

observed belong to the category of those apparent changes of diurnal period which may be explained by the varying state of rest and purity of the atmosphere and the different grades of illumination of the background of the sky. I have sought with particular care for an indication of any change of place of the most pronounced markings, with reference to the horns and with reference to the terminator; but I have not been able to make out anything with certainty which would indicate a more rapid rotation." This letter is accompanied by a sketch showing a marking diverging from the north pole, and another and more decided one proceeding from the terminator near the south pole in an easterly direction, and then curving round towards the north in the direction of a meridian. This marking underwent some slight change between July 5 and 7, the marking along the meridian only appearing on the latter date. In conclusion, Schiaparelli observes that the period of 224.7 days appears to be placed beyond all reasonable doubt. The second letter, written after the publication of Brenner's observations, contains a detailed description of Brenner's great marking, which is identical with the marking just described, and also with that observed in December 1877. Schiaparelli remarks that the view, advanced by him in "Considerazioni sul moto rotatorio del Pianete Venere," that the markings, though in reality atmospheric phenomena, depend to a certain extent upon the topographical conditions underneath, and recur under the same conditions, appears to be confirmed.

THE OBSERVATORY OF YALE UNIVERSITY.—The report of Dr. W. L. Elkin on the work done and in hand at the Observatory of Yale University, has been received. From the report we learn that the series of heliometer measures on the parallaxes of the first magnitude stars has been brought to a close, and the definitive results will be presented in the near future. The series on the parallaxes of the larger proper motion stars, on which Dr. Chase has been mainly engaged, now comprises 99 stars, all but two of which have been observed at two parallax maximum epochs, in general on three nights. Before drawing any conclusions from these data, it is proposed to secure two further epochs for each star, in order to eliminate the effect of the proper motion. An arrangement has been made with Dr. Gill that the observations and discussion of the *Iris* series for the determination of the solar parallax should be printed and included with his similar investigations on *Victoria* and *Sappho*. For the photography of meteor trails, an equatorial mounting, to carry a number of cameras, has been constructed and set up. The mounting carries four cameras, two with lenses of about 6 inches, and two with lenses of about 5 inches effective aperture. Some valuable results will, undoubtedly, be obtained from the photographic data accumulated by instruments of this kind. Already the Yale Observatory is in possession of some twelve impressions of Perseid trails, four of which were secured there and two at Ansonia by Mr. John E. Lewis, working in collaboration with Dr. Elkin. Prof. Barnard has sent three plates exposed also on August 9, 10, and 11, 1894, for about 8 hours in all, which show four and possibly five meteor trails. And Prof. Pickering has found on an examination of the Harvard Observatory plates one fine trail on a plate taken August 8, 1893, and sent it to Yale for measurement. Dr. Elkin has carried out a discussion of these trails, which will be very shortly ready for publication, and seems to lead to some interesting conclusions.

THE NEBULA N.G.C. 2438.—The first of a new series of celestial photographs, taken by Dr. Isaac Roberts, appears in the current number of *Knowledge*. It is a photograph of a portion of the constellation Argo, and shows the beautiful cluster M 46, and the involved nebula N.G.C. 2438. The nebula is a very small one, and was classed as a planetary nebula by Sir John Herschel; Lord Rosse, however, on some occasions, observed it as an annular nebula with two stars and a suspected third one enclosed; Lassell described it as a planetary nebula with two stars involved. The photograph, which was exposed for 90 minutes in the 20-inch reflector, shows the nebula to be as perfectly of the annular type as that in Lyra. It is circular in form, with three stars in the interior, the ring being most condensed on the north following side. The brightest star is near the centre, and is estimated at from 13th to 14th magnitude; on the south preceding side is a star of about 16th magnitude, and a still fainter one almost touches the ring on the south preceding side. There are indications of faint luminosity in the interior of the ring.

The cluster depicted in the same photograph is a "magnificent aggregation of stars between the 9th and 16th magnitude."

