

variety in the vegetation; mangroves monopolise all available space." The stagnant waters he describes as covered with a brownish green slime, disturbed occasionally by an alligator.

"Some spots were literally crowded with numerous varieties of ducks and teal. . . . Their cackling would often alarm a company of huge white cranes, quietly congregated on a sandbank. . . .

"On the floating islands, proud storks and sedate melancholy herons were engaged in catching and consuming their breakfast, whilst every nook of the mangrove thickets, every shallow in the lake, every log of wood on the water, was tenanted by all manner of birds, including alike the busy wagtail, the grandfatherly pelican, and the stately flamingo. As we cut the placid waters, a brace of neat sand-pipers or a swift kingfisher, scared by the snort of the engine, would suddenly emerge from the margin of the channel, and, darting ahead, be again frightened into the air almost before they had settled.

"Soaring in graceful circles far overhead, a variety of hawks view the scene from aloft, ready to pounce upon whatever appears an easy prey; whilst thousands of dark-blue glittering swallows hurry from island to island, feeding plentifully on the myriads of insects that hover above the water."

The vegetation near Colima is thus described:—

"The trees are not large, but are so interwoven as to form impassable barriers, even apart from the bushes and shrubs that spring from every spot of vacant ground. Hundreds of creepers cling to every trunk, and twine round every branch, connecting by a thousand wiry threads, thickets, shrubs, and cacti—a massive bulwark of profuse vegetation, through which the axe alone can hew a way. The huge *Organo* cactus, with its tree-like stem, often 2 ft. in diameter, and 10 ft. to 15 ft. high, sends up its stiff, straight branches to a height of 30 ft. or 40 ft. from the ground, whilst the smaller species mingle in thousands with the shrubs and bushes nearer the earth. Wherever the creepers may have neglected trunk or bough, prolific parasites, gay alike with taper leaf and gorgeous blossom, hasten to perform their part in this fairy work of nature. The flowers have little scent, but their profusion of white, yellow, and red, blended with the countless shades of green, charm the eye with tints as various as they are magnificent."

Beyond the fact of mentioning lava near Colima, Mr. Geiger has made no attempt to give any geological information, and the principal physical feature noticed is that the country is much broken up by *barrancas*, narrow ravines, which sadly interfere with the making of straight roads. The book is full of interesting information about social life.

Les Roses:—Histoire; Culture; Description. Par Hippolyte Jamain et Eugène Forney; préface par Ch. Naudin. 60 chromolithographies d'après nature, par Grobon. 2^{me} édition. (Paris: J. Rothschild.)

LIKE so many of our garden-flowers, the history of most of our cultivated varieties of the rose is involved in obscurity. A few species, as *Rosa centifolia* (the Cabbage Rose), *gallica*, *damascena* (the Damask Rose), *moschata* (the Moss Rose), *lutea* (the Yellow Rose), have retained their distinguishing characters; but the majority of the florist's flowers are the result of hybridisation or variation, in which all trace of their nativity is lost. The same is the case also in Western Asia, the rose which yields the famous attar of roses being of very doubtful origin, probably a form of *R. damascena*. In the work before us we have a history of the cultivation of the rose, followed by a description of the various species and varieties, with their geographical distribution; an account of the various modes of cultivation; and a history of the diseases and insect enemies to which it is liable—all embellished with very beautifully executed woodcuts. The greater part of

this handsome volume is occupied by sixty chromolithographs of well-known roses, which are triumphs of the engraver's art. The colours are so truthful, and the execution so clear and brilliant, that even in engravings coloured by hand you could scarcely obtain more accurate or beautiful illustrations. The volume is one that deserves a place on every drawing-room table.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

Dr. Petermann's Letters to the Presidents of the Royal Geographical Society in 1865 and 1874

THE letter from Dr. Petermann to the President of the Royal Geographical Society, dated Nov. 7, 1874,* refers to what took place ten years ago, and to the two letters which he then addressed to Sir Roderick Murchison on the subject of arctic exploration, a subject on which he then, as now, assumed for himself the right of speaking as an authority. There are many geographers who feel very strongly that Dr. Petermann did great injury to the cause of arctic discovery in 1865, and it seems desirable that as he has again put himself forward as an authority, his pretensions to that character should be examined.

