

in a column, the lowest one can be removed without making those above it fall, by hitting it aside with a very rapid stroke with a table-knife. Here again a feeble stroke will fail.

Our second figure illustrates inertia in another way. A heavy metal ball is hung by a thread to the ceiling or to a shelf, and another thread is attached below. Tug at the lower thread, and it will break. If the tug be slow the ball will come down too; but if the tug be sharp and fierce

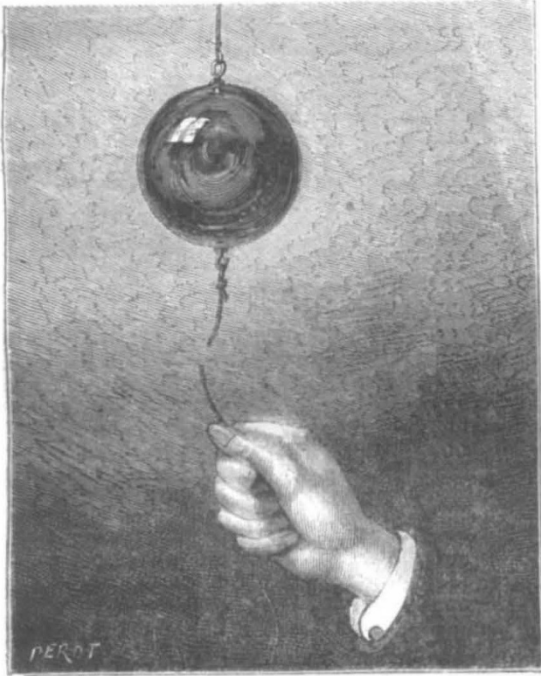


FIG. 2.

the thread will break off *below* the ball, breaking, in fact, before the pull has time to impart to the mass of the heavy ball a sufficient moving energy to enable it to rupture the string by which it hangs.

Many other illustrations of a similar kind might be narrated. Of these probably the most telling is that of firing a tallow candle from a gun through a deal board, in which it leaves merely a hole, as the writer can testify from several repetitions. Here, however, we are passing into the region of "apparatus," and must not pursue the matter further.

COUNT POURTALES

"IN the death of Louis François de Pourtales science has met a heavy loss. He was the Swiss representative of an old family, which had branches also in France, Prussia, and Bohemia. Trained as an engineer, he emigrated in early manhood to the United States at nearly the same time as the late Prof. Agassiz, to whom he was much attached, and whose pupil and fellow-worker he was. He entered the Government service in the department of the Coast Survey, and continued in it many years. His talents and industry made him a man of mark, to whom was intrusted much work that required original thought. Especially did he show interest in the problems of deep-sea soundings and the structure of the ocean bottom, an interest that led to profound observations on the physical geography of the Carribean Sea and the Gulf Stream. His papers on this

subject were of the first order, and established his reputation in Europe as well as in America.

"By the death of his father he succeeded to the title, and received a fortune which enabled him to devote himself wholly to his favourite studies, and to do much in continuing the great work of Louis Agassiz. Appointed keeper of the Museum of Comparative Zoology, he gave himself, with untiring devotion, to carrying out the arrangement so laboriously planned by his friend and master. Dividing the task with the curator, Alexander Agassiz, he pushed forward his part of the work with the easy power of a strong and highly-trained intellect. Every day and all day at his post—now pursuing special investigations, and now directing the details of the museum—he was the model of an administrative officer.

"He had not an enemy, and could not have had one; for, although firm and persevering in temper, he possessed the gentleness of a child and a woman's kindness. His modesty amounted almost to a fault; and people wondered why a man who was master of three languages should talk so little. But with intimate friends he would speak freely, and never without giving information and amusement. His range of learning was very wide, and his command of it perfect; nor was it confined to mathematics, physics, and zoology. He did not scorn novels and light poetry, and was knowing in family anecdotes and local history. Indeed, it was a saying in the Museum that if Count Pourtales did not know a thing it was useless to ask any one else.

"His strong frame and temperate mode of life gave hope of a long period of usefulness, for he was only fifty-seven, and in the prime of his powers. But it was not to be. Stricken, without apparent cause, by an obscure internal disease, he succumbed, after some weeks of suffering heroically endured. In seven short years he has followed Louis Agassiz, and there seems no hand to take up his burden."