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THE VOYAGE OF THE "ANTARCTIC" TO VICTORIA LAND.¹

ALLOW me first to explain that my scientific observations were made under the disadvantageous circumstances of a sailor before the mast on board the whaler *Antarctic*. There seemed no choice between adopting this course and remaining on shore, and I was consequently able to take very few instruments. This explanation may to some extent lighten the criticism of my results.

We left Melbourne on September 20, 1894. It was originally our intention to spend a few weeks in search of sperm whales off the south-west of Tasmania; but not meeting with any, we steered for Royal Company Islands. On October 18 we had snow on board for the first time. It came in heavy squalls, bringing a large specimen of the *Diomedea exulans* albatross on board for refuge. At night it was moonlight, and at twelve o'clock the Aurora Australis was visible for the first time, with white shining clouds, rolling from west to east, at an altitude above the southern horizon of thirty-five degrees. The *Antarctic* was at the time in the vicinity of Macquarie Island, in latitude about 50° south. The aurora seemed to be constantly reinforced from the west, the intensity of the light culminating every five minutes, dying out suddenly, and regaining its former brilliancy during the succeeding five minutes. The phenomenon lasted until two o'clock, when it was gradually lost in an increasing mist. As the snow was heavy, and there was little probability of any material benefit from landing, we set out for Campbell Island on the 22nd, and dropped anchor in North Harbour on the eve of October 25, drifting the following day down to Perseverance Bay, a much safer harbour, where we filled our water-tanks and made final preparations before proceeding south. Campbell Island shows from a great distance its volcanic origin and character, undulating ridges rising in numberless conical peaks to from 300 to 2000 feet above sea level. The land around the bay is rich in vegetation, and most of the island is covered with grass, on which a few sheep seem to live in luxury. Numerous fur seals were basking on the rocks, and we also found many sea-leopards (*Stenorhynchus leptonyx*). They seemed to thrive well, their skins being without scar or cut, and, except human beings, they appear to have no enemies in these waters.

While duck-shooting on the Campbell, I came on three graceful waders of the snipe type (*Novae Zealandia*). In the interior of the island grass was everywhere to be seen except where stunted brushwood covered the ground. I have no doubt that some of the hardy species of Scandinavian trees would do well on this island.

We weighed anchor on October 31. During the next few days, proceeding further into the fifties, the air and water remained at an equal temperature of 44° F. A large number of crested penguins were seen jumping about like small porpoises. We met with several icebergs from 100 feet to 150 feet in height. These bergs were solid masses of floating ice, with perpendicular walls and an unbroken plateau on the top.

On the 6th of the following month, in lat. 58° 14' and long. 162° 35', we sighted an immense barrier of ice, or chain of icebergs, extending for about forty to sixty miles from east to north-west, in fact as far as the eye could reach, the top being quite level and absolutely white, and the greatest height 600 feet. The perpendicular sides were dark ashy grey, with large worn green caves. Several icebergs, similar to those we had encountered before, were floating in all directions, and were undoubtedly children of this enormous monster.

By the time we had reached 55° the albatross had left us, as likewise the Cape pigeon (*Daption capensis*); but the white-bellied storm petrel still followed in our track. A lestris, with dark brown head and white bordered wings, and a small blue petrel put in an appearance. On December 7 we sighted the edge of the pack ice and shot our first seal, which was of the white kind (*Stenorhynchus carcinophaga*), its skin being injured by several deep scratches. We had also a very heavy snowfall, the vessel being covered on deck and rigging for the first time.

