

70° from the plane of the galaxy, the position of its densest part being R.A.=oh. 57.4m., dec.=+1° 20' (1885).

This nebulosity is also remarkable in appearance; around the densest region there extends a quantity of nebulous matter of varying intensity showing small clouds of increased intensity at several points. Further out the intensity becomes so feeble that it is impossible to define its limits, and Prof. Wolf expects that a longer exposure than the four hours which he gave may materially extend the nebulosity seen on the plate. Three B.D. stars are involved in the cloud, which extends about 40' in declination and 30' in R.A. When examined under the microscope the brighter parts of the image are filled with numerous minute spots and short trails, and Prof. Wolf thinks it possible that the cloud may consist of a multitudinous congregation of very small planetary nebulae which a more powerful instrument may be able to resolve. The present plates were taken with the 16-inch Bruce telescope (*Monthly Notices*, November, 1906).

PERIODICAL COMET DUE TO RETURN IN 1907.—Only one periodical comet is due to return during the current year, that discovered by Giacobini at Nice on December 20, 1900. As observed then it was very faint, and showed only a small nebulous disc, without any tail. As its period is about seven years, according to the elements calculated by Prof. Kreutz, and as it passed through perihelion about December 3, 1900, it is not likely to be re-discovered until nearly the end of the present year (the *Observatory*, No. 379).

ORBITS OF THREE DOUBLE STARS.—The results of an investigation, by Prof. Doberck, of the orbits of  $\zeta$  Cancri,  $\omega$  Leonis, and H139 ( $\Sigma$  3062), are published in Nos. 4144-5 of the *Astronomische Nachrichten*. The author gives a set of elements for the orbit of each system, and compares all the available observations with the calculated places; from a discussion of the whole he gives the probable error of the annual means of each observer's measures. According to the final elements, the respective periods of these three systems are approximately 60, 116.7, and 105.5 years.

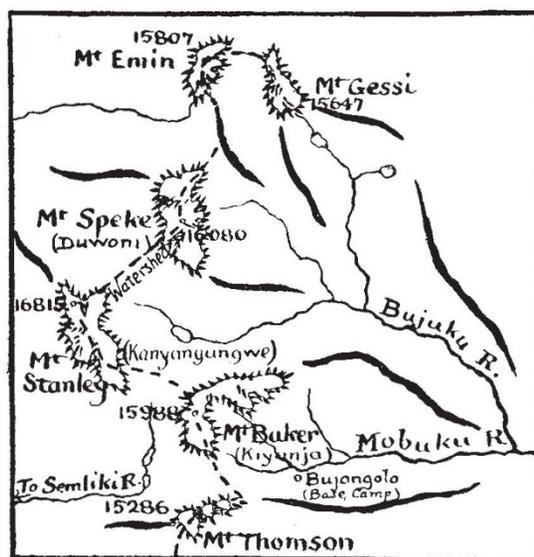
#### THE DUKE OF THE ABRUZZI'S ASCENTS IN THE RUWENZORI RANGE.

AT a crowded meeting of the Royal Geographical Society, held at the Queen's Hall on January 12, and honoured by the presence of the King and the Prince of Wales, the Duke of the Abruzzi gave an interesting account of his recent exploration of the snowy summits of the Ruwenzori range. It will be remembered that many attempts on these peaks have been made within the past few years, but that, owing rather to the climatic character of the range and its distance from an accessible base than to special difficulties from a mountaineer's point of view, all the Duke's predecessors had failed to reach its culminating point. Profiting by the experience of these, the Duke was able to avoid the causes of their failure, his expedition being provided with all that forethought could suggest in the way of equipment, while he was also fortunate in securing trustworthy information as to the times of year at which the climatic conditions were likely to be most favourable.

The Duke was accompanied by two Alpine guides and two porters, all from Courmayeur, as well as by experts entrusted with research in various scientific departments, including Major Cagni, his trusty companion on his previous expeditions, and Signor Sella, well known for his unique experience in mountain photography. Apart from the mountaineering interest of the expedition, there was much to be done before the topography or morphology of the range could be at all thoroughly understood. Captain Behrens, of the Anglo-German Boundary Commission, had, by triangulation, fixed the altitude of the highest summit within very narrow limits, and shown that it was much under the 20,000 feet attributed to it by some travellers. He had also fixed with considerable accuracy the position of the double-culminating peak, recognised as the Kanyangungwe of Stuhlmann, but the number and

relative positions of the several *massifs* were still matters of uncertainty.

It is unnecessary to refer to the first part of the Duke's address, dealing with the journey from the coast and final organisation of the expedition. The route adopted (after much deliberation) for the approach to the snows was that from the east by the Mobuko valley, followed by Moore, Johnston, Grauer, and others. During the toilsome march up this the Duke saw reason to doubt its being the best, and he subsequently found that the Bujuko, a northern branch, or even the main head-stream, of the Mobuko, possessed some advantages. After the usual difficulties had been overcome, the snows were at last reached, and a view of all the peaks obtained from a ridge running east from Kiyanja. To the north, four distinct snowy mountains, separated by well-marked depressions, were in view, the nearest and most westerly being crowned by two pairs of peaks, the loftiest of which were at once recognised as those seen from Butiti both by Freshfield and the Duke, while evidently quite distinct from the Duwoni of Johnston. This had already been suspected by Mr. Freshfield after receiving the account of Mr. Wollaston's ascents. After ascending to the summit of Kiyanja it was decided to make a circuit to the south of this mountain, and after descending into a valley belonging to the



Rough Sketch of the Ruwenzori Peaks.

