

SCIENTIFIC NEWS.

THE ARCTIC EXPEDITION.—It is reported from Malta that Captain H. E. Feilden, Paymaster of the 12th Brigade, Royal Artillery, serving in that garrison, and author of "The Birds of the Faroe Islands," &c., has been selected by the Royal Society to proceed as naturalist with the forthcoming Arctic expedition. The plan of the Arctic expedition will be as follows:—Two ships are to proceed to the entrance of Smith's Sound this year. One will stay there and set to work, establishing depots northwards, and the other will sail northwards, and, when stopped by ice, or when arrived at the farthest point from which it seems practicable to keep up communications with its consort, will, in the same spider-like fashion, begin stretching out a line of depots northwards. This will be the work of the autumn and winter of 1875, and in 1876 the advanced ship will send out a sledging expedition towards the Pole, which, instead of carrying all its commissariat along with it, will find much of it *caché* in the depots of the previous year.

PAPER FROM PEAT.—M. Bertmeyer has recently exhibited, in the Polytechnic Society of Berlin, specimens of paper and pasteboard obtained from the products of the peat beds about Königsberg, the quality of which is said to be excellent. The pasteboard was 2.4 inches thick, and sufficiently hard and solid to admit of polishing. The paper made from peat alone was brittle, like that manufactured from straw, but the addition of fifteen per cent. of rags produced the requisite toughness.

DIMENSIONS OF THE EARTH.—Two German scientific men, Messrs. Behm & Wagner, have recently published the results of some very accurate measurements that they have made respecting the dimensions of the earth. From these it appears that the length of the polar axis is 12,712,135 metres, that of the minimum equatorial diameter which is situated 103 deg. 14 min. east of the meridian of Paris, or 76 deg. 46 min. west, is 12,752,701 metres, whilst the maximum diameter at 13 deg. 14 min. east, and 166 deg. 45 west, is 12,756,588 metres. They estimate the total surface of the globe at 509,340,000 square kilometres, whilst its volume is equal to 1,082,460,000,000 cubic kilometres. The circumference of the globe on its shortest meridian is 40,000,038 metres, whilst that of the longest is 40,662,003 metres. The oceans and glaciers occupy 375,127,250 square kilometres. The total number of inhabitants of the earth is estimated at 1,391,000,000, viz., 300,530,000 in Europe, 708,000,000 in Asia, 203,300,000 in Africa, whilst the population of America is 84,512,000, and that of Oceania 4,438,000. The population of the towns and cities exceeding 50,000 inhabitants is 60,378,500, or about one-twentieth part of the total population of the globe, leaving nineteen-twentieths of the inhabitants for the villages and smaller towns.

M. P. TREVOR states that glass vessels in which various liquids, and even pure water, are boiled give up by degrees a small quantity of their substance, silica, potash, soda, and lime. The analysis is the more erroneous the longer the boiling is kept up. This, at least, is what results from the use of glasses brought from Germany, and sold at Nancy in 1873 and 1874. This fact may be shown by boiling in a flask pure water mixed with a tincture of red cabbage or sirup of violets, slightly reddened by an acid. After boiling for a few minutes, the liquid turns green. French glasses, with a base of soda, are not sensibly attacked, and therefore do not offer this inconvenience.

The physical influence of the solar forces in exciting life in general has of late years attracted much attention. M. de Candolle has especially selected as an illustration of this, some observations recently recorded by Prof. Von Heldreich, of Athens, which seem to show that certain seeds may germinate after having lain dormant in the ground for at least fifteen hundred years. A species of *Glacium*, one of the poppy color, has sprung up in localities which have been covered with a great thickness of old slags from the smelting works in which the silver ores from the Laurium mines were reduced, these slags being re-worked for the sake of the metal which they still retain. It is known that the accumulation of slags cannot be less than fifteen hundred and may be as much as two thousand years old. The plant appears to be a new species—if, indeed, anything can be called "new" which was known fifteen centuries ago—and has received the distinctive name of *G. Serpieri*. These observations, says the *Illustration*, go to prove the correctness of Lavoisier's statement, that organisation and life are directly dependent on light.