Captain (now Admiral) Sherard Osborn read an exhaustive paper before the Royal Geographical Society on Jan. 22, 1865, in which he advocated a renewal of arctic exploration by the route of Smith Sound. The long series of voyages in the direction of Spitzbergen had proved, by a process of induction, that the Smith Sound route was the one that should be followed; while the development, during the Franklin searches, of that system of sledge travelling with which the name of M'Clintock is associated, caused a revolution in the method of exploring, and must be looked upon in the light of a discovery. From that time it has been known that land must be the basis of polar exploration, that a real advance can only be made by following the land-ice, and that sending ships into the drifting packs between Greenland and Novaya Zemlya is a useless waste of time and money. Sir George Back, Admiral Collinson, Sir Leopold M'Clintock, Admiral Sherard Osborn, Captain Vesey Hamilton, and other arctic officers practically acquainted with the subject held that view in 1865, and they hold it now. Their opinions were based on practical experience and on the records of former voyages, and nothing has occurred since either to alter or to modify them.

Admiral Osborn's proposal was cordially supported, and there appeared to be good reason to expect that it would be unanimously accepted; when two letters from Dr. Petermann to Sir Roderick Murchison, by causing a useless and barren discussion, had the effect of destroying these fair prospects.

Dr. Petermann has no practical knowledge whatever of the arctic regions. He is famous for having propounded a theory more than twenty years ago, and he has ever since striven to make the obstinate facts fit into it—a hopeless task. So that while he has no actual acquaintance with the polar regions, the exigencies of his theory prevent him from judging of what he reads with an unbiassed mind. It was in January 1852 that the Petermann theory was first given to the world, in the form of a "Plan of Search for Sir John Franklin." The theory is that there is an open sea round the pole, caused by the Gulf Stream, and that it can be reached late in the autumn with perfect ease, by sailing north between Spitzbergen and Novaya Zemlya. He urged that Franklin's ships were beset near the coast of Siberia, and that the way to reach them was by sailing across the polar ocean during the winter.

This is the Petermann theory. It might have been very mischievous in 1852, by diverting the search from the proper direction; but fortunately it was considered absurd, and received little or no attention. Unluckily for the cause of arctic research, Dr. Petermann re-uscitated his theory in a modified form, in his two letters to Sir Roderick Murchison, in which he advocated the Spitzbergen route in 1865.

Dr. Petermann assigned eight reasons for his preference, which are easily disposed of. His first reason was that the voyage from England to the North Pole is shorter by Spitz-

* Published in NATURE, vol. xi. p. 37.

bergen; a matter which may be important to a company wishing to establish a line of packets between the two points, but which has no bearing on the question of exploration. His second reason was that the Spitzbergen seas form the widest openings into the unknown region. This is one of the strongest objections to the route, for the navigation must be conducted in a drifting pack, which is fatal to a successful advance. The third reason is still more remarkable, namely, that the "Spitzbergen seas are more free of ice than any other part of the arctic regions." This assertion is diametrically opposed to the experience of all who have visited those seas. The fourth reason is that "the drift ice north of Spitzbergen offers just as much or as little impediment to navigation as the ice of Baffin's Bay." This statement is made in the face of the fact that a fleet of whalers has annually passed through the ice of Baffin's Bay for the last fifty-six years, while the pack north of Spitzbergen has never once been penetrated. The fifth assertion is that "the sea north of Spitzbergen will never be entirely frozen over, not even in winter, nor covered with solid ice fit for sledge travelling." This is possibly true, and it forms another strong objection to the Spitzbergen route, for these streams and pools of water, while making exploration by sledges impossible, would add to the danger of wintering in the pack. The sixth assertion is that from Sir Edward Parry's furthest point a navigable sea was extending far to the north, and that in $82^{\circ} 45'$ there was a perfectly navigable sea. The assertion is the very reverse of the real fact. Parry, at his extreme point, found the ice thicker and the floes more extensive than any he had previously met with, and there was a strong yellow ice blink always overspreading the northern horizon, denoting field-ice. The seventh assertion is that "the polar region north of Spitzbergen consists of sea and not land." This is the very reason that the Spitzbergen route is the worst that can be selected, land and land-ice being essential to a real advance. The eighth and last reason is that Parry's voyage only took six months. Here is another reason against the example being followed, for a hasty voyage of that kind must fail to secure the scientific results to be obtained from arctic research.

