

these estuaries or passages were only entirely open in the Crag period.

I have said Vectis is equivalent with the Celtic word "gwyth," a passage. Now there is a closed passage or haven (a gwyth, or vectis, or iktis) from Sandown to Bembridge in the Isle of Wight (Fig. 1). From this passage the whole island gets its name "Gwyth" in Celtic, Latin "Vectis," Saxon "Wiht," English "Wight," never spelt "White," although it has white chalk cliffs.

The safety of any of the harbours called Vectis or Iktis arose from the fact of these islands (or parts of them) near the coast of Britain being peninsulas at low water and islands at high water. These were, therefore, typical natural harbours. The Greek writers, Diodorus Siculus and others, insist particularly upon this property of change with the tide. The remarkable tide contrasted strongly with the different circumstances in the Mediterranean. Now the prevailing winds on the south coast of England have caused modern beaches to form, particularly at all of these four passages on the south coast of England, and many of the passages have been closed, as we know, in the historical epoch. Their ancient form is clearly shown in my woodcut. Now the sea is entirely shut out by modern beaches and works.

The drawings show the changes which have occurred in Fig. 1, the Isle of Wight. Fig. 2 is the passage between the Isle of Thanet and Kent, closed in the historical period between Ritupæ and Regubium. In Fig. 3, the Chesil Bank, has filled up the old waterway between the Isle of Portland and the mainland. Fig. 4, passage from St. Michael's Mount to Hayle. Gravel and stream tin-drift, closing up the ancient passage from near St. Michael's Mount at Marazion to Hayle.

The type of all that has happened is well seen, Fig. 1, Vectis, the Isle of Wight. Even in 1670 there was only a groyne and a small alluvial deposit near Sandown. Nearly all the passage to Bembridge was an estuary; now it is nearly all dry land.

The term "vectis" in Latin, or "iktis" in Greek, was no doubt applied to all the passages in these four islands.

The Cornish tin no doubt came in coracles, and by land on horses, to Magnus Portus or to Stansoar Point for shipment to Brading, and was shipped from these Hampshire ports and Isle of Wight ports to the banks of the Seine, to be carried on horseback in thirty days to Marseilles. Thus both the Bembridge peninsula and St. Michael's Mount were shipping places for tin, and both were properly called Iktis and Vectis, and as usual we find there was no error in the Greek observations.

Then as to the period when the contour lines of the south coast began to change. The Crag period was that in which the great estuaries round the British coast began to be filled up. Then pebbles and sand were driven along the coast. I believe all the four channels in the drawing, were open in the Crag period, and gradually closed up in the long period which intervened between the Crag and the present time. The continuous filling up has also occurred in the estuaries and passages on the opposite coast of the English Channel. It is probable that Portus Itius, at Gessoriacum? (Boulogne) obtained its name in a similar manner to Vectis and Iktis as I have already stated.

We find pure iron B.C. 3124 in Egypt. If iron was a necessity for the production of copper, and the metal tin was of no use without copper, we may place the inventions of the metals in the following order: (1) iron, (2) copper, (3) tin.

A. TYLOR

#### THE BEN NEVIS OBSERVATORY

SINCE the formal opening of the Observatory on October 17, workmen have been engaged in fitting up and finishing the interior, and pushing forward the provisioning of the establishment with tinned meats,

biscuits, tea, coffee, &c., capable of lasting for six months, with fuel for a like period. Nothing that could be thought of has been left undone to render the observers as comfortable as possible during the winter. The telegraph cable is now in working order from the Observatory to Fort William, so that communication is always possible with the outer world. Mr. Omond, the superintendent, and his two assistants took up their residence on the top of the Ben about a fortnight ago; and it is extremely gratifying to learn that the building, every part of which during erection, and for some time after being roofed over, was soaked with water, is now thoroughly dry; the walls, roof, and windows have been officially inspected, and found to be perfectly tight in every respect; and in corroboration of this, during the storm of Thursday, the 8th inst., none of the finer snow particles of that elevated region entered the dwelling. As an additional protection against the severe weather which may happen, a large roll of tarpaulin, thirty-five feet long, was carried on the shoulders of twelve men to the top on Monday last week, and securely fixed over the roof of the building.

