

the South African Chats, to some of which Mr. Seebohm has applied his principle of hybridisation, as we are not yet satisfied that the changes of plumage cannot be accounted for by the more natural process due to age or the season of the year. These few remarks will not, however, detract from the sterling merit of Mr. Seebohm's volume, which bears on every page the evidences of the careful and exhaustive work which the author bestows on every subject he handles. The eighteen coloured plates are beautiful examples of Mr. Keuleman's great talents as a natural history artist, and the colouring is much more satisfactory than in the last volume of this Catalogue, issued by the British Museum.

MAGNETIC AND AURORAL OBSERVATIONS IN HIGH LATITUDES¹

LEUTENANT WEYPRECHT, the noted leader of the Austrian Arctic Expedition of 1872-74, whose death is a great loss to science, recently published a little text-book embodying the results of his wide experience in Arctic observation of magnetic and auroral phenomena, which will be invaluable in pointing out to future observers the precautions and requirements which only actual experience of Arctic life can suggest, and the arrangements of apparatus and stores, which, once left behind, must be done without; frequently to the loss of opportunities for observation which do not recur. It would however be wearisome to the general reader to enter into details of Arctic work, and no one to whom the matter is of practical moment will omit reading the book itself. Some however of the precautions suggested give so vivid an idea of the difficulties and even the suffering which Arctic observers have to meet in the cause of science, that we cannot forbear a passing mention of them.

In magnetic observatories, where iron is rigidly tabooed, and uniformity of temperature is of the first importance, stoves are naturally out of the question. In winter, when the huts are thickly covered with snow, the temperature should never fall below -20°C . (-4°F .), which, as Weyprecht says, may be borne for some hours in suitable clothing without severe suffering. Good fur garments are naturally essential. The most difficult part is the sufficient protection of the feet, that found most effectual being very wide felt boots reaching to the knee, into which the feet, clad in thick woollen stockings, are packed with dry hay or straw. The hands are covered with thick woollen gloves, and whenever they are not in actual use are further protected by fur. In absolute determinations however, which have to be carried on in a separate hut, which is also used as an astronomical observatory, and hence more open to the weather, the cold is not only much more intense, but the fingers must be left bare, or at most covered with thin cotton gloves, on account of the delicacy of the instruments. On two occasions during the *Tegetthoff* Expedition such quantities of snow were driven into the observatory through the crevices of the shutters as, by loading one side of the telescope, actually to throw it off its pillar.

For absolute magnetic observations Weyprecht gives preference to Prof. Lamont's portable theodolite, which contains in itself everything necessary for the determination of declination and horizontal and vertical intensity. If however a fixed scale could be attached to the telescope for rapid readings the instrument would be still further improved.

With regard to northern light observations, Weyprecht repeats his important classification of auroral forms given in his *Nordlichtbeobachtungen*. For observations on the altitude of auroræ, with a view to calculation of height, he recommends a simple instrument consisting of a tube with an eye-piece, movable in the magnetic meridian, and

with an altitude circle reading to $\frac{1}{2}^{\circ}$. The tube must be attached to the end of the axis, so as to be capable of sweeping the entire meridian. The observations should be repeated at short and regular intervals, and both the upper and lower edges of the arches should be observed, thus giving at once the mean altitude and the breadth of the bands. If the "dark segment" is visible, its mean height and the azimuth of its summit must be observed, as it probably indicates the direction of the origin of the aurora. If a corona is formed the approximate position of its centre must be observed. Another method of determining the position of the corona is by measuring the direction of the rays of which the arches are formed. This is best done by measuring their inclination from the perpendicular in two azimuths 90° apart. If the tube we have mentioned be provided with an azimuth circle and cross-wires in the eye-piece with a position circle reading to $\frac{1}{2}^{\circ}$ this is readily accomplished, the perpendicular being verified by observation of a plumb-line.

For spectral observations Weyprecht considers direct-vision instruments of good dispersion the most suitable. In low latitudes we have found a single bisulphide prism and simple slit and eye-hole without lenses to answer well, and if such an instrument were attached to the same axis as the measuring tube, which would act as a finder, we believe it would show fainter spectra than any direct vision arrangement. We do not know however how it would be affected by Arctic temperatures. Weyprecht does not mention any means of measuring the position of the lines—the simplest is Piazz's Smyth's comparison with the hydrocarbon spectrum of a spirit-lamp, and another very good scale is the band-spectrum of air yielded by a vacuum-tube fixed across the slit and made to flash as required.

Weyprecht insists on the importance of further comparisons between the movements of the aurora and magnetic disturbances, and points out the high interest that would also attach to observations of the earth-currents.

H. R. PROCTER

NOTTINGHAM UNIVERSITY COLLEGE

THE fine building, auspiciously opened the other day as a college in the heart of Nottingham, represents the last development of that all too tardy interest in higher education which, in the more recent years, has originated the Victoria University in Manchester, the Yorkshire College in Leeds, the Science College in Newcastle (a flourishing offshoot of Durham University), the Mason Science College in Birmingham, and others.

It is gratifying to find in a new provincial centre, with its varied activities and the usual temptations associated with money-getting, an intelligent, if somewhat late, appreciation of the thirst after knowledge for its own sake, as well as for that to which it may be profitably applied, and a disposition to take generous means of satisfying it.

Of the inception and growth of the Institution we need not here speak at any length. The elements of a college were already in existence. For seven or eight years past lecturers from Cambridge have visited Nottingham and drawn large audiences. The Government Science Classes were also highly appreciated. It is thus estimated that no fewer than 1400 students will be ready to take advantage of the instruction soon to be provided. Nottingham, moreover, has possessed a public library since 1868, and this, along with the Natural History Museum, greatly needed larger accommodation. From the union and consolidation of these and other educational agencies under one roof where the conditions of progress are much more favourable, excellent results may be anticipated. A distinctive feature of the Nottingham College is that it has been built by the Municipal

¹ "Praktische Anleitung zur Beobachtung der Polarlichter und der magnetischen Erscheinungen in hohen Breiten," von Carl Weyprecht, Schiffscapitän. (Wien, 1881.)