

THURSDAY, DECEMBER 19, 1872

ARCTIC EXPLORATION

IT is now upwards of twenty-five years since the British Government sent out any expedition to those little known northern regions, the exploration of which has won so much glory to the British navy, formed such a splendid and peaceful sphere for the training of our sailors, and been so fruitful in the highest results to Science. Since that time, and especially during the last few years, every important civilised power in the world, except Britain, has been doing what it could to advance the interests of Science, which are coincident with the highest interests of humanity, by sending out expedition after expedition to force from the Arctic Regions the wonderful secrets which they have so long held in their icy grip. What has been done by other nations has been sufficiently detailed from time to time in these pages, and the knowledge thus gained cannot but be of the greatest service to any deliberately organised expedition which this country may send out.

About seven years ago the Geographical Society tried to move the Government to take action in the matter, and to fit out an Arctic expedition; but Government excused itself then on account of the want of agreement among geographers as to the most favourable route to be followed. Since then there has been much discussion on this point, and the results of recent expeditions have led to almost entire unanimity among those best able to judge as to the route which is most likely to be in every way attended with successful results. Therefore the distinguished deputation which on Monday waited upon the Chancellor of the Exchequer and Mr. Goschen was not one got up in hot haste as the result of some temporary excitement, but was the culmination of long discussion and deliberation founded on many years' accumulation of pertinent and valuable facts. The deputation was the bearer not merely of the desires and convictions of the distinguished scientific societies whom it represented. Arctic exploration has in this country ever been popular with all classes, and to judge from the earnest and enthusiastic tone in which most of our leading newspapers speak of the objects of the deputation, the public mind is as strongly set as ever on seeing that work completed which for so long has engaged the energies of some of the greatest names on the roll of the British navy.

That the Government will forthwith respond favourably to the universal desire, when this has been so clearly, fully, ably, and unanimously brought before it by our most distinguished learned societies, we think there cannot be any doubt. What Government will do when reputable men of science come before it with a well-defined and important object has been shown in the expedition, so liberally fitted out, which has just left our shores on board H.M.S. *Challenger*. Indeed, we believe that Government would long ago have done something towards Arctic exploration had the matter been brought before it as powerfully and definitely as it was on Monday.

As was well urged by the deputation, without such an Arctic expedition as is wanted, the work which it is sought to accomplish by the *Challenger* must remain incomplete; the work set before that ship is of magnitude sufficient to engage it during all the time it will be abroad; and if Government is really in earnest in advancing the interests of science by marine exploration, it cannot choose but fit out an Arctic expedition as the indispensable complement to that which is about to explore the middle and southern latitudes of the globe. The answer that was given by the Chancellor was all that was asked, and all that we could expect; and it seems to us that if he and his colleagues do what he has promised—"carefully consider the matter, and read over the papers" laid before them—they can only form one opinion. We only hope that all sections of the Press—as the mouthpiece of all the various classes of the people—will say very unmistakably what is the conclusion that all intelligent subjects of Her Majesty desire their purse-keeper, Mr. Lowe, and his colleagues to come to. If this and all other legitimate influences are used, and if Government treats the subject justly, and without prejudice, we have no doubt that by next May the resumption of Arctic exploration by this country will be a thing accomplished.

The deputation, headed by Sir Henry Rawlinson, represented the Royal Society, the Royal Geographical Society, the Geological Society, the Linnean Society, the Anthropological Institute, the Scottish Meteorological Society, and the Meteorological Office in London. Each of these bodies, in response to a letter from the Geographical Society, sent in papers showing the important objects to be gained from its own point of view, by a well-organised Arctic expedition. These papers, with the statements of the Geographical Society, maps, &c., were laid before the Government by Sir H. Rawlinson, and it is after the consideration of these that Mr. Lowe has promised to give his opinion. It is only needful here to state very briefly the points brought before Mr. Lowe and Mr. Goschen by the deputation.

Arctic authorities are now almost unanimous that the best route for an expedition to follow is up the west coast of Greenland to Baffin's Bay and Smith's Sound, one reason being that in this direction facilities are offered, in case of disaster, for retreat to the Danish settlements; besides, in this direction the most varied and most valuable scientific results may be obtained, and all seem agreed that this is the route along which the extreme north is most likely to be reached. The deputation thought that nothing better could be got in which to convey the expedition, than two strongly-built and thoroughly-strengthened Dundee screw-whalers of from 200 to 300 tons each, and each having a Government crew of 60 men and officers. These should start next May, and should be equipped and provisioned to carry on their work for three summers and two winters. One of these vessels it is proposed to station at some distance within the entrance of Smith's Sound, while the other would advance as far as possible to the northward, preserving communication with the dépôt vessel. From the point reached by the other, sledge parties would start in the early spring and explore the unknown region in various directions. By this means a wide extent of coast-line

would be discovered, and a safe return would be ensured ; for the advanced parties would be able to fall back upon their consort, whence, in case of accident, the whole expedition could retreat to the Danish settlements in Greenland.