PROFESSOR William North Rice, of Middletown, Conn., states that among the most interesting results of his experiments was the observation that certain poisons, which act with extreme violence upon the mammalia, are very feeble in their action on mollusca. This is especially true of hydrocyanic acid and woorara. Specimens of *Ulyanassa obscura*, immersed in dilute hydrocyanic acid on Friday, showed somewhat feeble signs of life on the following Tuesday. A specimen of *Lamna borealis*, into which a quantity of woorara had been injected, was found the next day to show no sign of any injury. Indeed, both of these poisons seemed to produce death very little sooner than the animals would have died in stale water. The sudden introduction of a large amount of carbonic acid in the manner which has been described, seemed to produce no decided effect. On the other hand, chloral hydrate seems to be very suddenly fatal, the animals treated with it becoming instantly contracted, and not resuming their activity when kept for a number of hours in sea water. Cyanide of potassium is similar in its effects, though not quite so instantaneously fatal. The effects of quinine are similar; though less energetic. Chloroform produces instantaneous contraction, and probably death.

M. TELLIER suggests the use of sulphur as a means of extinguishing fire on board ship. The material when burning in the air, as is well known, generates sulphurous acid, in which flame is not sustained. M. Tellier proposes to cover wicks with the sulphur, and to let them down into the burning portion of the vessel, through holes in the decks. Sixty-six pounds of sulphur ignited will entirely absorb the oxygen in 3,350 cubic feet of air; but as only half the oxygen need be removed in order to render the atmosphere unfit to support the combustion, thirty-three pounds are sufficient for the volume mentioned.

A RECENT French process consists in obtaining sugar from molasses by the addition to the latter of certain salts which provoke crystallisation. The plan is to add to spent molasses—containing, say, fifty per cent. of sugar, fifteen per cent. of salts, and twenty per cent. of water, crystallised sulphate of magnesia in the proportion of twenty per cent. by weight, together with a little water, to make a solution of the sulphate marking ten degrees Beaume. The whole is then subjected to centrifugal action in a machine having either perforated sides or very fine wire cloth. The sulphates of lime and potash precipitated are retained, and the liquor is then filtered through charcoal, and boiled *in vacuo*. After cooling, a certain quantity of powdered sugar is added to form nuclei, and the syrup is lastly subjected to the ordinary temperature of fillings, the heat being alternately raised and lowered. After a few days crystallisation becomes exceedingly abundant, and continues to increase for some time, after which the hydro-extractor is employed. The crystallisation of the sugar results from elimination of the potash, the salts of which are prejudicial, its place being taken by the magnesia, whose salts are favourable.

The Cariboo Sentinel of the 9th of January contains the following mining intelligence.—All the claims on Williams Creek have been obliged to stop work on account of the cold weather. The claims above the Cariboo are now dry, and the bed-rock drain will be cleaned out next week. At Lightning Creek the Van Winkle Company washed up 256 oz. last week, and 110 oz. on Wednesday. Victoria Company 190 oz. last week, only worked part of two days. Vancouver Company 326 oz. last week, and 140 oz. on Wednesday. Vulcan Company prospecting on both sides of their main drive, and running ahead. Costello, Gladstone Companies are unable to work to advantage, on account of scarcity of water.

THE HUDSON RIVER BRIDGE AT ALBANY.—The immense traffic which passes over this bridge may be learned from the following item:—Every day of the year 700 passenger and freight cars pass over the bridge into this State. Every passenger of the hundreds on the trains has to pay five cents toll, and every ton of merchandise has to contribute to the revenues of the Bridge Company. Every barrel of flour is assessed four cents, and every car of coal or lumber is levied on to the extent of \$5, and each car-load of cattle or sheep has also to pay toll. The bridge earns \$1,500,000 per year, and paid for itself in a year and a half.

CAPTAIN Lull, who is surveying the route for a canal along the line of the Panama Railroad, finds the result more favourable than was expected, and has discovered a lower summit level than that of the railroad, which is 202 feet.