"THE Monthly Index to Current Periodical Literature, Proceedings of Learned Societies, and Government Publications," published at the office of the *American Bookseller*, New York, seems to us a very useful publication.

THE passage of the meteor referred to in Mr. Thwaites' letter last week, occupied one and a half, not eleven and a half seconds.

THE additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Major Gape; an Egyptian Jerboa (*Dipus ægyptius*) from Egypt, presented by Dr. Hastings; a Cape Bucephalus (*Bucephalus capensis*) from South Africa, presented by Mr. C. B. Pillans; two Black-faced Spider Monkeys (*Ateles ater*) from East Peru, a Southern River Hog (*Potamochærus africanus*) from South Africa, a Razor-billed Curassow (*Mitua tuberosa*) from Guiana, a Yarrell's Curassow (*Crax carunculata*) from South-East Brazil, a Blue and Yellow Macaw (*Ara ararauna*), two Orinoco Geese (*Chenalopex jubata*) from South America, two Rufous Tinamous (*Rhynchotus rufescens*) from Brazil, deposited; a Common Rhea (*Rhea americana*) from South America, a Spotted-billed Toucanet (*Selenidera maculirostris*) from Brazil, an Electric Silurus (*Malapterurus beninensis*) from West Africa, purchased.

BIOLOGICAL NOTES

TRANSVERSE COMMISSURE IN ARTHROPODS.—From a recent memoir laid before the Belgian Academy by M. Lienard (*Archives de Biologie*, tom. i. fasc. 2), it would appear that an arrangement of the cephalic nerve-centres, hitherto thought to have been peculiar to Crustacea, is really to be found in nearly the whole of the Arthropoda. It has been long known that in Crustaceans, *e.g.*, Decapoda, besides the super and sub-œsophagean ganglionic masses and their lateral connections, there is a well-marked transverse commissure, situated in front of the sub-œsophagean mass, and immediately behind the œsophagus. This commissure in other Arthropoda seems, from quite technical causes, to have escaped notice. M. Lienard finds it nearly everywhere among the Myriapoda, Coleoptera, Odonata, Lepidoptera, Hemiptera, Diptera (nymphs and larvæ). He has dissected the complete ring in nearly 100 forms, belonging to 70 genera. He is trying to ascertain the origin of the fibres which form the transverse commissure.

THE HÆMATOPŒTIC FUNCTION.—In a recent paper to *R. Accademia dei Lincei*, Sig. Fleti describes the effects of splenotomy as observed by him in dogs. Some of these are as follows:—Immediately after the operation (the previous *régime* of life being maintained) the quantity of hæmoglobin increases for a short time, and more in old than in young animals. Next it diminishes much and progressively in old animals, but without reaching half the normal quantity. In a third phase there is a slow progressive increase, which by degrees brings the quantity up to and above the normal. In young animals the diminution is much less, and the quantity of hæmoglobin sooner reaches and surpasses the normal. In all cases the weight of the animal does not diminish, but may even considerably increase (under good hygienic and alimentary conditions). Sig. Fileti adds some chemical observations as to colorations obtained with hydrochloric acid and yellow prussiate of potash. It clearly appears (he concludes) that, the spleen being removed, the marrow of the bones does not compensate for its function. As the quantity of hæmoglobin first increases—and we cannot admit a real increase in production as resulting from splenotomy—we must suppose that in this brief period the failure of the spleen makes itself felt more in destruction than in production. The former of these functions comes to be compensated more quickly, and there is then a gradual diminution in production of hæmoglobin as a direct consequence of the spleen being absent, and this diminution is greater the less able the marrow is to act, *i.e.* the older the animal. When, finally, the hæmatopœtic function of the spleen has been completely compensated by the marrow of the bones, the quantity of hæmoglobin returns to the normal figure, and may even surpass it. Sig. Fileti is studying the influence of light on the production of hæmoglobin.

