the Society for Psychical Research to combine critical and negative work with work leading to positive discovery. To the penetration and scrupulous fair-mindedness of Professor Henry Sidgwick and of the late Edmund Gurney is largely due the establishment of canons of evidence in psychical research, which strengthen while they narrow the path of subsequent explorers. To the detective genius of Dr. Richard Hodgson we owe a convincing demonstration of the narrow limits of human continuous observation.

It has been said that 'Nothing worth the proving can be proved, nor yet disproved.' True though this may have been in the past, it is true no longer. The science of our century has forged weapons of observation and analysis by which the veriest tyro may profit. Science has trained and fashioned the average mind into habits of exactitude and disciplined perception, and in so doing has fortified itself for tasks higher, wider, and incomparably more wonderful than even the wisest among our ancestors imagined. Like the souls in Plato's myth that follow the chariot of Zeus, it has ascended to a point of vision far above the earth. It is henceforth open to science to transcend all we now think we know of matter, and to gain new glimpses of a profounder scheme of Cosmic Law.

An eminent predecessor in his chair declared that "by an intellectual necessity he crossed the boundary of experimental evidence, and discerned in that matter, which we in our ignorance of its latent powers, and notwithstanding our professed reverence for its Creator, have hitherto covered with opprobrium, the potency and promise of all terrestrial life." I should prefer to reverse the apothegm, and to say that in life I see the promise and potency of all forms of matter.

In old Egyptian days a well-known inscription was carved over the portal of the temple of Isis: "I am whatever hath been, is, or ever will be; and my veil no man hath yet lifted." Not thus do modern seekers after truth confront nature—the word that stands for the baffling mysteries of the universe. Steadily, unflinchingly, we strive to pierce the inmost heart of Nature, from what she is to reconstruct what she has been, and to prophesy what she yet shall be. Veil after veil we have lifted, and her face grows more beautiful, august and wonderful, with every barrier that is withdrawn.

William Crookes.

RECENT ADVANCES IN MALACOLOGY.

We have received lately, though the work has been some time issued, the second Lieferung of Bergh's Malacological Researches on the collections made by Semper in the Philippines.* The fasciculus in question treats of the *Pleurobranchidæ* in the masterly manner and with all the wealth of anatomical detail and illustration which this author has taught us to expect from him. The text is devoted to an exhaustive anatomical account of *Oscanius*, beginning with the Mediterranean type *O. membranaceus*, *Oscaniopsis* and *Oscaniella* Bergh, new genera, the first exclusively Indo-chinese and the second chiefly so, but having one Antillean representative. The plates include full data on two species of the eastern United States, *Pleurobranchæa tarda* Verrill and *P. obesa* Verrill, the genus *Koonsia*, originally proposed for the latter, being regarded as identical with *Pleurobranchæa* by Bergh.

A very full and useful monograph of the *Dreissensüdæ* of the Palæarctic region has been published by N. Andrusov in the Russian language,† the plates of which have

* Reisen im Archipel der Philippinen von C. Semper. Bd. VII., IVte Abth. Die Pleurobranchiden von Dr. Rudolph Bergh, Wiesbaden, 1897.

†Travaux de la Soc. des Naturalistes de St. Petersbourg. Sect. Géol. et Min., Vol. XXV., 4to, 1898, avec 20 planches phot.

been distributed with an octavo *résumé* of 115 pages in German. In the recent fauna *Dreissensia* is confined to Europe and western Asia, while *Congeria* is distributed in west Africa and the tropical and sub-tropical regions of America. This is curious, since fossil Congerias are extremely abundant in some of the Tertiaries of eastern Europe. A small area in Farther India produces mollusks not distinguishable by the shell from *Dreissensia*, but which our author suspects are different anatomically and refers to as pseudo-*Dreissensia*. Notwithstanding the abundance of *Dreissensia* in Europe and of *Congeria* almost under the shadow of the Johns Hopkins University, a complete account of the anatomy is still a desideratum, while the imperfect data recorded have given rise to the most diverse hypotheses as to the relations of this family, of which by far the larger number of species are only known in a fossil state.

Although somewhat belated, notice should be taken of a magnificent contribution to the paleontology of the Alpine Trias by A. Bittner.* This work is devoted to the Pelecypoda of St. Cassian, covering fifty-six genera, of which ten are newly instituted. One of these, *Arcoptera* Bittner, bears a name which has already been used by Heilprin for a Pliocene fossil.† The later genus is based on two very elegant little species of *Arcacea*, and we would suggest that the preoccupied name be replaced by *Bittnerella*. The fauna is one of classic interest, and is illustrated lavishly by admirable lithographic plates.

