

work to the crystalline constituents' of the rock in which it occurs."

I should not have referred to the matter had not the date of publication in NATURE been quoted in a way that suggests a sort of challenge. It seems only fair to point out that my paper was read on March 19, 1895, and that the conclusion—that the material was "an altered basic glass"—was published in two places in the *Irish Naturalist* on May 1, 1895. The full paper appeared on July 1, 1895. The two investigations, to some extent supplementing one another, afford certainly a curious case of parallelism.

GRENVILLE A. J. COLE.

Royal College of Science for Ireland, August 20.

#### Foreign Snails in the West Indies.

Two large living specimens of *Stenogyra (Rumina) decollata*, Linn., were recently found in the garden of Dr. W. J. Branch in St. Kitts. Though familiar with the land shells of the island, having lived and collected there for many years, Dr. Branch had never come across this shell before.

These had probably been introduced accidentally as young or eggs among European plants. Tryon states that the snail is naturalised in Charleston, South Carolina. It seems to have thrived in our garden, which is very tropical, but we cannot say yet that it is naturalised.

We have tried the introduction of foreign snails into this island. *Helix (Dentellaria) josephinae*, Fér., from Barbados, did well in a garden, but since we changed our residence it seems to have disappeared. *Bulinus (Borus) oblongus*, Mull., introduced a few years ago, also from Barbados, thrives and multiplies, but has not, so far, gone beyond the garden. It would seem, then, that the chances are against the *Stenogyra* becoming fixed in St. Kitts. The fact of its chance occurrence is, however, worth recording.

C. W. BRANCH.

St. Kitts, W.I., August 2.

#### THE ARCTIC RECORD OF 1896.

THE triumphal progress of Dr. Nansen and his companion, Lieut. Johansen, along the coast of Norway has been interrupted by the most striking coincidence ever known in Arctic travel—the appearance of his ship the *Fram*, with all her crew in good health, and with a record of northern latitude only less remarkable than that attained by Nansen himself. On the very day that Nansen sighted the coast of Norway, the *Fram* forced her way out of the ice-pack into the open sea.

It will be remembered that Dr. Nansen's expedition was based on a theory of polar ocean-currents. The map published in NATURE for May 17, 1894 (vol. l. p. 57) shows that a current or drift was supposed to set across the Arctic Sea from the neighbourhood of the New Siberian Islands to the coast of Greenland, passing within a few degrees of the North Pole. The strongest piece of evidence for the existence of such a current was the discovery off Julianehaab, in south-west Greenland, of certain relics believed to have drifted from the *Jeannette* after her loss near the New Siberian Islands. The authenticity of the *Jeannette* relics is still in dispute. A very elaborate criticism of the evidence concerning them was published, by Prof. W. H. Dall, in the *National Geographic Magazine* for 1896 (vol. vii. p. 93), which concluded with the opinion that the whole affair was a hoax. This was warmly contradicted by a powerful Committee of the Geographical Society of the Pacific, which wound up its report on May 9, 1896, with the words: "After carefully weighing these statements and recalling the mental and physical characteristics of Dr. Nansen and the brave comrades and men who cheerfully accompany him, and the special fitness of the *Fram* to encounter ice dangers, the Committee places upon record its convictions—that the present expedition was fully warranted, and that it will return successful." A month ago these arguments were the only data on which to found an opinion as to Nansen's fate; and I was astonished to find how pessimistic were the views entertained by well-informed Norwegians, some of whom laughed heartily at me off the Nordkyn on August 10 for turning

my glass on the northern horizon on the chance of sighting the *Fram*, which they believed to have been long ago crushed in the ice, and her crew perished. The unfavourable views expressed by our leading Arctic authorities on Dr. Nansen's scheme of pushing his ship into the ice and allowing her to drift with it, and on his plan of building his vessel so that she should be forced out of the ice instead of being crushed by it in case of being nipped, were loudly expressed, but they are also, fortunately fallacious. The new scheme, founded on a carefully considered hypothesis, has proved completely successful, in spite of its opposition to all the maxims of polar experience and the demands of traditional prudence.

