: Meetings of the Sections. 7.30 p.m.: Dinner in the hall of Trinity College. Tickets, price 15s., must be applied for in the Reception Room not later than 1 p.m. on Wednesday, August 24.

Saturday, August 27, 9.30 a.m., at the Guildhall.—General meeting of the Congress to settle the time and place of the Fifth International Congress.

Arrangements for the Congress in London.

Saturday, August 27, 4 p.m. to 7 p.m.—Reception by the President and Council of the Zoological Society of London in their gardens in the Regent's Park, London. Tea and light refreshments will be served. 9 to 11.30 p.m.: Reception by the Right Hon. Sir John Lubbock, President of the Congress, of the members of the Congress, at the Natural History Museum, Cromwell Road.

Sunday, August 28, 2.30 p.m. to 7 p.m.: The Natural History Museum, Cromwell Road, will be open. Tea and light refreshments will be served to members of the Congress from 4 p.m. to 6 p.m. 9 p.m.: The President and Committee of the Royal Societies' Club, St. James's Street, S.W., will hold a reception in honour of the Congress (gentlemen only).

Monday, August 29.—Visit to Tring Museum. Visitors will be received by the Hon. Walter Rothschild, who will entertain them at lunch.

Note.—Notice of intention to visit Tring must be given in writing to the Secretaries not later than noon on Wednesday, August 24.

Tuesday, August 30.—His Grace the Duke of Bedford will be glad if such zoologists as are interested in the study of the Cervidae will visit his parks at Woburn on Tuesday, August 30. Mr. R. Lydekker, F.R.S., has promised to conduct the party, which should not exceed in number sixty. Further information