On December 8, in lat. 68° 45', long. 171° 30', large streams of ice drifting around us, a strong ice blink appearing towards the south, and the presence of the elegant white petrel (*Procellari Nivea*) gave us unmistakable evidence that we had now before us those vast ice-fields into which Sir James Ross successfully entered with his famous ships *Erebus* and *Terror*, on January 5, 1841. In the evening we slowly worked our way in

¹ Abstract of a paper read by Mr. C. E. Borchgrevink at the Sixth International Geographical Congress on August 1

through the outer edge of the ice-pack, which consisted of large and heavy hummocky ice. I saw multitudes of the *Argonauta Antarctica* everywhere in the pack, usually swimming in cavities in the ice-floes to escape their enemies the whales. The large-finned whale (*Physalus Australis*) was spouting about in all directions. The white petrels were numerous here, and I secured more of them. The white-bellied petrel departed at the edge of the pack, leaving the icy regions to its darker, harder brethren (*Thalassidroma Wilsonii*). We shot several seals, but they were scattered about sparsely, most having scars and scratches in the skin. Sir James Ross noticed similar wounds on the seals, and it has been supposed that they are inflicted by the large tusks in battle between themselves. My opinion, however, is that these scars must be ascribed to the action of a different species. The wounds are not like those inflicted by a tusk, being from two to twenty inches in length, and straight and narrow in shape, and where several are met with on the same animal, they are too far apart to have been produced by the numerous sharp teeth of the seal. Nor do I consider that they are due to the sword-fish, though that is doubtless doing mischief there. If my opinion, that these wounds are inflicted by an at present unknown enemy of the seal, proves correct, it may serve to explain the strange scarcity of these animals in regions where one would expect to find them almost everywhere.

When we entered the ice-pack the temperature of the air was 25° F., that of the water 28° F., which latter temperature was maintained all through the pack. Penguins were about in great numbers.

On the 14th we sighted Balleny Island, finding it in lat. 66° 44', long. 164°; this agreeing with Ross. The ice-floes became gradually larger as we approached land, and it was evident that the ice-pack then around us was in great part discharged from the glaciers of Balleny, some of it carrying stone and earth. Although the higher part of the island was lost in mist, we got a good view of its lofty peak, which rises to a height of 12,000 feet above the sea level. The size and shape of the ice about Balleny was a source of considerable danger to our vessel, covered as it is with snow to a depth of several yards, and running out under water in long sharp points. It is not likely that a vessel depending entirely on sails would long survive in such ice. The air temperature at Balleny was found to be 34° F., that of the water 28° F.

Finding the pack so impenetrable in this locality we resolved to work eastwards, in the track which the *Erebus* and *Terror* had followed. On December 22, in lat. 66° 3', long. 167° 37' E., I shot a seal of ordinary size and colour, but with a very thick neck, and no sign of scars, a kind which none of our old sealers on board had ever seen before.

On Wednesday, the 26th, we crossed the Antarctic circle, and on New Year's Eve were in lat. 66° 47', long. 174° 8' E. at twelve o'clock. In lat. 67° 5', long. 175° 45' E., I secured a specimen of *Appenodytes Forsterii*—a large penguin. I only secured four of these birds altogether, and never saw it in company with others of its kind. On the 14th, in lat. 69° 55' and 157° 30' E., we came again into open water, having spent 38 days in working our passage through the ice-pack. A clear open space of water was now before us. We steered straight for Cape Adare on Victoria Land, and sighted it on the 16th of January. On the 18th, in lat. 71° 45', long. 176° 3' E., the temperature of the air was 32°, and of the water 30°. The cape, which is in 71° 23' and 169° 56' E., rises to a height of 3779 feet, and consists of a large square basaltic rock with perpendicular sides. From there we saw the coast of Victoria Land to the west and south as far as the eye could reach, rising from dark bare rocks into peaks of perpetual ice and snow 12,000 feet above the sea level, with Mount Sabine standing out above the rest. I counted as many as twenty glaciers in the immediate vicinity of the bay, one of which seemed covered with lava, while below a layer of snow appeared another layer of lava, resting on the surface of the glacier. A volcanic peak about 8000 feet in height had undoubtedly been in activity a short time before. On the 18th we sighted Possession Island, and effected a successful landing on the North Island, being the second to set foot on this island, Sir James Ross having preceded us fifty-four years before. The island consists of vesicular lava, rising in the south-west into two pointed peaks 300 feet high. I scaled the highest of these, and called it Peak Archer, after A. Archer, of Rockhampton, Queensland. To the west the island rises gently upward, forming a bold and conspicuous cape, to which, not having been christened by Ross, I gave the name of Sir Ferdinand von Mueller. I quite unexpectedly

