

16 square feet, thirteen feet only of it being immersed, as some portion of the arms was constantly above the water. The angle of the centre of the float was 45° . The speed of the propeller was generally 95 revolutions per minute. With these dimensions, the speed attained was described as $10\frac{1}{4}$ statute miles per hour. The amount of "slip" of the screw in the water, as ascertained by Massey's log, was stated not to exceed 5 per cent. Several experiments were detailed, which showed that there was not more tendency to "list," or to turn round, by the action of the screw, than with paddle wheels; and the vessel was said to have excelled all the other steamers of the port of Liverpool in towing out vessels in a rough sea. Designs were submitted on this principle for a steam frigate, and for large steamers, working with oscillating cylinders direct upon the main shaft.

A model was exhibited, by permission of Sir H. T. De la Beche, from the Museum of Economic Geology, showing all the kinds of valves used in the pumps for draining the Cornish mines; and the merits and defects of the various kinds were explained and commented upon by Mr. Jordan, under whose direction the model was constructed.

Feb. 20.—The President in the chair. The discussion on the "screw propeller" was resumed. Mr. Grantham explained the construction of the propeller used on board the *Liverpool Screw*. It was formed of four arms with broad shovel ends, set at an angle of 45° , and, from his account, its action appeared to have been satisfactory; he also spoke highly of Ericsson's form of propeller, as better adapted for large diameters than any other kind. This statement was confirmed by Mr. Braithwaite, who promised, at a future meeting, to give the results obtained on board the *Princeton* steamer, United States, America.

The discussion upon the valves of pumps was also resumed. The resemblance between the disc valve of Palmer and Perkins and that invented by Belidor, was examined, and the general feeling appeared to be, that Messrs. Palmer and Perkins's valve would be very useful in large pumps for mines through which much sand or chips passed. The general question of valves with large openings, with their influence on the working of the deep mines of Cornwall and other places, was noticed. The discussion occupied so much time, that no papers could be read: those, therefore, which had been appointed for the 20th, were announced for reading on the 27th inst.

INSTITUTE OF BRITISH ARCHITECTS.—Feb. 19.—T. L. Donaldson, V.P., in the chair.—Drawings by F. Catherwood, Esq., of the architectural antiquities discovered in the ruined cities in Central America, were exhibited and described, (see also *Athen.*, Nos. 790, 791, 804, and 805.) The drawings exhibited tend to prove that a higher degree of civilization existed anciently on the American continent than historians have been willing to concede. One of the most singular facts necessary to be kept in mind, when considering the arts of this people, is, that they had no knowledge of the use of iron tools, but used copper instruments hardened by the admixture of tin or some other available metal, and with such tools their buildings of stone and sculptures in granite were worked. The Indians, besides a perfect knowledge of stone cutting, and laying stone, were well acquainted with various kinds of mortar, stuccoes, and cements; and large masses of excellent concrete are found in many of their buildings. They were, in fact, so far as the mechanical part went, accomplished masons. Their painting is superior both to their architecture and sculpture, and in no wise inferior to that of the Egyptians, and they went even a step beyond them, in the blending of colours; approaching more nearly to the paintings found at Pompeii and Herculaneum. In one of the rooms of a large building are paintings covering the entire walls, from the floor to the ceiling. The figures are not more than 6 to 8 inches in height, but most interesting subjects are represented, abounding with life, animation, and nature. Mr. Catherwood noticed the peculiar style of the buildings of Central America and Yucatan. The prevailing type of the architecture consists in first constructing mounds or terraces (called by the Indians *teocalli*), and on these placing the sacred edifices and palaces. These *teocalli* are found in great numbers; they are frequently of large dimensions, of a pyramidal form, but do not terminate in a point,

like the Egyptian structures. They have on their summits platforms of sufficient extent for the temples, which contained the statues of the deities, and in front was conspicuously seen the sacrificial stone or altar, convex on its upper surface, so as to raise the chest of the human victim. The buildings are generally long, low, arched, and of a single story, a mode of construction frequently adopted by the Spaniards, on account of the shocks of earthquake to which many parts of the country are exposed. Another, and not less distinguishing feature, is the arched rooms found in almost all these buildings. These arches invariably consist of stones overlaying each other from opposite walls, until the last meet over the centre of the room, or, what is still more commonly the case, when the last stones approach within about 12 inches of each other, a flat stone is laid on the top, covered either with solid masonry or concrete: the joints of these stones are all horizontal. The roofs have a slight inclination, to throw off the rain, and are cemented. This form of arch appears at first sight original, and is so as regards the Indians, but the same principle was adopted in the earliest times in the Old World, and would probably suggest itself to any people requiring stone roofs over spaces too wide to be covered by flat stones. As regards analogies in architectural ornaments, the same argument may apply. That most frequently met with, and perfectly alike in Greece and in Yucatan, is one likely to be found wherever rope making was understood—and what people so barbarous as to be unacquainted with this simple and primitive process? Other ornaments, offering remarkable coincidences of form, might be adduced, but the same reasoning will apply to them all.