So much for Dr. Petermann's first letter to Sir Roderick Murchison. The only point in the second letter is the argument that there will be no difficulty in boring through the polar ice-fields north of 80° , because Sir James Ross got through the extensive pack in the antarctic regions in lat. 62° S., after it had drifted and become loose for many hundreds of miles over a boundless ocean. The fallacy of this comparison was fully exposed by Admiral Collinson.* That arctic explorer pointed out that the antarctic pack was drifting away from a solid line of immovable grounded ice-cliffs, and of course left open water in its rear, because there was no moving ice further south to take its place. The exact analogy of the voyage of Sir James Ross in the south is that of Scoresby in the north. The antarctic pack, in lat. 75° S., is analogous to the ice met by the whalers in the early spring in 75° to 76° N., through which they can usually pass. The open water north of Spitzbergen is analogous to the open sea found by Ross in the south; and the polar pack which Scoresby found bounding that open water to the north, from whence the ice he had passed through had drifted, is analogous to Ross's line of impenetrable ice barrier.

Dr. Petermann finally asked for any reason, however slight, why it would not be as easy to sail from Spitzbergen to the pole and back as to go up Baffin's Bay to the entrance of Smith Sound. This is a curious instance of the way a preconceived theory destroys the power of seeing the simplest facts. The reason is clear enough, and is well known to all arctic navigators. North of Spitzbergen the sea is encumbered by a drifting pack, through which no ship has ever penetrated. In Baffin's Bay there is land-ice, along which vessels can creep while the pack drifts past. The consequence is, that whereas a fleet of whalers passes up Baffin's Bay every year, no vessel has ever gone far into the pack north of Spitzbergen.

Although these fallacies were completely exposed at the time, the letters containing them caused a barren discussion which gave the appearance of dissension among geographers, and destroyed the previously hopeful prospect of the English Government being induced to consider Capt. Osborn's proposal favourably. Unanimity was essential to success; and thus Dr. Petermann's inopportune letters had the effect of throwing back arctic discovery for ten years.

At the same time the efforts of Capt. Osborn and his fellow

arctic voyagers in 1865 bore some good fruit. His own paper is an important document, which clearly states the true principles of arctic exploration, and has been invaluable for reference. Dr. Hooker prepared a statement of some of the scientific results of an arctic expedition; and Commodore Jansen, of the Dutch Navy, contributed an admirable memoir on the discoveries and proceedings of his countrymen in the Spitzbergen seas.

Having thus seriously injured and retarded the progress of discovery, so far as England was concerned, Dr. Petermann called upon his own countrymen, with some success, to undertake arctic voyages in pursuit of his theory. Two or three such voyages were undertaken. In 1868 the *Germania* made a voyage to Spitzbergen with exactly the same result as had attended the hundreds of voyages which preceded it; and in 1869 another *Germania* followed the track of Capt. Clavering in 1823 to the Pendulum Island, on the east coast of Greenland, adding nothing whatever, so far as navigation is concerned, to our previous knowledge. Capt. Koldewey commanded both these expeditions, and he returned after being fully convinced of the fallacy of Dr. Petermann's theory, and that Smith Sound is the route for effective north polar exploration. It is much to be deplored that these gallant German explorers, who certainly might have done really good work if they had been guided by the practical experience of their predecessors in arctic navigation, should have been made to waste their energies in accordance with a fanciful and baseless theory.

The other arctic work that has been achieved since 1865 was not undertaken under Dr. Petermann's auspices, or to prove his theories; and the results have been much more important. The Swedes have done admirable scientific work in Spitzbergen. The Norwegians, under the auspices of Prof. Mohn, of Christiania, have circumnavigated Spitzbergen and Novaya Zemlya, and revisited Wyche's Island in 79° N., which was discovered by an English ship in 1617. Capt. Hall sailed far up Smith Sound, proving the accuracy of Admiral Osborn's views; and lastly, Lieut. Payer and Capt. Weyprecht discovered the extensive region between Spitzbergen and Novaya Zemlya, and proved the utter fallacy of Dr. Petermann's theory, which he propounded in 1852, and has since so persistently adhered to. The ice drifted with the wind, and there was no sign either of a warm current or of a navigable polar basin.

In 1872 Admiral Sherard Osborn read his second paper, again urging the renewal by England of arctic exploration by the route of Smith Sound, with the west coast of Greenland as a base. Fortunately, complete unanimity was secured, and, thanks to the tact, judgment, and perseverance of two successive Presidents of the Geographical Society—Sir Bartle Frere and Sir Henry Rawlinson—the Government has resolved to fit out a naval arctic expedition of discovery to proceed by way of Smith Sound. Success has thus at length crowned the efforts of the Society, and baseless theories have had to give place to the experience of practical men.