DEVELOPMENT OF LEPIDOSTEUS.—In an interesting memoir read at the last meeting of the British Association (Swansea) Prof. F. M. Balfour and Mr. W. N. Parker gave the results of their investigations of some larval forms of Lepidosteus which had been most liberally supplied to them by Prof. Alexander Agassiz. Some of the more important of these were:—1. That the segmentation was, as in the sturgeon, complete, but the larger segments of the lower pole very early fused together to form a yolk sac. 2. That the epiblast was divided into nervous and epidermic layers, and that the nervous system was formed by a solid thickening of the epiblast, as in Teleostei, and not by the closure of a groove, as in the sturgeon. 3. That the lens of the eye and auditory vesicle were developed from the nervous layer of the epidermis. 4. That the general relation of the embryo to the yolk, and the general characters of the germinal layers are precisely like those in Teleostei. 5. That there is present a suctorial disk in front of the mouth, with numerous papillæ, as was first noticed by Agassiz; this disappears in the adult, and is probably a persisting rudiment of a primitive vertebrate organ, remains of which are also found in the adhesive papillæ of larval ascidians, the adhesive disks of larval amphibians, &c.

VISCERAL ANATOMY OF HERRING.—Mr. F. W. Bennett calls attention to the following, it would seem new, fact in the visceral anatomy of this common fish (*Journ. Anat. and Physiol.*, July, 1880). It possesses an extremely long air-bladder, which stretches towards to the head, terminating near the labyrinth of the auditory organs. About the middle of its length it is connected by a duct with the stomach. The latter is capacious and elongated; while the commencement of the mid-gut is near the gullet the posterior portion of the stomach continues on into the ductus pneumaticus. This communication will be found most usually closed with mucus; but Mr. Bennett points out that there is another and a more important communication between the air-bladder and the cloaca. Till within one half-inch of this latter the air-bladder retains its well-known and beautiful silvery appearance; this then suddenly ceases, and the remainder of the bladder is muscular. This will account perhaps for its having been overlooked so long; what the exact uses of this passage may be are not yet known, but it is certain that it affords freer passage for gas than the duct leading into the stomach. Bristles may be readily passed through it, and gas may be made to bubble out if slight pressure be carefully applied under water. The usual arrangement of the apertures of the cloaca is as follows:—In front lies the anus, then the generative aperture, and hindmost of all, the urinary duct opens; the opening of the duct now described by Mr. Bennett lies between the anus and the urinary aperture, and usually to the left of the genital aperture.

MONSTROUS BEETLES.—Mr. Horace F. Jayne has recently published, in the *Trans.* American Entom. Soc., vol. viii. pp. 155–62, Pl. IV., descriptions of some monstrosities observed in North American Coleoptera, all of which belong to that class to which the terms "Monstra per excessum" and "Monstres polyméliens" have been applied. They belong to the genera *Calosoma, Cychrus, Metrius, Pasimachus, Scarites, Dyschirius, Chlænius, Lichnanthe, Polyphylla, Strategus, Telephorus, Prionus, Eleodes*, and *Helops*, and form an interesting addition to the already numerous recorded instances of this kind of monstrosity in beetles. All show a tendency to reduplication in some of the cephalic or thoracic appendages. In some it is the antennæ, in others the palpi, in others the legs, that are thus affected, and in some cases the tendency is exhibited in more than one of these appendages in the same individual. Beetles appear to be particularly liable to the production of such monstrosities, but it is probable that no parallel instance like that here recorded and illustrated by Mr. Jayne in an example of a longicorn beetle (*Prionus californicus*) has been noticed. In it each maxillary palpus has two terminal joints, and each femur has two perfectly-formed tibiæ and tarsi, with the claws, &c., the whole monstrous development being remarkably symmetrical; the labial palpi and the antennæ are normal, as is all the rest of the insect. Mr. Jayne contents himself by describing and figuring these interesting monsters, and does not venture upon any suggestions as to causes, in which he is perhaps wise, considering the uncertainty that exists as to the origin of parallel monstrosities in animals far higher in the scale. Reduplication of cephalic, thoracic, and probably abdominal appendages in the Arthropoda is by no means rare, but it is possible that a distinct combination of two individuals more or less united in one, such as is sometimes found in vertebrates, does not exist.