The above account of Count Pourtales appears in the *Boston Daily Advertiser* of April 20, and is, we believe, from the pen of Prof. Theodore Lyman. We would here, in addition, refer briefly to some of Count Pourtales' scientific work. Almost from the commencement of his connection with the United States Coast Survey he deeply interested himself in deep-sea questions, and some of the earliest observations on the nature of the deep sea bottom and of Globigerina mud were made by him. He wrote on the structure of Globigerina and Orbulina, and described the occurrence of the small Globigerina-like shells bearing spines in the interior of certain Orbulinæ, which he concluded were the swollen terminal chambers of Globigerinæ containing young in progress of development. The first step in deep-sea investigation in the United States was taken by the late Prof. H. D. Bache on his assuming the duties of the United States Coast Survey in 1844, when he ordered the preservation of specimens brought up by the lead. Every specimen was carefully preserved and labelled, and deposited in the Coast Survey Office in Washington. The microscopical examination of the specimens was commenced by the late Prof. J. W. Bailey, and after his death this work passed into the hands of Pourtales, who devoted his time to it in the intervals of other duties. That most important deposit, Globigerina mud, was first discovered by Lieutenants Craven and Maffit, U.S.N., during Gulf Stream explorations in 1853. In 1867 systematic dredging in deep and shallow water was commenced on the assumption of the superintendence of the Survey by Prof. B. Pierce, who ordered the dredging. At the suggestion of Louis Agassiz, dredgings were made down to a depth of 1,000 fathoms. In Prof. Agassiz' report one of the richest grounds for deep-sea corals, lying off Cape Florida, was named Pourtales Plateau. In 1871 Pourtales published what is probably his best-known work, namely, his "Deep-Sea Corals" (*Ill. Cat. Mus.*

Comp. Zool.," Harvard, No. iv.), a most excellent memoir, containing valuable disquisitions on the affinities of various genera, and excellent notes on the geographical distribution of the species and the nature of the bottom on which the dredgings were made. The memoir contains the results of some interesting researches on the relations of the Rugose to the Henactinian corals, in connection with the account of the aberrant genus *Haplophyllia*. The deep-sea *Antipallaria* and *Actinidæ* are described in it, as well as the stony corals, and the genus *Pliobothrus*, with great acumen, referred to its proper place amongst the Hydrozoa. A second memoir on deep-sea corals was contributed by Count Pourtales to the account of the zoological results of the *Hassler Expedition*, and many others on this and other zoological subjects are to be found in the *Bulletin* of the Harvard Museum of Comparative Zoology. The last work which appeared from his pen is the description of the plates of corals in the Report on the Florida Reefs, by the late Prof. Agassiz, which has just been published by Alexander Agassiz, by the permission of the superintendents of the U.S. Coast Survey. These plates are the most perfect and beautiful representations of corals that have as yet been published anywhere. They were drawn under the immediate direction of Prof. Agassiz.

Count Pourtales' name is indissolubly connected with deep-sea zoology by means of the genus *Pourtalesia*, named after him. *Pourtalesia*, a sea-urchin, one of the *Spatangidæ* allied to *Ananchytes*, was found by the *Challenger* expedition to be one of the most ubiquitous and characteristic deep-sea animals. Numerous species of the genus new to science were obtained by the expedition in deep water, some of them being of most extraordinary shapes. In conclusion it need only be added that Count Pourtales' kindness and good-nature were as much appreciated by English naturalists as elsewhere. He was most generous, always ready to give advice to naturalists working in the same most difficult field as himself, to supply them with specimens for investigation, and to discuss in the freest manner, with perfect impartiality, any question of systematic arrangement. He will be regretted by many friends in England, to which he paid frequent visits on his way to his native country, his last visit having been made in the spring of the present year.