Yet we have been again visited by a long letter from Dr. Petermann, which, however, did not arrive until the question was settled. Its precise object is, therefore, not very apparent; but, remembering the injury done by the two previous letters in 1865, it is certainly incumbent on those who have, after much labour and watchfulness, reached the goal, to defend the ground which has been gained, even when the old opponent has become apparently harmless.

In his third letter Dr. Petermann begins by the assertion that actual exploration since 1865 has proved that there is "greater navigability in all parts of the arctic seas than was formerly supposed to exist." There is really no ground for this assertion. Our knowledge of the arctic seas previous to 1865 has not been increased to any material extent, and the amount of navigability in those seas was as well known before that date as it has become since. The voyage of Capt. Hall, satisfactory as it is, merely proved that practical arctic men were right, and that the theorists were wrong; and although it is very generous of Dr. Petermann to withdraw his opposition to the Smith Sound route, he must surely be aware that the time has now passed when that opposition would have any effect. If the voyages since 1865 have not added much to previous knowledge, they have at least had the effect of disproving a theory which has done more than anything else to retard discovery.

Most of Dr. Petermann's letter consists of a recapitulation of the work accomplished by the Norwegians on the coast of Novaya Zemlya, and by other recent voyagers, the point of which is not apparent; and of an attempt to make out that Payer and Weyprecht were not the discoverers of Franz-Joseph

* Royal Geographical Society's Proceedings, ix, p. 118.

Land, but that it was visited previously by Baffin and by Cornelis Roule. His arguments are not at all borne out by the authorities to which he refers. Nor will the British Government be guided by any proposals not originating from those experienced arctic officers upon whose advice they rely, so that Dr. Petermann's suggestions about sending one steamer to the west coast and another to the east coast of Greenland might have been spared.

English geographers have always fully recognised the valuable services of Dr. Petermann as a cartographer, and the important and useful work he has long done in collecting and disseminating geographical information. But at the same time it cannot be forgotten that his persistent adherence to an indefensible theory has retarded discovery, and that in 1865 his inopportune interference had a most injurious effect upon the prospects of arctic exploration from this country. That danger is at last overcome, but those who have borne the heat and burden of the day, cannot but protest against Dr. Petermann's present assumption of the position of an arctic authority and adviser.

Nov. 22

CLEMENTS R. MARKHAM

The Present State of the Arctic Ice Barriers

IN a letter from Capt. David Gray, quoted by Dr. Petermann (*NATURE*, vol. xi. p. 39), some very interesting observations on the arctic drift ice of this year's summer are recorded, which Capt. Gray regards as justifying the conclusion that "nearly the whole of the ice was driven out of the arctic basin last summer."

Capt. Gray's observations appear to be limited to the coast of Greenland. If corresponding phenomena were presented in other and distant parts of the Arctic Ocean, they must afford strong confirmation of his conclusion. I have lately returned from a summer visit to Arctic Norway, having sailed round the North Cape and into the Varanger Fjord, stopping a few days at Tromsø and halting at Hammerfest, Vardø, Vadsø, and other arctic stations, and I was much surprised at the curious difference between the climate I found there this summer and that which I previously experienced at the same season.

The following extract describes the temperature between Tromsø and Hammerfest during my first visit in July 1856:—"The weather was excessively hot. During the hottest part of the day the thermometer stood at 77° in the cabin, at 92° in the smoking saloon—a little cabin built on deck—and 108° in the sun: on shore, in the valleys, it must doubtless have been much hotter. The contrast of this glaring Italian, or I might almost say Brazilian sky, with the snow-clad rocks and glaciers dipping almost to the sea-edge, is very striking. It was a continual source of wonderment; one of the few scenes which one does not become accustomed to, but retains its novelty day after day." Such was the prevailing weather during the summer of 1856, and such is the usual summer weather of Arctic Norway from the beginning of July until a week or two after the disappearance of the midnight sun. This year it was miserably different, to the great disappointment of the ladies I ventured to pilot thus far, and vexation to myself. The contrast was strikingly shown in the course of a walk up the Tromsødalen. This summer I made two excursions up this valley with a fortnight's interval. On both occasions the lower part of the valley was a mud swamp from recent snow-thaw. In 1856, three weeks earlier in the season than my second visit this year, the snow water had evaporated, leaving the path hard and dry. In 1856, the poor little Lapps were outside their huts, gasping with heat and varnished with oily perspiration; their huts were so insufferably hot that only one or two out of a party of seven or eight male travellers dared to venture inside. This year, the ladies, as well as myself, were glad to warm ourselves by sitting round the hut fire upon the boulders that serve as chairs. Drizzling rain and cold mists replaced the oppressive heat, the brilliant sky, and rainless summer-time of 1856.