In a letter dated the 14th inst., Mr. Omond states that the Sunday previous was one of the finest days he ever saw; that Monday and Tuesday were nearly as good; and that on the Wednesday only the distant view was shut out by haze. Up to that date the top of the Ben had been all but free from stormy weather; indeed, while tempestuous weather raged below, the wind rose to a gale only on Thursday the 8th. A telegram was received direct from the Observatory on Thursday last week, which stated that the temperature for the day had been minimum 17° and maximum 28°, while inside the Observatory the temperature was 55°, which happened to be exactly the temperature of the Scottish Meteorological Society's office in George Street at the time.

A meeting of the directors was held at Edinburgh on the 15th inst., Sir William Thomson in the chair, at which Dr. Sanderson, the Treasurer, reported that the subscriptions now intimated amounted to a little over 5000*l.*, nearly three-fourths of which sum had been subscribed since the middle of May last.

A scheme of work for the coming winter, consisting of hourly observations by night as well as by day, was agreed upon. The observations include the barometer; dry, wet, maximum, and minimum thermometers; direction and force of the wind; rain, sleet, snow, and hail; evaporation from snow; species, direction, and velocity of upper and lower cloud strata; and sunshine, together with thunder, lightning, halos, auroras, meteors, &c. In addition to the regular observations, Mr. Omond is to conduct physical inquiries into the hygrometry of this boreal climate by an instrument specially designed by Prof. Chrystal; inquiries as to the direction and speed of the wind and optical phenomena by instruments specially designed by Prof. Tait; and inquiries as to the best modes of conducting the observations under the special difficulties presented by the climate of Ben Nevis.

All the hourly observations will be extended on a daily sheet, three copies of which will be made, one for the Observatory, and two for the Scottish Meteorological Society, one of which will be sent to the Scottish Meteorological Council, London. Forms have also been supplied for monthly summaries of the observations. It has further been arranged that a series of similar observations at 8 and 9 a.m. and 2, 6, 9, and 10 p.m. be made at Fort William by Mr. Colin Livingstone, one of the Scottish Meteorological Society's observers.

A Redier's continuously-recording barograph and a Richard's continuously-recording thermograph have been supplied to the Observatory, and also to Mr. Livingstone, to be used as interpellation instruments. By the double set of hourly observations thus obtained, comparisons may be made between the atmospheric conditions on the top of the Ben and those at sea-level, which are of such

vital importance in the larger questions of meteorology. It may be noted here that it was found necessary to take the barometer, which had been for upwards of two years exposed in the cairn to the severe weather of the Ben, to Edinburgh to be thoroughly overhauled. It has since been conveyed to its permanent place in the Observatory, and is in excellent order. The full equipment of the Observatory is delayed till next summer, when the directors will have before them Mr. Buchan's report on the instruments in use at the different European meteorological observatories he visited in the autumn, the work of the Observatory during the next eight months, and the results of Mr. Omond's investigations into different methods of observing on Ben Nevis.

#### NOTES

WE deeply regret to announce the death of Sir William Siemens on Monday night, at the age of sixty years. His death is attributed to rupture of the heart, the result of a fall which he sustained a fortnight since. We must defer to next week a detailed notice of Sir William's career and work.

It is proposed to acquire for the Cambridge Museum of Comparative Anatomy the beautiful collection illustrating the fauna of the Bay of Naples, which Dr. Dohrn exhibited at the International Fisheries Exhibition. The cost will be only 80*l.*, little over that of the glass jars and the alcohol in which the animals are preserved.

LIEUT. WISSMANN, the African traveller, has just left Hamburg again on another three years' exploration in the Congo region. He has undertaken to furnish the Royal Museum at Berlin with all the natural history specimens which he may collect during his travels, and has even been prevailed upon by some anthropologists to take plaster casts of all the races he may come in contact with.

THE widow of the late Mr. John Elder, of Glasgow, has given the munificent sum of 12,500*l.* to the University of Glasgow for the purpose of endowing a chair of naval architecture.

WE regret to learn of the death of Mr. James Stewart, C.E., who has done so much for the exploration of the region around Lake Nyassa. At the time of his death he was engaged in the formation of a road between Lakes Nyassa and Tanganyika.