DIGESTION IN PLANTS.—Dr. Lawson Tait has recently investigated afresh the Digestive Principle of Plants. While he has obtained complete proof of a digestive process in *Cephalotus*, *Nepenthes*, *Dionæa*, and the *Droseraceæ*, he entirely failed with *Sarracenia* and *Darlingtonia*. The fluid separated from *Drosera binata* he found to contain two substances, to which he gives the names "droserin" and "azerin." Dr. Tait confirms Sir J. D. Hooker's statement that the fluid removed from the living pitcher of *Nepenthes* into a glass vessel does not digest. A series of experiments led him to the conclusion that the acid must resemble lactic acid, at least in its properties. The glands in the pitchers of *Nepenthes* he states to be quite analogous to the peptic follicles of the human stomach; and when the process of digestion is conducted with albumen, the products are exactly the same as when pepsine is engaged. The results give the same reactions with reagents, especially the characteristic violet with oxide of copper and potash, and there can be no doubt that they are peptones.

STIPULES IN ONAGRACLÆ.—Prof. Baillon says (*Bull. mensuel. Soc. Lin. de Paris*, No. 33) that in the majority of works on descriptive botany, this family is mentioned as characterised by the constant absence of stipules, and in justification of this quotes the classical works of Decaisne, Duchartre, Endlicher, and Hooker; nevertheless he states that the existence of these organs in this family admits of easy proof, not indeed that they ever occur of large dimensions, for then they could not have escaped detection, but still they are present, more commonly as little subulate tongue-like bodies, acute, often red-coloured at the base of the petioles in both opposite and alternate-leaved plants. In Hauya they soon turn black and wither off early. In the fuchsia of our gardens little stipules are often present. In Circea they can also be detected. In the Lopezia of our gardens all the leaves have two very distinct stipules, which indeed have been often referred to in botanical works, and it is the same with Haloragia, though Bentham and Hooker describe them as here absent.

A NEW GREEN CILIATED PLANT.—Under the title of "A New Ciliated Organism furnished with Chlorophyll," Prof. van Tieghem has published (*Bull. Soc. Bot. France*, 1880, p. 130) a memoir of a strange new form. The organism in question was found by Prof. Perrier twice: once at Roscoff, in sea-water containing algæ and some of the lower animals; and again at the Museum (Paris), in a little aquarium in the laboratory. It presents the appearance of a gelatinous tremulous mass of a pure green colour; in outline well defined, spherical or oval in shape, attaining more than a centimetre in diameter, and attached by a portion of its periphery to a large marine alga. At first sight it would be called a Nostoc. Exposed to sunlight it gave out oxygen, so one concludes its colouring-matter to be chlorophyll. On a closer inspection it is seen that the mass is composed of a colourless jelly, scattered throughout which are isolated green points, visible to the unassisted eye, and sufficiently numerous as to give to the whole mass the green coloration distinguishing it, so one would not now refer it to Nostoc. Each little green body is spherical, and measures from three to four-tenths of a millimetre. It is formed of a very finely granular and somewhat dark protoplasm, very uniformly permeated with an amorphous chlorophyll; neither nuclei nor vacuoles, nor red spot were detected, and the surrounding membrane was very thin. At one place (called the pole) the cell bore a tuft of vibratile cilia which were attached side by side, so as to cover a space more or less large according to age and to allow of independent movements. On the equator at two diametrically opposite points a small hollow in the green mass is seen, and by these passes a band of homogeneous protoplasm which traverses the membrane, turning towards the pole, and in the superior hemisphere dividing on its outer border into fine fringes with vibratile cilia. These cilia are confluent at their base, and are not independent in their movements. In process of development the polar cilia become detached (absolutely fall off), next the lateral moustaches disappear (these seem to be retracted), a continuous membrane covers over all, but the general aspect and dimensions remain unchanged. Later on the cell divides into two (equatorially), next it divides again (perpendicularly), and the segmentation continues until there is a family of sixteen rounded-off cells, and the organism has passed through a phase of encystment. Lastly each daughter cell increases in size, separates more and more from its neighbour, gets closed in a fine membrane, and then appears all covered over with cilia. It now escapes into the water and secretes in abundance a gelatinous material. The clothing of cilia drops off as the form approaches its adult size: soon appear the polar cilia, next the lateral moustaches; and so far its life-history is complete. At no phase in its development was either cellulose detected in its cell-membrane, nor starch in its protoplasm. Prof. van Tieghem concludes:—"Is this organism an animal or a plant? I am not well able to say, and I must add besides that this question, to which formerly so much importance attached, in the actual condition of science, appears to me to be destitute of interest." It is called *Dimystax perrieri*. With every respect to the dictum of so distinguished a botanist as Prof. Tieghem, we venture to call our readers' attention to this strange form, which M. Roze seems disposed to regard as an animal, in the hopes that some of them may assist in determining its proper position in nature.

