

blind unless the skin is cut away. The ear lobe, enlarged in the portrait to many times its natural size, has been again increased, becoming in some cases more than seven inches in length by four or five in breadth when spread out, and offering an area of some thirty square inches. These characters have been carried to such an excess that the breed has become altered from an abundant layer of large eggs into a practically useless variety, and at many shows where they were formerly the most numerous birds exhibited they are now absent, having been, as it were, improved by the fanciers almost out of existence, their laying qualities and utility having almost entirely disappeared. At the Crystal Palace show recently held, where nearly 4000 fowls were exhibited, less than a dozen Spanish put in an appearance, and at the show just opened at the Alexandra Palace, where there are no less than 281 classes for the different varieties of fowls, Spanish are conspicuous by their absence.

Darwin in his list enumerates thirteen varieties of fowls as known to him, namely Game, Malay, Cochin, Dorking, Spanish, Hamburg, Polish, Bantam, Rumpless, Creepers, Frizzled, Silky and Sooties, with their sub-breeds, which he also mentions. In the last Crystal Palace show we had no less than 240 classes, which included all the varieties shown. The old English Dorking breed was the one which has been least changed or modified during the last fifty years, having been merely increased in size. Cochins, which were imported, not, as the name implies, from Cochin China, but from Shanghai,



FIG. 1.—Section of skull of crested fowl.

many hundred miles distant, were originally characterised by profuse fluffy plumage, very small wings, which rendered them almost incapable of flight, a small amount of feather on the tarsus or scaly part of the leg and on the foot. This breed, with all the others, was regarded by Darwin as descended from one wild species, the jungle fowl, *Gallus ferrugineus*. This was one of the very few points in which I differed from my honoured master. I believe that the Cochin descended from another species of wild *Gallus*, which in consequence of its scant power of flight had all passed into a state of domestication and which has long ceased to exist as a wild bird. My opinions are based upon the fact that there is considerable structural difference between the Cochin and the varieties of the *Gallus ferrugineus*. In the Cochin, the axis of the occipital foramen is greatly elongated perpendicularly; in the ordinary fowl its long axis is horizontal. In the Cochin, as originally introduced, a deep median furrow is visible down the frontal bone, which is not present in other fowls. These points could not have been produced by artificial selection. Then again, the voice of the bird was utterly distinct from that of any descendants of *Gallus ferrugineus*. The habits of the birds, as originally introduced, were exceedingly distinct from those of our domesticated species. At the present time the Cochin threatens to become as nearly extinct in England as the Spanish,

having been bred for fancy points, and the tendency to produce feather on the lower extremities has been so enormously exaggerated that in prize specimens the feet are as nearly full plumaged as the wings.

In Darwin's time one of the most remarkable breeds raised by fanciers was the crested, or, as they were then called, the Polish breeds, characterised by a very large tuft of feathers on the top of the head. I paid much attention to these breeds from the singular anatomical peculiarity which they offered; the cranium became greatly modified, the crest taking its rise from a very large bony protuberance of the frontal bones. This in well-developed specimens contained more than half the brain, which, instead of retaining its normal form, became of an hour-glass shape. Specimens of these remarkable skulls were shown by me at the Zoological Society in 1856, figured by Darwin in "Variation" and in my "Poultry Book," from which the accompanying engraving is reproduced. These birds have almost gone out of fashion, there being now no classes for them at the Crystal or Alexandra Palace shows.

If we compare the varieties of poultry as shown at present with those that existed in Darwin's time, we find that the offer of prizes, often of great value, at poultry shows, has induced, not only the formation of innumerable new breeds obtained by crossing and selection, but has led to the exaggeration of the salient points of every variety, as far as is actually possible. If I may presume to quote my own book, on "Table and Market Poultry," I would state: "The fancier has not even a standard of beauty which he regards as final. The greater the extent to which he can make the specimens he produces excel others in fancy points is the object at which he aims; consequently hideous monstrosities are not unfrequently produced and exhibited, the only advantage of which, from a scientific or practical point of view, is to prove the extent to which living organisms are variable under the influence of artificial as opposed to natural selection." W. B. TEGETMEIER.

FRESH LIGHT ON THE ANTARCTIC.¹

THIS is the second narrative of the cruise of the *Southern Cross* and of the first winter spent on Antarctic land. It is written for the same class of the general public as its predecessor by the commander of the expedition. Mr. Bernacchi is, however, a man of scientific training, and although the exuberance of his literary style is sometimes in excess of the strict requirements of science and some of his words do not occur in the dictionary, we are able to gather a few new facts and some corrected impressions from his book. Unfortunately, the book has been written in a hurry, for which there is at least the excuse that the author has set out once more to the South Polar regions; but in one place he acknowledges, and in many places leaves it to be discovered, that he was unable to consult his companions on points that require some explanation.

It is not everyone who can write a book so as to exclude the irrelevant and make the essential attractive to the average reader; yet this, we think, should be the chief justification of a narrative, and especially a second narrative, of an expedition that was in a considerable degree scientific.