LINNEAN SOCIETY.—Feb. 6.—R. Brown, Esq., in the chair. Prof. Agassiz and Dr. Schleiden were proposed as foreign Fellows.—A paper was read from Mr. Curtis, on two species of Hymenopterous insects. The first belonged to the family Tenthredinidae, and constituted a new genus, which Mr. Curtis proposed to call *Dieloceras*. This insect had been taken by Mr. Ellis in the Brazils; hence he called the species *D. Ellisii*. This insect is chiefly remarkable for its larvæ forming for themselves a cocoon in community, a fact that has not hitherto been observed among insects. The cocoon exhibited was oblong, and about the size and form of a Jargonelle pear. The outside consisted of a tunic, of woolly substance, well adapted to keep off water as well as to resist the attacks of the Ichneumonidae. In the inside the cocoon consisted of about 30 cells, having a resemblance to those of the wasp and bee, but not so regular in form, though about the same size. The second insect described was a species of wasp, which Mr. Curtis proposed to call *Vespa brumex*. This insect forms a remarkable nest, about 8 inches in length and 15 inches in circumference. It has a conical form, and is suspended from the branch of a tree by its apex. The texture is very hard, resembling an earthenware vessel, and very different from that of other wasps. At the base there is an opening, not allowing the passage of more than one insect at a time. The nest had not been opened.

ROYAL INSTITUTION.—Feb. 16.—Mr. Solly 'On the Changes of the Brain at every period of Life, from Infancy to Old Age, and the importance, in the treatment of Insanity, of viewing the Brain as a compound Organ.'—Mr. Solly commenced by a familiar explanation of the nervous system. He described the ganglia as centres of force, from whence sensation, motion, and the unconscious action of the vital powers proceeded. He exhibited the respective uses of the cineritious and of the white matter of the ganglia, by designating the former as the generator—the latter as the conductor of action. He illustrated by diagrams, exhibiting the development of the brain in the lower animals, his assertion, long since published, that the human brain is but a series of large ganglia. He explained the use of the commissures, as combining the several independent ganglia into one acting whole, and remarked, that these conducting portions of the nervous system were found wherever their presence was required, in the spinal chord as well as in the brain. The known office of the various nerves in ministering to vegetative, animal, and intellectual life, were recited. Mr. Solly then entered upon his immediate subject, by dwelling on the uses

of the membranes covering the brain, and of the cineritious matter largely distributed throughout its convolutions. He showed that the convolutions shrunk in old age, the space occupied by them within the skull being then filled with fluid. Referring to his assertion that the human brain was a group of separate ganglia, each being endowed with separate functions, Mr. Solly enforced the importance of ascertaining, in cases of insanity, in which of these separate centres of power the disease was seated, so that it might be relieved by the beneficial stimulus afforded to the healthier ganglia. Such is the plan by which Dr. Conolly has been enabled to discard all the apparatus of coercion which made the receptacles of the insane so horrible in former days. Mr. Solly concluded by inferring, that as lunatics were susceptible of kindness they were under the influence of the terror of punishment—a fact deserving the attention of those who are charged with legislating for, or administering the criminal justice of the country.

ENTOMOLOGICAL SOCIETY.—Jan.—G. Newport, Esq., President, in the chair.—Various donations were announced. Extracts were read from letters addressed to the Rev. F. W. Hope, by Dr. Savage, from the Gold Coast, Africa; and from Mr. Fortnum, of Adelaide (N.S.W.). The former contained a notice of a new species of Goliath beetle, discovered by the writer; and in the second was given an account of the entomology of South Adelaide, and some particulars relative to the process of reproduction of limbs in some of the Phormidæ. An extract from a letter from Colonel Hearsey was also read, giving an account of the habits of the singular Dipterous genus *Diopsis*. A paper was also read by the Secretary, containing descriptions of some new species of sacred beetles, brought home by the Expedition in Southern Africa, undertaken at the expense of the Earl of Derby.

Feb.—The President in the chair.—Some Goliath beetles were exhibited by Mr. Rich, and a large collection of Lepidoptera, formed by Mr. Barnston near the Albany River, in North America, remarkable for the apparent identity of a very great number of the species with English forms. The President exhibited a specimen of *Hypena rostralis*, which he had kept alive since the 1st of September without food. Mr. Bond exhibited a specimen of the small white garden butterfly, captured during the preceding month; and Mr. Walton a singular monstrosity occurring in *Oliorhynchus picipes*. The following memoirs were read descriptive of a genus of Diptera, new to the British lists, by Mr. Desvignes: 'Descriptions of some New Exotic Lucandæ,' by the Secretary. 'Descriptions of some New Species of Parastasia,' by Professor Erichsen, of Berlin. Also, 'A Correspondence relative to the action of Insects in deteriorating Manure,' which led to an extended discussion. The President stated, that the Rev. F. W. Hope proposed offering two prizes of 5*l.* 5*s.*, one for the best essay upon the natural history and medical properties of the blister-fly, and the other upon a subject to be announced at the next meeting.

MICROSCOPICAL SOCIETY.—Feb. 15.—J. S. Bowerbank, Esq. F.R.S., in the chair. This being the anniversary, reports from the auditors and from the council, laying before the Society the expenditure and abstract of the proceedings of the council, were read. After which the secretary read an address, in which he gave a brief summary of the present state of the Society, and also the substance of the various papers read during the past year, for the particulars of which we must refer to the abstracts given in this publication. He also stated the various presents made since the last anniversary, and concluded by noticing the deaths of two of the members. The Society then proceeded to the election of the president and other officers, for the ensuing year, when T. Bell, Esq. F.R.S., Prof. of Zoology, King's College, was elected president, the other officers remaining as before.

SOCIETY OF ARTS.—Feb. 14.—G. Moore, Esq., V.P., in the chair.—J. F. Doyle, W. A. Goodhue, W. H. Todd, and H. Yool, Esqs., were elected members.—Mr. Heaton continued his experiments illustrative of the principal cause of the rocking motion of railway engines and carriages, (*ante*, p. 112.) The machine by which these experiments were shown, consists of a cam ring, having four sets of cams on its