The current volume of the *Journal de Conchyliologie* contains an important article by H. Fischer, summarizing the works of the late Dr. Felix Bernard on the development of the shell in *Pelecypoda*.* The premature decease of this promising and estimable student came as a shock to those who had admired and profited by his excellent researches. While one might feel disinclined to accept in their entirety the theories he based upon them, the collection of new facts relating to the development of the hinge in Pelecypods is a solid contribution to science for which we shall always be in his debt, while his excellent anatomical papers have met general commendation. Dr. Fischer's summary, in default of the general work contemplated by Bernard, will possess a permanent value.

In this connection we may express our regret at the death of the veteran M. Hippolyte Crosse, senior editor of the *Journal*, to which he devoted many years of conscientious and conservative attention. M. Crosse had attained the age of 71 years, and died on the 7th of August last, followed five days later by Bernard, in the 35th year of his age—two most regrettable losses for French malacology.

We are informed, though it has not yet come to hand, that an index to the last twenty volumes of the *Journal* has been issued, which will be indispensable to all students of mollusks, recent or fossil. We trust that the editorial staff will in future do away with the inconvenient practice of antedating the issues of the *Journal*, which has gradually come about of late years through the delay in publishing some of the numbers. The volume for 1897 (largely issued in 1898), besides the paper above mentioned, includes interesting data on the genus *Cyprœa* in the Mediterranean, by the Marquis de Monterosato; on minute shells from the New Caledonian Archipelago, by the R. P. J. Hervier, and on the Quaternary fossil shells collected by M. Piette in the cave of Mas d'Azil (Ariège), by Dr. H. Fischer.

*Revision des Lamellibranchiaten von Sct. Cassian. Abh. K. K. Geol. Reichsanst. Bd. XVIII., Heft. 1, 236 pp., 24 pl., 4to.

†Trans. Wagner Inst. Sci., Philadelphia, Vol. 1, 1885.

**Journ. de Conchyl.*, Vol. XLV., No. 4, pp. 209–224, 1898.

The last number of the Proceedings of the Malacological Society* contains several articles of more than average interest. The anatomy of *Mülleria* has long been a desideratum and the typical Columbian species *M. lobata* is still undescribed. Very unexpectedly a second species turned up in southern India, and from specimens of this form M. F. Woodward has been able to give a very complete account of its anatomical features. It is known that in the young the usual anterior adductor of Pelecypods is developed, but the creature soon becomes sessile and the adult shell presents a remarkable resemblance to an oyster and, like the oyster, preserves only its posterior adductor. The gills are normal, reticulate, and so attached to the mantle as to separate the anal and branchial chambers; but the margins of the mantle remain free. The foot is entirely abortive, but the pedal ganglia remain; the rectum is entirely free from the pericardium and heart, and there is no provision for a branchial marsupium, as in the Naiades. On the whole the characters support the opinion previously based upon the shell, that *Mülleria* is related to the Naiades, but presents extreme modifications due to the sessile habit.

In the same number (pp. 85, 86) Dall gives an account of the macroscopic anatomy of the two peculiar New Zealand genera, *Resania* and *Zenatia*, Gray; of which nothing was previously known. Their relationship to the *Mactracea* is established. In *Resania* the anal and branchial chambers are separated (as in *Verticordia*) by a fleshy septum independent of the gills, and the ctenidia in five adult specimens agreed in being asymmetrical and in having the pendant laminæ on the left side discontinuous longitudinally, the anterior portion being separated from the posterior by a vacant space.

We have also (pp. 94–104) a discussion of the classification of the slugs of the family *Arionidæ* by Professor H. A. Pilsbry, preceded by an account of the anatomy of *Anadenus* and notes on *Geomalacus*. He finds the modifications of the free muscles most fundamental in this group. Geographically the family occupies three widely separated areas which have no common genera. The most primitive forms are American, and an American origin for the family is regarded as probable. Their phylogenetic tree is supposed to have its roots in the *Endodontidæ* and its culmination in the genus *Arion*. *Binneya* is regarded as a connecting link with the *Endodontidæ*, and the family may have spread to Asia by way of an Alaskan land connection.