The book is divided into two parts, "Narrative" and "Scientific." The narrative need only be referred to in order to remind the reader of the necessary dates which are usually difficult to gather in such works. The *Southern Cross* left London on August 22, 1898, reached Madeira on September 4, left on the 5th, touched at St. Cruz on

¹ "To the South Polar Regions. Expedition of 1898-1900." By Louis Bernacchi, F.R.G.S. Illustrated from photographs taken by the author. Pp. xvi + 348 (London: Hurst and Blackett, Ltd., 1901.) Price 12s. net.

the 7th, stayed a day at St. Vincent (date not given), reached Tasmania on November 27, ninety-seven days out from London, and sailed on December 19 for the Antarctic regions. The ice-pack was entered on December 31, the Balleny and Russel Islands were seen while fast in it, and on February 10, 1899, the ship, having been unable to penetrate the belt of ice, came out again on the northern side. She entered it once more on the 14th, got through in six hours, and reached Cape Adare on the 17th. On March 1 the ship left for Australia after landing the expedition, and on January 28, 1900, she returned; but no particulars are given, either here or in Mr. Borchgrevink's book, of her two voyages through the pack. On February 2 the whole party started southward in the ship; they landed on Possession Island, in Wood Bay, at the foot of Mount Melbourne, on Franklin Island on February 10, at Cape Crozier,

clear weather. He states definitely that Mount Erebus was never clearly visible, merely a glimpse having been had of it, too short to allow a photograph to be taken. On February 19 the ship as she lay at the ice-barrier was beset with young ice, and broke through with such difficulty that another day's delay would have meant another year.

The specially "scientific" part of the book is an appendix, though not so called, of 50 pages. It treats of the climate of the South Polar regions, terrestrial magnetism, zoology, geology, astronomy, and concludes with miscellaneous notes and a short glossary of ice-terms.

In discussing the climate, Mr. Bernacchi finds his remarks on a preliminary study of the observations taken at Cape Adare, which have been discussed at the Meteorological Office and are to be published by the



FIG. 1.—The Slate Formation in Robertson Bay. (From "To the South Polar Regions," by L. Bernacchi.)

close under Mount Terror, and finally upon the ice-barrier itself in $78^{\circ} 34'$ S. on the 17th. The ship remained moored to the ice-barrier all day on the 18th, and on February 19 the return voyage began along nearly the same route as had been taken coming south. The weather was very boisterous, and the remarkable fact is now stated, we believe for the first time, that no ice whatever was met with and there was absolutely no pack to go through. Auckland Island was reached on March 21, 1900, and here the expedition may be said to have completed its labours. It would have been highly important if the log of the *Southern Cross* were published in full, so that there might be no uncertainty as to the exact dates of reaching the various points, and in particular as to the condition of the sea-ice.

Mr. Bernacchi very clearly indicates the character of the Antarctic summer, a period of low temperature and high wind, with very frequent fogs and rare intervals of

Royal Society. The winter was not nearly so cold as at continental stations within the polar circle in the northern hemisphere, the absolute minimum recorded being $-43^{\circ} 5$ F. and the mean minimum of the coldest month, August, $-22^{\circ} 7$ F. On the other hand, the summer is very cold, the absolute maximum being $48^{\circ} 7$ and the mean maximum of January (the warmest month, apparently, although there are no values for February) $37^{\circ} 0$; the mean temperature of this midsummer month was only 33° , and the absolute minimum 25° F., but a short distance further south minima below zero Fahrenheit were observed early in February. The most remarkable feature, however, was the wind. Windroses are given for each month of the year, showing that the south-eastern quadrant of the horizon has an immense preponderance of winds in every month and a monopoly of gales. This is assumed as strong evidence of the existence of a great continental anti-

cyclone to the south; and no doubt that theory is attractive and has much evidence in its favour. But the gales which burst from the E.S.E. or S.E. were invariably accompanied by a sudden and great rise of temperature, which in eleven cases cited ranged from nearly 14 to more than 44 Fahrenheit degrees. This wind beat against Cape Adare from the level surface of the frozen sea, and does not suggest a Föhn effect or an origin in the icy heart of a South-Polar anticyclone. Does it not rather indicate the passage of a cyclone centre to the north and the sweeping in of air from the warm surface of the sea south of Australia? An anticyclone brooding over the southern land would probably tend to turn wandering cyclones eastward along its margin, and the two explanations are thus to some extent compatible.

The magnetic observations are being worked up by Dr. Chree; from the preliminary figures quoted here we note that the greatest dip observed was $88^{\circ} 2' 37''$ at the base of the Mount Melbourne, but it is pointed out that the magnetic dip all along the coast of Victoria land was less than at the time of Ross's expedition. The zoological chapter contains no information; it merely quotes a few descriptive remarks of the vertebrates noticed, all of them of known species. The invertebrates are not referred to, but the whole of the zoology of the expedition is being worked up at the British Museum.