found vegetation on the rocks about 30 feet above the sea level, vegetation having never been discovered in so southerly a latitude before. We gave to this island, which I judged to be about 300 to 350 acres in extent, the name of Sir James Ross Island. Possession Island is situated in lat. 71° 56', long. 171° 10' E.

On January 20 we steamed southwards, and on the 21st sighted Colman Island at midnight. Finding the eastern cape of this island unnamed, we called it Cape Oscar, in honour of his Majesty our King. I noticed great irregularities in our compass at Colman Island, and undoubtedly it contains secrets of scientific value. On the 22nd, being in lat. 74° S., and no whales appearing, it was decided to head northwards again, although all regretted that circumstances did not permit of our proceeding further south.

On the 23rd we were again at Cape Adare. Icebergs of large size were everywhere to be seen, and showed distinctly whether they were broken from the big barrier or discharged from the glaciers on Victoria Land. We landed at Cape Adare that night, being the first human beings to put foot on the mainland. Our landing-place was a kind of peninsula or landslip, gently sloping down from the steep rocks of Cape Adare until it ran into the bay as a long flat pebbly beach. The peninsula formed a complete breakwater for the inner bay. The penguins were, it possible, even more numerous here than on Possession Island, and were found in the cape as far up as 1000 feet. Having collected specimens of the rocks, and found the same cryptogamic vegetation as on Possession Island, we again pulled on board. We now stood northward, and in lat. 69° 52', long. 169° 6' E., again ran into the ice-pack. On February 1, in lat. 66°, long. 179° 31' E., we reached open water, having this time spent only six days in the ice-pack. On the 17th the Aurora appeared stronger than I ever saw the Aurora Borealis. It rose from south-west in a broad stream towards the zenith, and down again towards the eastern horizon, being quite different in appearance from when we last saw it on October 20. It presented long shining curtains rising and falling in wonderful shapes and shades, sometimes seemingly quite close to our mastheads, and it evidently exerted considerable influence upon our compass-needle. In lat. 44° 35' and long. 147° 34' we met with a great number of sperm whales. After struggling for several days with a furious storm of distinctly cyclonic character, we sighted the coast of Tasmania on March 4, and entered Port Philip on the 12th, five months and a half after our departure from Melbourne.

As my report shows, we had comparatively high temperatures during our voyage, higher than Sir James Ross experienced, and higher than those observed last year by the whaling fleet south of Cape Horn. The minimum temperature we experienced within the Antarctic circle was 25° F., the maximum 46°. The average temperature from 200 readings each month was 32°·5 for January, 30° for February. The temperature of the water remained at 28° F. all through the ice-pack, rising 1° wherever a larger sheet of water broke the ice-fields. In the large bay in South Victoria Land the temperature remained nearly constantly about freezing-point. The question naturally arises—Has the average temperature at the shore of Victoria Land risen during the last fifty-four years, and has vegetation for the first time developed in those southern latitudes since Ross was there? It does not seem probable that the appearance of vegetation on Possession Island would have escaped the observation of the naturalists who accompanied that expedition. It is evident that a warm current with a constant direction northwards breaks the ice-fields at the very place where Sir James Ross and we penetrated to the open bay of Victoria Land. Within the Antarctic circle the barometer at 29 inches always indicated calm, clear weather, and even at 28 inches it remained fine. This low barometric reading is remarkable considering the dryness of the air. The prevailing wind in the bay seemed to be from the east, but at Cape Adare a change appeared to take place, and westerly winds are there, to all appearance, predominant. The direction of the movement of the ice is distinctly north-easterly, and the scarcity of ice in the bay of Victoria Land is undoubtedly not alone due to warm currents, but also to the protection from drift ice afforded by the shore from Cape Adare down to the volcanoes Erebus and Terror.