H. N. MOSELEY

THE BRITISH ASSOCIATION AT SWANSEA

PREPARATIONS of the most unstinted kind are now being made at Swansea to insure to the members of the British Association a hearty, hospitable welcome, a good opportunity for the interchange of scientific results, and an instructive and healthful summer holiday during their visit in the week commencing on Wednesday, August 25 next. The Excursion Committee have already made arrangements for visiting the more interesting places in the district. The presidential address will be delivered on Wednesday, and a portion of Thursday, August 26, will be devoted to an excursion, limited to 200 members, to the celebrated iron-works and collieries at Dowlais, by special invitation of G. T. Clark, Esq., of Dowlais House. As this excursion will take place so early, members who intend joining in it should send in their names to the Local Committee as soon as possible before their arrival in Swansea. The return will be made in time for the reception *soirée*, which the Mayor of Swansea (Alderman John Jones Jenkins) will give in a fine wooden pavilion capable of accommodating 6,000 people.

Saturday, August 28, will be almost entirely devoted to excursions to the Gower Coast, Penrice Castle, Oxwich Bay, Arthur's Stone, Worm's Head, Bishopstone Valley and its underground river; Bacon Hole and other bone-caves, with the Bays; the Via Julia at Langhor, with ruins

of castle, hospitium, sanctuary, and collieries and tin-works; Llandilo, Golden Grove, Carreg-Cennen, and Dynevor Castle; and by sea to Lundy Island and Ilfracombe.

Among the sciences geology this year takes the foremost place in the person of the distinguished president, Prof. Ramsay. There are few districts which comprise, within so small an area, so many geological formations as Swansea, and fewer still that offer such problems for solution and such advantages for useful study. To the west of the town an axis of old red sandstone is thrust up through lower shales and limestones, and the stratifications of the whole neighbourhood have been dislocated and curiously denuded. Along the coast of the Bristol Channel for twenty miles the grand limestone cliffs are fissured and distorted until they exhibit almost every variety of dip and strike. Here are bold projecting torrs, inhabited by sea-birds; undisturbed sandy bays, the realised dream of the bathing enthusiast; and the celebrated bone caves, explored by Buckland and Col. Wood, and described by Falconer. The list of their fossil contents is a long one, including, with the exception of the *Drepanodon (Machairodus)* of Kent's Hole, all the larger-sized extinct carnivorous and herbivorous mammalia found in all the caves of England put together. Of the smaller-sized genera, too, Bacon Hole and its neighbouring caverns contained representatives of every one save *Lagomys* and *Spermophilus*. In Mewslade Bay Mr. Prestwich discovered a fine example of raised beach, and beneath the sands of Swansea Bay are well-exposed beds of peat—roots, stems, branches, and leaves of the silver birch, and larger vegetation, the remains of a forest still retained in local tradition. On the other side of the bay, in these deposits, have been found antlers of splendid proportions, and British and Roman implements. The *Pholas candida* is found in the decayed wood, and the rocks at the western extremity of the bay abound with *Lithophagi*, the most numerous being *Saxicava rugosa*. The South Wales coalfield, the largest but one in Britain, is brought within easy workable range by a great east and west anticlinal and several smaller axes, and is so cut into by deep river valleys that the coal is generally worked by means of adits and galleries. As a consequence of this fortunate conformation of carboniferous strata and surface, the deepest coal-pit in the whole basin—Harris's Deep-Navigation Steam Colliery, in the Aberdare Valley—does not exceed 700 yards of vertical depth. There is still considerable difference of opinion as to the identity of certain beds which occupy the place of the millstone grit. To the north and east of the basin the grit is of the usual kind, save where the sands and gravels are compacted into a hard, whitish, quartz-like rock; but to the west of Swansea the equivalent beds change into siliceous under-clays, with coal-seams above them. At Lilliput, in Swansea Bay, there are two interesting outcropping ridges of this kind; and a little farther west still the coal-measures are found to lie conformably on the limestone, with the exception of those in the neighbourhood of Oystermouth Castle, where Sir Henry de la Beche found a section "of a kind of lenticular mass which fines off to the east and west," and "was formed under minor conditions of a different nature." At the head of the Swansea Valley there is said to be "a seam of coal occurring in the millstone grit." The Town hill sandstones, which form the highlands in the neighbourhood of the town, and the high bold escarpments of which may be traced almost all round the Basin, are equivalent to the Pennant rocks of the Bristol district. They are peculiarly interesting for the great quantity of *detrital* coal they contain. A few minutes' walk from the town to the quarries enables the geologist to see the curiosity *in situ*. Even the same coal pebble is sometimes seen to consist of coal of two distinct ages. The markings beautifully show how the newer plants were pressed down