DR. HECTOR, F.R.S., stated at a recent meeting of the Wellington (N.Z.) Philosophical Society, that his two self-registering barometers had shown a remarkable up and down vibration on the revolving drum upon which the record is marked on dates corresponding with those of the Sunda earthquake, and a severe earthquake twenty-six hours afterwards, which was felt all along the northern coast of Australia. This agitation was quite distinct from those caused by ordinary atmospheric influences. He attributed the curious tidal disturbances which occurred on the New Zealand coast in August to those earthquakes.

In a letter from Maranhao, Brazil, the writer states that from August 31 up to September 6, the sun, until 7 a.m., could be looked at without the least difficulty, its light being as soft and pale as the moon's.

AT its meeting, October 27, *Science* states, the Philosophical Society of Washington listened to a communication by Dr. T. N. Gill on the ichthyological results of the voyage of the *Albatross*, and to one by Prof. A. Graham Bell on fallacies concerning the deaf. Dr. Gill described two anomalous fishes, one of which required the institution of a new order.

HERR JACOBSON, who has spent four years on the north-west coast of America in making ethnological collections for the Berlin

Museum, has recently returned, and will sail for Europe. Dr. Leonhard Stejneger has arrived in San Francisco, *en route* for Washington. He has spent a year in Behring Island in the study of its fauna, and in collecting remains of the extinct Arctic sea-cow.

AT the recent meeting of the American Association, Mr. C. V. Riley read a paper on "Some recent discoveries in reference to Phylloxera." Every new fact, he said, in the life-history of the insects of this genus has an exceptional interest, because of its bearing on the destructive grape-vine Phylloxera. The genus is most largely represented in this country by a number of gall-making species on our different hickories, and the full annual life-cycle of none of them has hitherto been traced. The galls are produced, for the most part, in early spring; the winged females issue therefrom in early summer; and thence forth, for the remainder of the year, the whereabouts of the insect has been a mystery. The author has for several years endeavoured to solve this mystery, and at last the stem-mother (the founder of the gall), the winged agamic females (issue of the stem-mother), the eggs (of two sizes) from these winged females, the sexed individuals from these eggs, and the single impregnated egg from the true female, have been traced in several species. There is some evidence, though not yet absolutely conclusive, that this impregnated egg hatches exceptionally the same season; also, of a summer root-inhabiting life. In *Phylloxera spinosa*, which forms a large roseate somewhat spinous gall on *Carya alba*, and which has been most closely studied, the impregnated egg is laid in all sorts of crevices upon the twigs and bark and in the old galls, in which last case they fall to the ground. Up to this time they have remained unhatched, and will in all probability not hatch till next spring, thus corresponding to the "winter egg" of the grape Phylloxera.

THE *Times* Calcutta Correspondent, in speaking of the possibility of opening up Thibet to Indian trade by way of Darjeeling, states that the Prime Minister of the Lama at Shigatze, said to be a most intelligent man, sent recently to Darjeeling for a supply of English books, photographic and other scientific apparatus.

THE piercing of the Arlberg Tunnel was unexpectedly completed on Tuesday afternoon last week. In length the new tunnel ranks third among the great tunnels of the world, its length being 10,270 metres, while the Mont Cenis Tunnel is 12,323, and the St. Gothard 14,900 metres. But while the excavation of the first lasted no less than fourteen years and a half, and that of the second about eight, the Arlberg Tunnel will have taken, when vaulted and ready to receive the first locomotive, not more than four years, thanks to the experience acquired during the construction of the first two Alpine tunnels, and to some innovations which constitute another important step in the art of engineering required for the construction of large tunnels. The engineers of the St. Gothard Tunnel introduced dynamite for blowing up the rock, already pierced through by the boring machine, which useful tool was naturally not disregarded in the construction of the new tunnel. It was also only natural that the Ferroux percussion boring machine, first introduced at the Mont Cenis works, should be again employed, under the supervision of the inventor himself, who in the meantime had considerably improved his powerful boring instrument; but this time the Brandt turning borer, first employed at the works of the St. Gothard, was allowed to compete with the Ferroux percussion borer, the former being used in boring on the tunnel's western side, and the latter on the eastern. To this end, several streams from the heights of the snow-covered Arlberg were gathered on the eastern side into reservoirs, from which two turbines and three water columns were directed to the machines, which compressed the air to five atmospheres, with