The rocks on Possession Island seem all to be of volcanic origin, and represent basaltic lava flows which have taken place during late geological epochs. The specimens I brought from South Victoria Continent differ but little from those I found on Possession Island. One peculiar rock I collected has an indistinct granular structure, and resembles much the garnet sand-

stone of Broken Hill; it seems to bear some close relation to granilite. The specimen is composed of quartz, garnet, and felspar fragments. This rock holds out hopes that minerals of economic value may occur in these regions.

The peninsula on which we landed at Cape Adare must be some seventy acres in extent; on the top of the guano were lying the primitive nests of the penguins, composed of pebbles. Some hundreds of yards up these landslips I came upon two dead seals, which from their appearance must have lain there several years. I made a thorough investigation of the landing-place, because I believe it to be a place where a future scientific expedition might safely stop even during the winter months. Several accessible spurs lead up from the place where we were to the top of the cape, and from there a gentle slope leads on to the great plateau of South Victoria Continent. The presence of the penguin colony, their undisturbed old nests, the appearance of the dead seals, the vegetation on the rocks, and, lastly, the flat table of the cape above, all indicated that here the unbound forces of the Antarctic circle do not display the whole severity of their powers. Neither ice nor volcanoes seemed to have raged at the peninsula at Cape Adare, and I strongly recommend a future scientific expedition to choose this spot as a centre for operations. At this place there is a safe situation for houses, tents, and provisions. I myself am willing to be the leader of a party, to be landed either on the pack or on the mainland near Colman Island, with Ski, Canadian shoes, sledges, and dogs. From there it is my scheme to work towards the south magnetic pole, calculated by Ross to be in $75^{\circ} 5'$ and $150^{\circ} E.$, Colman Island lying in $73^{\circ} 36' S.$ and $170^{\circ} 2' E.$ I should have to travel about 160 miles to reach the south magnetic pole. Should the party succeed in penetrating so far into the continent, the course should be laid, if possible, for Cape Adare, in order to join the main body of the expedition there.

As to the zoological results of future researches, I expect great discoveries. I base my expectations on one point—on the scars found on the seals, which in my opinion point to the existence of a large unknown mammal within the Antarctic circle. Although the white polar bear of the Arctic has never been found in the south, I should not be surprised to discover similar species there. It would indeed be remarkable if, on the unexplored Victoria Continent—which probably extends over an area of 8,000,000 square miles, or about twice the size of Europe—animal life hitherto unknown on the southern hemisphere should not be found.

It is of course possible that the unknown land around the axis of rotation may consist of islands, only joined by perpetual ice and snow; but the appearance of the land, and the colour of the water with its soundings, in addition to the movements of the Antarctic ice, point to the existence of a mass of land much more extensive than a mere island.

It is true that the scientific results of this expedition have been few, but my little work gives me at least the satisfaction of feeling that it will fill a useful, if molecular, place among those strong arguments which for years have accumulated, and which prove that further delay of a scientific expedition to South Victoria Continent can scarcely be justified.

WEATHER FALLACIES.¹

IN the long and patient pursuit which the attainment of all accurate knowledge exacts from man, it may sometimes be instructive to turn one's gaze backward and contemplate the errors which have been corrected, the fallacies which have been demolished, and the superstitions which have been lived down; and this consideration has prompted me to take for the subject of this year's address that wide range of human opinions which may fitly be classed under the head of "Weather Fallacies."

Nothing could have been more in accordance with the law of growth in other branches of knowledge than that Meteorology should, in its earliest dawn, have been with difficulty able to emerge from the mists and darkness of guesses and surmises such as have surrounded the transfer of any truth from the barbaric to the philosophic stage.