The Duke of Roxburgh, who has spent sixteen summers in Arctic Norway (he has the Alten salmon river opening in lat. 70°), told me that the low temperature and drizzling mistiness of this summer was quite exceptional to his experience; that the summer of 1868, which was memorably cold, was not so bad as this. The usual crops of rye and potatoes were expected to fail completely this summer.

This unusual summer is the more remarkable when compared with that of England, which, judging by the abundance of the wheat crop, must at least have reached, if not exceeded, the average of mean warmth. The exceptional arctic summer must

have been due to some exceptional arctic influence. The southward drifting of large quantities of polar ice, and consequent removal of some of the barriers that stand between us and the north pole, will account for what I have described, provided the loosened ice was sufficient in quantity and eastward extension.

The North Cape, though in lat. 71°, is not visited by icebergs; the sea there, and for some distance further north, is sufficiently warmed by the Gulf Stream to remain quite open all the year through. The free northward exposure must, however, render this part of the Arctic Ocean very susceptible to the cooling influence of an unusual southward drift of polar ice, and the peculiarities of this year's summer were exactly those which such an abnormal cooling of the sea would produce. These were evidently exaggerated over the open sea a little further north. During the few fine days we had while going round the island of Magerø, the sun was visible until about 11 or 11.30 P.M., but on approaching the north horizon it dipped into a mist-bank which hung with apparent permanency over the northernmost and most distant part of the sea. As we were desirous of seeing the actual orb of the sun quite at midnight, this repeated disappearance just at the critical time was of course especially noted. I afterwards learned that on these same nights, when the midnight sun thus played at hide-and-seek with us over the Arctic Ocean, it was clearly seen by spectators further south, who had a land or near coast horizon.

These facts, in conjunction with "the important information" given by Capt. Gray, justify us, I think, in looking forward very hopefully for important results from the proposed Arctic Expedition, and afford strong reasons for avoiding any possible source of delay that might stand in the way of an early start to make full use of next summer.

W. MATTIEU WILLIAMS

Zoological Gardens, Regent's Park

I MUST trouble you with a few words in reply to your correspondents "Viator" and Mr. C. Traill (vol. xi. p. 67.)

It is quite true that our gardens in the Regent's Park are "too small in area." We have for many years endeavoured to get them enlarged; but all we have succeeded in obtaining is the slip of land on the north side of the Regent's Canal, where the new North Entrance has been made. If "Viator" has any influence with the First Commissioner of Works, and can persuade him to grant us a further extension on the south side, we shall be truly grateful.

I admit also that the larger carnivora are at present badly housed, and that their dens are much too confined. This, however, will, I trust, be remedied by the erection of the new Lions' House, which will be commenced early next year.

The plan of establishing a second Garden for breeding purposes out of London was adopted by the Council some years ago, but was not found to answer. It has, however, many advantages, and may be again tried when our funds shall permit of it.

"Viator" finds great fault with our drainage. He cannot be aware that the Sanitary Authorities of the district, who have been much exercised in this matter, have pronounced us free from all blame.

Finally, I may say, without any wish to disparage the continental gardens (with all of which I am well acquainted), that none of them can vie with those of this Society in the extent, variety, and completeness of its living collection, or in the rarity of many of the objects exhibited. That this collection is appreciated by the public is fully evident from the yearly increasing number of visitors and the continual augmentation of the list of members.

As regards the remarks of Mr. Traill, I have to observe that the Society's "Proceedings" contain several papers by the Secretaries and Superintendents of the Gardens relating to points in the economy of the animals in them; and that the Prosector (whose office was created mainly with the hope of utilising the collection more completely in a scientific point of view) has lately devoted considerable attention to this subject, on which he will, no doubt, ultimately give us the benefit of his observations.

Dec. 1

P. L. SCLATER

Utilisation of Aquaria

I SHALL be glad if you will allow me to use your columns as a medium of inquiry with regard to the Brighton and Manchester Aquaria. Are there any arrangements in force already, or contemplated, whereby these fine institutions can be utilised for the promotion of zoological research? If I am not mistaken, the

* "Through Norway with a Knapsack," p. 139.