Semliki system, to strike north for the saddle between the two highest peaks. During the descent of this valley a striking sunset view over the great Congo forest was obtained, and the Duke's description was well reinforced by one of Signor Sella's striking photographs. The ascent was successfully accomplished by the Duke and the guides on June 18, the chief difficulty arising from the mists and from an overhanging cornice, which required great care to negotiate. A peculiar feature was the presence of huge "ice-stalactites," which supported the cornice. The twin peaks received the names of the Queens of Italy and England. Between June 22 and July 10 the Duke ascended all the main peaks, while his coadjutors prosecuted their own several tasks, Major Cagni completing an excellent map, while Signor Sella pursued his photographic labours, of the admirable results of which the audience had many specimens.

To the individual *massifs* and peaks the Duke has given the names of distinguished explorers of the region and of Royal personages, although it may be doubted by some whether the native names which have already found their way into Ruwenzori literature are not more in harmony with the romantic aloofness of the range than any exotic appellations, however otherwise suitable. Even though not strictly belonging to the summits, the native

names might as legitimately be transferred to the latter as many of the names in use in the Alps and elsewhere. An interesting point brought out is the fact that all the snowy *massifs* lie on the main water-parting of the range. As regards its geology, the theory of a volcanic origin may be absolutely excluded, there being only one spot in the whole upper region at which even local traces of basaltic veins were seen. The evolution of the range may be ascribed to (1) an upheaval *en masse* of a portion of the Archæan floor of Central Africa; (2) to a highly accentuated anticlinal uplift, ellipsoid in form, with strata more or less tilted in the central group; (3) the presence in this of a series of rocks (amphibolites, diorites, &c.) far more resistant than the gneisses and mica-schists of the outer ranges. Evident traces were seen of the enormous development of glaciers in the Ice age, while at present they are of the second order only, on the upper slopes and in the larger ravines. They are all, at the present moment, in retreat. The snow-line seems to be at about 14,400 feet. Among other results of the expedition, various new species of birds, molluscs, insects, crustacea, &c., were collected, though the fauna of the upper region was naturally poor.

The Duke showed a praiseworthy caution in identifying

behind Arequipa, and ascended the main Chachani summit to an altitude of 18,000 feet, being satisfied that the ascent could be completed. In January, 1892, Prof. Pickering established a station at the Chachani Ravine at an altitude of 16,650 feet. An attempt was made in December to start a station on the main summit, but when Prof. Pickering and Mr. Goodair reached a height of 18,800 feet the Indians who were carrying the instruments and baggage deserted, and the attempt failed. The Chachani Ravine station was visited about once a month during 1892, and discontinued in 1893.

In October, 1893, a station was erected on the summit of the Misti Volcano, and in December another lower down on the eastern flank, the altitudes being 19,200 feet and 15,600 feet respectively. In 1895 observations were also taken at an altitude of 13,300 feet.

These stations constituted a chain from the sea coast over the western Cordilleras, and in order to continue this chain across the Andes, Prof. Solon I. Bailey, in July, 1894, started a station at Cuzco, in the valley between the western and eastern Cordilleras. The instruments were established in the yard of a brewery, and one of the employees commenced observations in July.



The Meteorological Station at the Chachani Ravine (16,650 feet).

the range with the "Mountains of the Moon," in spite of the obvious allurements of the notion, to which so many of his predecessors have succumbed.

At the conclusion of the address the King, in a short speech, expressed the thanks of the assembly to the Duke, whom he congratulated upon his successful expeditions in tropical and polar regions.

METEOROLOGY IN PERU.<sup>1</sup>

IN 1892 Prof. W. H. Pickering and others of the staff of the Arequipa Observatory were trying to establish meteorological stations in Peru, a region which up to the present has not been very well represented in meteorological observations. The meteorological station at Mollendo had been discontinued during 1890 and 1891, but observations were resumed there and at Arequipa during the early part of 1892, and in March a station was established at La Joya, a town midway between these two places.

In December, 1891, Messrs. Douglas and Goodair made a journey of inspection past the Chachani Ravine,

<sup>1</sup> "Annals of the Astronomical Observatory of Harvard College." Vol. xxxix., part ii., Peruvian Meteorology, 1892-5. By Prof. Solon I. Bailey.

After an unsuccessful attempt to secure a station to the east of Cuzco, Prof. Bailey went on northward, using mules and encountering many difficulties on the way. Very often the shelters and instruments had to be carried by hand under the low branches of trees and overhanging rocks, which would otherwise have struck them from the backs of the mules. At Santa Ana Prof. Bailey met one of the estate owners, who willingly agreed to make the observations in his own grounds, and did so for more than a year.

The various stations were all fitted with Richard barographs and thermographs, standard and maximum and minimum thermometers, &c. Observations were also made of rainfall, clouds, winds, and of occasional phenomena.

At Mollendo, La Joya, and Cuzco observations were made at 8 a.m., 2 p.m., and 8 p.m. each day, but at Santa Ana only at 8.0 a.m. At the mountain stations observations were made only at intervals of about ten days by various members of the Arequipa staff.

In the volume under notice only eye observations have been discussed, the automatic records being left for a future volume. So also are all the Arequipa records.

An examination of the thermometer records shows that the annual range of mean temperature at the lower stations is small, being largest at Mollendo on the coast,