There was no geologist on board the *Southern Cross*, but the non-technical descriptions of rocks in the narrative and the reference to the determination of specimens by Mr. J. T. Prior show that the geologist on the *Discovery* will have a splendid field in which to win his spurs, though the alternation of volcanic and metamorphic rocks does not suggest the probability of sensational fossil finds.

The difficulty of making astronomical observations in high southern latitudes is feelingly dealt with. The determination of longitude was particularly difficult, the only really satisfactory attempt to fix Cape Adare being by an occultation of Saturn by the moon. Refraction was a never-ceasing trouble, for the horizon was frequently very far from being a straight line. Thus on one occasion Mr. Bernacchi says (p. 156):—

"Huge icebergs to the north which must have been quite thirty miles away, and which, under ordinary circumstances, were invisible even from the huts, were elevated by refraction to a height on a level with the top of Cape Adare, the height of which is nearly 900 feet. The display, it can almost be called so, was ever changing in appearance; sometimes one part of the horizon was elevated, then this would subside and another part rise up. At this time of the year the coast line in the direction of Yule Bay and Cape North, nearly 100 miles away, was frequently seen on clear days in consequence of the great rarity of the atmosphere."

A comparison of Mr. Borchgrevink's and Mr. Bernacchi's narratives yields several minor points of interest to which it is unnecessary to refer; but we find the resultant of reading both books is an increase of our opinion of the commander's power of overcoming difficulties and of the physicist's scientific zeal and loyal cooperation.

THE SPECTRA OF BRIGHT SOUTHERN STARS.¹

THE well-known researches on stellar spectra which have been carried on for many years at the Harvard College Observatory under the direction of Prof. E. C. Pickering have now reached another very definite stage. The publication of the Draper Catalogue in 1890 put us

¹ "Spectra of Bright Southern Stars, Photographed with the 13-inch Boyden Telescope as a Part of the Henry Draper Memorial, and Discussed by Annie J. Cannon under the Direction of Edward C. Pickering." (*Annals of the Astronomical Observatory of Harvard College*, vol. xxviii. part ii.)

in possession of the general characteristics of the spectra of more than 10,000 stars, and this work will long remain a monument to the skill of Prof. Pickering, besides fulfilling its original purpose as a lasting memorial of Dr. Henry Draper (*NATURE*, vol. xlv. p. 427). Following this, a detailed description and classification of the spectra of 681 of the brighter stars north of -30° , based upon photographs taken with relatively large dispersion, was published in 1897 (*NATURE*, vol. lvi. p. 206). The establishment of a branch observatory in the southern hemisphere, at Arequipa, Peru, has enabled Prof. Pickering to extend the inquiry to the southern stars, with results described in the volume under notice.

The prismatic camera has been employed throughout the whole investigation, and the accumulation of so much valuable material in so short a time must be attributed in great measure to the many advantages which this instrument possesses over the slit spectroscope when radial velocities are not in question. At Arequipa the 13-inch Boyden telescope has been employed in conjunction with one, two or three prisms, giving spectra of lengths 2.24, 4.86 and 7.43 centimetres respectively from H_{ϵ} to H_{β} . The number of photographs taken from November 29, 1891, to December 6, 1899, was no less than 5961, with an average exposure of one hour; but as many of the spectra were photographed several times the number of individual stars investigated is smaller, namely 1122. In these are included all stars south of declination -30° which have a photometric magnitude of 5.0 or brighter, numerous fainter stars in the same region, many stars between the equator and -30° , and a few northern stars.

Dr. McClean's magnificent series of photographs of the spectra of southern stars had prepared us to find that the spectra are not less diverse than in the northern hemisphere, and it became a point of much interest to see if the greater number of stars now studied necessitated any revision of the classification proposed for the northern stars alone. This question of classification, it will be understood, is one of the greatest importance, since the ultimate aim is not merely to enable the astronomer to place his photographs in their proper pigeon-holes, but to indicate the various stages of star life. It is an unfortunate circumstance, however, that not one of the classifications hitherto suggested has met with general acceptance, but the reason for this may perhaps be traced to a want of confidence due to the frequent revisions which have been necessary as the more delicate features of the spectra have been brought to light by the use of better instruments. However that may be, it is sufficiently remarkable that the old classification which we owe to Rutherford and Secchi is almost the only approach to a universal language of stellar spectra, in spite of the fact that it is hopelessly inadequate to deal with modern data.

For the present discussion Miss Cannon has found it convenient to revert to the nomenclature of the Draper Catalogue, but with modifications to suit the intermediate classes revealed by the use of greater dispersion. It is pointed out that in most cases the symbols can be readily translated into the numbers previously applied to the groups of northern stars, but it would surely have been more convenient to have two such closely associated investigations expressed in the same language. However, the classification is fairly adequate, but as the nomenclature is too cumbersome to be likely to come into common use it is unnecessary to describe it in detail.

The great majority of the 1122 stars discussed in this publication can be arranged in a sequence, agreeing in the main with that arrived at in the case of the northern stars, but permitting its extension towards the beginning of the series. The investigation of the northern stars led Prof. Pickering and Miss Maury to commence the