NATURE published last week the very full telegraphic data, obtained by the *Daily Chronicle*, as to the main points of this most successful of all polar expeditions. These should suffice to satisfy public curiosity until the intrepid explorer is able to give a personal account of his work. The fact that the pole was not reached is unimportant, for it is conclusively proved that the pole may be reached with comparative ease by good ski runners, aided by a sufficiency of dogs. The additional news brought by the *Fram*, throws a good deal of new light on Arctic geography. As reported in the *Daily Chronicle's* telegram from Skjervö on August 21 and 25, the general course of the vessel was exactly that predicted by Nansen when he quitted her, viz. westward round the north of Franz Josef Land. She was left under the command of Captain Sverdrup on March 14, 1895, in 83° 59' N., 102° 27' E., embedded in the drifting ice about 450 miles north of Cape Chelyuskin, and 400 miles east of Franz Josef Land. By the end of February 1896, she had reached 84° 9' N. and 15° E., a drift of 600 miles, which brought her to a point about 280 miles north of Spitzbergen. Parry in 1827 had reached 82° 45' on the same meridian by sledging over the floe until he was stopped by the rapid southerly drift of the ice. While north of Franz Josef Land the *Fram* reached its highest latitude, 85° 57', only about 20 miles short of that attained on Dr. Nansen's sledge journey, viz. 86° 14'. Had it been possible to dispatch a sledge party from this point, the pole would most probably have been attained. From July 19 to August 12 the *Fram* was working her way out of the ice by her steam power; then gaining open water, she reached Skjervö on August 21. The minimum temperature observed was -52° C., the maximum only 3° C. Neither land nor icebergs were seen, only an expanse of hummocky floe ice unbroken by any considerable stretches of open water. The ice grew to about 13 feet in thickness, and the sea ranged in depth from 1800 to 2200 fathoms.

Sir George Baden-Powell was fortunate enough to receive Dr. and Mrs. Nansen on his yacht the *Otaria* at Hammerfest, and to have the satisfaction of taking them to meet the *Fram*, with which they will probably proceed to Christiania. The enthusiasm of the Norwegian people over Dr. Nansen's success and safe return was beginning to be touched with anxiety for the fate of his equally courageous companions, which this happy reunion has effectually banished.

Until the voluminous observations bearing on almost all branches of science have been fully discussed, the true value of the results of the expedition cannot of course be known. Even now, however, some important facts are plain. Franz Josef Land is only a group of islands possibly smaller than Spitzbergen, and it does not afford the dry land highway to the pole to which at one time it was hoped to be the doorway. The absence of icebergs practically proves the absence of any extensive land in the track of the current, although it may be that the drift of the *Fram* being towards the east and not the west of Greenland, indicates the existence of a land barrier near the pole, or on the American side of it. The dream of an open polar sea must be abandoned for

ever. One of the most interesting results so far announced is the great depth of the Arctic Sea over a very large area. This accentuates the physical contrast between the Arctic and the Antarctic regions; and will probably make it necessary to adopt a greater mean depth for the ocean, and a deeper position for the line of mean-sphere level (*cf.* NATURE, vol. liv. p. 112). The general course of the *Fram*, as sketched from the provisional data, shows an altogether remarkable parallelism with Dr. Nansen's hypothetical track of the *Jeannette* relics, and fully bears out his theory of the circulation of the Arctic Sea. A "palæocrystic sea" would appear to be possible only in conditions which give rise to eddies, or otherwise impede the normal circulation. The temperature has not been found so low as that frequently experienced in northern Siberia, so that unendurable cold can no longer be viewed as an obstacle in the way of making high latitudes.

So far as high latitudes go, Admiral Markham, in 1874, succeeded in passing Parry's position of 1827 by only 35', or about forty miles; Lockwood, in 1882, did not get more than four miles further north than Markham; but Nansen has taken the unexampled stride of 2° 50', or almost two hundred miles beyond the previous "record," in consequence of his simple plan of not opposing, but siding with the workings of nature. The result is a triumph of science, and a proof—if proof were needed—that scientific training, no less than courage, perseverance, and physical endurance, is necessary in a great explorer.

Apart from the voyage of the *Fram*, this summer has yielded a rich harvest of arctic exploration. The *Windward*, which left Vardö on June 29, under the command of Captain Brown, an experienced whaler, and with the aid of Mr. Crowther as ice-master, has made a remarkably quick voyage to and from Franz Josef Land. She took out Mr. W. S. Bruce and another member of Mr. Jackson's party, and brought back several whose time with the expedition had expired. The telegrams which have been received show that Mr. Jackson's party have passed the winter comfortably, and have had excellent sport; they have devoted themselves to the mapping of the region around their winter quarters, and dispatches are promised by the *Windward*, which will doubtless give particulars as to points visited and positions attained. Dr. Nansen's journey on the ice north of Franz Josef Land will be a powerful stimulus which should result in great achievements.