PHYSICAL NOTES

A FRESH measurement has been made by Mr. T. C. Mendenhall of the acceleration of gravity at Tokio, an account of which appears in the *American Journal of Science*. The experiments were made after the accepted methods with Kater's and Borda's pendulums, the only novelty introduced being that of employing a chronograph in connection with a reliable chronometer to determine the time of vibration of the pendulum. At every sixtieth or hundredth vibration of the pendulum a light break-circuit apparatus placed beneath it was raised to just such a height as to be "thrown" by the pendulum at its lowest point of swing, thus enabling its rate to be calculated to the ten-thousandth of a second. Mr. Mendenhall considers his determinations to be more reliable than those of Professors Ayrton and Perry, which were made with a long wire pendulum; he revises their calculations, altering their value of "g" from 9·7974 to 9·7979, and asserts that their calculation of the theoretical value by Clairaut's formula is wrong, and should be 9·7980, not 9·797 (metres). His own determinations give a mean result of 9·7984.

A SECONDARY battery, the electrodes of which consist of porous fragments of gas-carbon, has been devised by M. Henri Sauvage. Though inferior in power and durability to a perfectly "formed" Planté cell with lead electrodes, this cell would be cheaper, more readily and rapidly constructed, and would yield a current of longer duration. The action is probably due to the occlusion of the hydrogen and oxygen gases respectively in the pores of the carbon. The inventor recommends that the two plates used as electrodes be kept apart with a simple thin wooden frame.

PROF. O. N. ROOD calls attention to the fact that when the colour of ultramarine blue is mixed with white by the method of rotating disks the tint appears to verge towards violet. Brücke advanced the explanation that what we call white is really a reddish colour. Aubert, on the contrary, regarded it as showing that violet is only a pale shade of ultramarine blue. A series of experiments made with other colours showed that when mixed thus with white green-yellow becomes greenish, and green green-bluish, that full yellow and orange incline to red, and red becomes purplish. These observations accord with neither theory, and Prof. Rood advances none himself. He thinks that the fact as it stands explains why it is impossible in the polariscope to produce a red free from purplish tint, there always being white light mingled with the red rays.

PROF. J. TROWBRIDGE, in investigating with telephones connected to earth-plates the flow of return-currents through "earth," found that at a mile from the Harvard College Observatory the time-signals of the observatory clock could be heard by merely tapping the earth at points fifty feet apart.

FROM his recent researches on dilatation and compressibility of gases under strong pressures, M. Amagat derives (*Comptes rendus*, August 30) the following laws:—1. The coefficient of dilatation of gases (for temperatures not too much above the critical) increases with the pressure to a maximum, then decreasing indefinitely. 2. This maximum occurs under the pressure with which the product $p\,v$ is minimum, where the gas accidentally follows Mariotte's law. 3. It diminishes for higher and higher temperatures, and at length disappears. 4. At a sufficiently high temperature the compressibility of fluids is represented by the formula $p\,(v - \alpha) = \text{const.}$; α being the smallest volume the mass of fluid can occupy; this is the limiting law. For each gas α has a special value. 5. For pressures