One of the most interesting recent contributions to malacology is that on the fresh-water mollusks of Celebes by the brothers Sarasin.* In the heart of the island, amid high mountains, is the large Lake Passo, lying in a depression of ancient non-volcanic rocks. Close to its shores, covered with a moderate depth of water, is a sandy border which descends abruptly into much deeper water, which has a muddy bottom. On the sandy terrace live many fresh-water shells, and the beaches are abundantly strewn with them. Other lakes have a not very different shell fauna, but in Lake Passo was found the curious Limnæid genus *Miratesta*, one of the prizes of the expedition. The shell is heavy and sinistral, with coarse sculpture, and the animal possesses a large and well developed gill and a peculiarly muscular buccal mass. The dentition is close to that of *Limnæa* and *Isidora*. The latter genus also occurs, and the authors show that *Pulmobranchia* Pelseneer (as pointed out in this Journal, N. S., IV., p. 772, 1896), is synonymous with *Isidora* Ehrenberg (*Ameria*

*Vol. III., No. 2, July, 1898, pp. 63–110.

*Die Süsswasser-mollusken von Celebes, von Drs. Paul and Fritz Sarasin. Wiesbaden, C. W. Kreidel. 1898. VIII., 104 pp., 13 pl., 4to.

H. Adams), which has as one of its characters a more or less completely developed gill. A new genus of the patelliform Limnæids, *Protancylus*, from the lakes of Celebes differs by the same character from the Palæarctic *Ancylus*. The authors suggest that these facts indicate that these forms retain ancient characters belonging to a time when the fresh-water Pulmonates were less differentiated from the marine Opisthobranchiates than at present. Welcome details are also given of the opercula and radula of various Melanians and *Viviparidæ*. There are a few *Neritinæ*, two *Corbiculæ* and a species of *Batissa*, but one of the curiosities of the Celebes fauna is the absence of Naiades, though the latter occur both east and west of Celebes, in Borneo and Australasia.

WM. H. DALL.

AN INSTANCE OF LOCAL TEMPERATURE CONTROL OF THE DISTRIBUTION OF MAMMALS.

IT is a well-known fact that boreal mammals, such as lemmings (*Synaptomys*), red-backed mice (*Evotomys*) and long-tailed shrews (*Sorex*), are found locally in cool situations far to the south of their normal range. The faunal status of the species is thus in no way altered, however; for the occurrence of an animal beyond its usual geographic limits does not prove that the species can defy the influences of climate.

While every life zone undoubtedly has its outlying islands, perhaps the best-known instances of the phenomenon are the small boreal areas scattered through the transition zone and northern part of the upper austral zone in the eastern United States. Many of the 'boreal islands' are found on mountain tops, where their presence is readily explained by the low temperature of high elevations, but others occur practically at sea level, or at an altitude much below that normally attained by the zone in which they lie. Good descriptions of 'islands' of this kind have been recently published by Mr. Vernon Bailey and Mr. Chas F. Batchelder. Mr. Bailey calls attention to 'Tamarack Swamps as Boreal Islands,'* and mentions the fact that the layer of sphagnum with which these swamps are generally carpeted acts as a cooling agent, partly by protecting the ice which during the winter forms beneath it, and partly by inducing evaporation, by which the air at the surface is continually cooled. He found many 'islands' of this kind in the upper austral zone near Ann Arbor, Michigan. Mr. Batchelder describes the cold rock slides in which the Hudsonian *Microtus chrotorrhinus* occurs in the Canadian zone of the Adirondacks, and the swamps that afford the Canadian *Evotomys gapperi* a congenial home in the transition zone of southern New England.† The so called 'rock vole,' *Microtus chrotorrhinus* was found in Essex County, New York, on "a steep hillside heavily wooded with an old mixed growth. The lower slopes were made up of a talus of large angular blocks of rocks piled one upon another as they had fallen from the cliffs above. The damp rocks were covered with sphagnum and ferns, and from the holes and spaces between them came currents of cold air, indicating the presence of masses of yet [August 29] unmelted ice somewhere in the depths below." Of *Evotomys* in southeastern New England he says: "One may look for it with some confidence in almost any large tract of wet ground that retains its moisture through the summer, but is not subject to serious floods, and which bears a growth of woods sufficiently heavy to afford it dense shade, so that the ground beneath and the roots of the trees are covered with a deep carpet of sphagnum. * *

*SCIENCE, N. S., III., p. 250, February 14, 1896.

†Proc. Boston Soc. Nat. Hist., XXVII., pp, 188 and 192–193, October, 1896.