Mr. Andrée's balloon expedition has had to be postponed on account of delay in getting the balloon-house erected and the balloon filled, but it will certainly be renewed next year. Spitzbergen, with weekly mail-steamer, a comfortable hotel, and even a set of postage-stamps, has been largely visited by tourists during the summer; but amongst the sight-seers and sportsmen there have been several scientific men bent on serious exploration. Sir Martin Conway, with Dr. Gregory, Mr. Garwood, and Mr. Trevor Battye, have been over a large amount of new ground, and made several interesting discoveries. The geology of the islands in particular has been carefully worked up, and the results will be looked forward to with confidence. The whole party has safely returned to Norway.

Mr. Peary's expedition to the north-west coast of Greenland has been much hampered by the ice, and it is uncertain whether it will yield any scientific results. The application of the name *Peary-land* to the extreme north of Greenland, proposed by the Geographical Club of Philadelphia, has been generally approved as a tribute due to an explorer of great power and perseverance.

Prospects of Antarctic exploration are no brighter. The Belgian expedition has been postponed, and the English expedition to Cape Adare does not seem likely to start this year. There is, however, a possibility that

the wave of enthusiasm in polar research, which is sure to pass over Europe during the coming winter, may float some of the existing schemes, or even move high quarters, and lead to the dispatch of a properly equipped Government expedition. However glad we should be to see a British party regaining the national prestige in the polar regions, the need for scientific research in those quarters would lead us to welcome the first who comes forward with a sane plan and a sound party, be their nationality what it may. The drift of the *Fram* has shown that the new explorer may succeed, even though he may contravene every law laid down by the old, provided he respects the law of nature of moving in the direction of least resistance, and not trying to hurry through in a season what should be the deliberate progress of years. May it not be possible that we have somewhat over-estimated the necessity for naval discipline, and undervalued the power of scientific enthusiasm in polar exploration?

HUGH ROBERT MILL.

#### SIR WILLIAM ROBERT GROVE.

I HAVE long held an opinion almost amounting to conviction, in common I believe with many other lovers of natural knowledge, that the various forms under which the forces of matter are made manifest have one common origin; or in other words are so directly related and mutually dependent that they are convertible, as it were, into one another, and possess equivalents of power in their action. In modern times the proofs of their convertibility have been accumulated to a very considerable extent, and a commencement made of the determination of their equivalent forces."

Thus wrote Faraday in 1845, beginning his paper "On the Magnetization of a Ray of Light and the Illumination of Magnetic Lines of Force," and the words describe admirably the subject of William Grove's great work "On the Correlation of the Physical Forces" which appeared in the following year. But as a matter of fact this famous essay had been brought into existence three years before as a course of lectures delivered at the London Institution, in which Grove then held the post of Professor of Experimental Philosophy. It was the first systematic statement of the connections between the different departments of physical phenomena, and as such was of great scientific (that is *science-making*) value. Helmholtz's magnificent exposition of the principle of conservation of energy appeared the year after, and contained as completely as was then possible that quantitative discussion referred to in the last words of the above quotation from Faraday, as being when they were written, at various points begun. These two remarkable essays may be said to form the starting-point of the modern science of energetics, of which the experimental foundation was even then being overhauled and laid still more deeply and stably by Joule. If we reflect how much has come from the principle of constancy of energy with the necessary aid of other dynamical principles (for the theory of conservation is by itself insufficient for the determination of the mode of action of physical forces), we are better able to form an idea of the value of the work done by these pioneers in exploring and mapping out the paths which appeared to lead from one province of science to another.

At the time of the publication of his essay Grove was about thirty-five years of age, having been born at Swansea in 1811. He had already accomplished a considerable amount of original work of great value. His voltaic cell, known now to all who have even the slightest knowledge of electricity, was one of several voltaic combinations which he devised, and was described first at the British Association meeting at Birmingham in 1839, and again in a paper in the *Philosophical Magazine* for October of the same year. Though the Grove battery is now superseded in most of our laboratories by dynamo, it was in