It is to the Greeks that we must look for the first real weather observations after the matter had passed through what may be called the mere savage phase; and we find Hesiod, Theophrastus, and Aratus presenting us with an early code of rules, which serve at least to show us how little we have ourselves advanced in some matters since their time.

An address delivered to the Royal Meteorological Society, by Mr. Richard Inwards, President. (Reprinted from the *Quarterly Journal of the Society*.)

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One of our Fellows, Mr. J. G. Wood, has just given to the world an excellent and scholarly translation of the work of Theophrastus, which has not previously been put in an English garb, and Mr. Wood has done the whole country a great service in giving us this translation of the "Winds and Weather Signs," a book which contains a host of rules and observations about the weather, and which, as might have been expected from the production of the favourite pupil of Plato and Aristotle, is singularly free from errors of the grösser and more superstitious kind, such as were plentifully produced in Western Europe many centuries later.

But long before the time of Theophrastus, and probably very soon after the invention of agriculture itself, there were weather gods and weather fallacies; for we find that Jupiter Tonans and Pluvius—the thunderer and the rain-maker—were set by men on the highest pedestals. And centuries after this, Lucian tell us that it was usual in his time to offer prayers for suitable weather, and he recounts in his "Dialogues" how two countrymen were at the same time offering up contrary petitions—one that not a drop of rain might fall until he had completed his harvest, while the other prayed for immediate rain, in order to bring on his backward crop of cabbages—both suppliants only too sure to find that the ears of the image were deaf as the stone of which they were made, and that the wheels of the universe would not wander or turn back for any selfish ends of man.

In considering these early times, when the weather had to be studied from cloud, sky and sea, and from the behaviour of the animals and plants, we must be ready to excuse men for doing that which is still too frequently a cause of error, viz. foretelling what they most wished for, and putting down as universal law that which was only a coincidence of totally independent events. In considering weather fallacies it will be impossible to follow a chronological order, so I shall treat them, or rather a small portion of them, under the heads of saints' day fallacies, sun and moon fallacies, and those concerning animals and plants, while finally I shall consider the almanack makers, weather prophets and impostors who have from time to time furnished the world with materials for its credulity or its ridicule.

The first class of weather fallacies which I shall scarcely more than mention, are those which refer to the supposed connection between the weather of any day in the week or year, and that of any other period, and it may be as well to state at the outset that there is no kind of foundation in fact for any of these so-called rules. They are for the most part born of the wish to see certain kinds of weather at certain times of year, and, like all these predictions, were faithfully remembered when they came true, and promptly forgotten when they failed. One has often heard—

"Fine on Friday, fine on Sunday."

Or that "Friday is the best and worst day of the week," and the superstition even extends to hours of the day, for we have—

"Rain at seven, fine at eleven,"

which is only another way of saying that rain does not usually last four hours, and the rule generally fails when applied to daily experience; but the host of proverbs connected with saints' days are more difficult to deal with, on account of the longer time which elapses between the prophecy and its fulfilment or failure. All or most of these proverbs concern the days of certain saints, though I think no one imagines that this is anything more than a convenient method of fixing the date, because our ancestors had a saint for every day, so that they naturally referred to the day by his name.

There are forty weather saints, among the most prominent of whom is undoubtedly St. Swithin, whose day is July 15, and the superstition is that if it should rain on that day it will rain for forty days after. Now, as Mr. Scott observes, this date is very near a well-known bad time in wet years, as the terms, long in use, of "St. Margaret's flood" and "Lamma's flood" abundantly testify. The fact that some of these heavy rains began on July 15 has been enough material for the adage-monger, and so we have another "universal" law laid down, a law which is, however, constantly broken, as every student of the weather very well knows. The whole thing is a fallacy of the most vulgar kind, and ought speedily to be forgotten, together with all the adages which make the weather of any period depend on that of a distant day.

Turning in weariness from this class of superstitions, which may be said to belong to the self-exploding order, we are next met by an extensive array of authorities who, under the protecting