The direct advantages offered by this route are, the discovery of the northern side of Greenland, and the prospects of securing the most valuable results in the various branches of scientific research,—in geography, hydrography, botany, zoology, ethnology, geology, geodesy, and meteorology : but all the advantages to science cannot possibly be foreseen. Among the possible results enumerated by the Geographical Society are these :— Completing the circle of Greenland, ascertaining the extent and nature of its northern point, and discovering the conditions of land and sea in that area ; supplementing the investigations of the *Challenger* expedition as to the bottom of the ocean ; the probability of forest vegetation, proved to have flourished on what is now the Greenland coast, having extended over the Pole itself, thus confounding all previous geological reasoning as to the climate and conditions of the globe during the Tertiary period ; a more complete knowledge of the teeming life of the Arctic Ocean ; a knowledge of the customs and mode of life of the supposed dwellers in the unknown area, of whose former existence there is proof, who have no communication with the most northern known people, and who have probably been isolated for centuries ; a knowledge of the kinds of microscopic vegetation inhabiting the northern Greenland seas, which would throw great light on investigation into the age of the rocks of our own island, and on the later changes of the climate of the northern hemisphere, besides the geological results, in rocks and fossils, and the observations on glacial action, which would be yielded by the examination of a long coast line ; observations of the pendulum and of the dip and intensity of the needle ; and observations as to temperature, pressure, winds, and currents. These manifold advantages, of the highest importance—in spite of the vague Philistine tirade of the *Times*—are confirmed and supplemented by the documents of the other societies.

As to the element of danger, it is clearly shown in the Linnean Society's paper that, as compared with explorations in Africa, Australia, and elsewhere, Polar voyages, North and South, show a comparative immunity from loss and hardship ; and during the last few years experience has been so fruitful in her teachings, that the element of discomfort and danger may now be reduced to a minimum. The Geographical Society concludes its documents by adding to the other advantages that another generation of naval officers will be trained in ice navigation,—and they will be needed in 1882,—that opportunities will be offered for distinction, and that a great benefit will be conferred on the Navy, and through the Navy on the country. The belief is expressed that all classes of the people will unite with men of science in the desire that the tradition of Arctic discovery should be preserved and handed down to posterity, and that Englishmen should not abandon that career of noble adventure which has done so much to form the national character, and to give our country the rank she still maintains.

All this is irresistible.

FORESTRY IN ITS ECONOMICAL BEARINGS

TO what extent the climate of any portion of the surface of the earth can be changed by human labour is still an open question. Certain districts of the globe we are accustomed to look upon as condemned by Nature to perpetual sterility. The arid deserts of Africa and Central Asia, the frozen realms of Siberia, appear as if predestined to a gloomy lifeless solitude. To reclaim them to human control and human habitation may be one of the problems of the future. That climates have changed materially within recent times, we know as a historic fact. Macaulay has made us familiar with the damp fogs and perpetual rain-clouds with which our island was invested during the period preceding the arrival of the Danes and the Saxons. Much of the amelioration of climate which has since taken place is doubtless due to the increased cultivation of the land, and the extent to which the fen-districts have been drained ; but the main agent has probably been the destruction of the forests which then clothed a large portion of the island.

The mode in which forests act in increasing the amount of moisture in the atmosphere is much misunderstood. Even in an article which recently appeared in the pages of so well-informed a journal as the *Pall Mall Gazette*, it is affirmed that this effect is due to the attraction exercised by the trees on the rain-clouds. The principle by which trees act in effecting this is, however, at least mainly, by acting as pumps in drawing up the superfluous moisture from the soil. The most trustworthy experiments show that, under normal circumstances, plants have no power of absorbing through their leaves water, either in the fluid or gaseous state ; their supplies are obtained entirely through their roots ; and the superfluous moisture is evaporated from the leaves. The amount of aqueous vapour thus delivered into the atmosphere by vegetation is enormous, and has been the subject of careful investigations by French and German botanists. Von Pettenkofer recently detailed* some experiments on the amount of evaporation from an oak tree, made during the whole period of its summer growth. He found the amount gradually to increase from May to July, and then decrease till October. The number of leaves on the tree he estimates at 751,592, and the total amount of evaporation in the year at 539'16 centimetres of water. The average depth of rainfall for the same period on the area covered by the oak tree would be only 65 centimetres ; the amount of evaporation is thus 8½ times more than that of the rainfall. The excess must be drawn up by the roots from a great depth ; and thus trees prevent the gradual drying of a climate, by restoring to the air the moisture which would otherwise be carried to the sea by streams and rivers.

The immediate result, therefore, of the diminution of forests in a thickly-wooded country will be to increase the proportion of the annual rainfall that is carried to the sea by the natural drainage of the country, and proportionately to decrease the amount returned insensibly to the atmosphere, which then condenses into rain and cloud. Within certain limits it is obvious that this must be an unmixed good ; but as the country becomes more and more thickly populated, and the land more

* Sitzungsberichte der k. bayerischen Akademie der Wissenschaften zu München, 1870, Band 1, Heft 1.