We cannot close these notes without saying a word in commendation of the excellence of most of the catalogues, especially those of Ceylon and the Cape of Good Hope.

JOHN R. JACKSON

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IPECACUANHA CULTIVATION IN INDIA

THE following note is from a letter which I have received from Mr. Gammie, who has charge of the cinchona plantations of the Bengal Government at Darjeeling. The facts are of considerable biological interest, as showing that amongst closely connected forms, which can scarcely be distinguished by palpable morphological differences, there may yet be unobvious constitutional distinctions which in the struggle for existence may determine the survival and ultimate dominance of some one form in particular.

The facts are also perhaps interesting in another way. To any one who will be at the pains to turn up vol. vii. of NATURE, p. 6, it will be amusing to see the sequel which the chance of circumstance has brought to one branch of a long-burnt-out controversy.

W. T. THISELTON DYER

Royal Gardens, Kew, December 13

"I don't think I ever told you the final results from our ipecacuanha-growing experiments, but do so now.

"Our original stock of plants came from Kew and Edinburgh—the great majority from Edinburgh. The few plants from Kew differed a good deal in appearance from the Edinburgh lot, which, again, differed greatly from each other. All the Kew plants were of one sort, which we named, from the start, the Kew variety. It was rougher in the leaf than the Edinburgh sorts, and not so strong-growing while under glass.

"After we had satisfied ourselves that we could make nothing of ipecacuanha, from a commercial point of view, we put all the plants out in the open, under shade, and let them take their chance. By this time we had all the sorts mixed up together; and as we had originally at least ten Edinburgh plants for each one of the Kew sort, and the Edinburgh lot had, besides, been much the stronger growers under glass, the Kew plants formed less than 5 per cent. of the whole. But very soon the Edinburgh sorts began to disappear, until, in the course of a year or two, there was not a single plant of one of the Edinburgh varieties alive, whilst almost every plant of the Kew variety lived. Of it, at the present moment, we have a good stock, and in one place, at 1400 feet elevation, under the shade of living trees, we have plants, which were put out many years ago, in the most perfect health, but unfortunately their growth has been so slow as to render the prospect of any profitable return from them almost hopeless. Still it strikes me that, in places geographically better situated for ipecacuanha-growing than Sikkim, this particular variety may succeed, although other sorts may have failed. Probably our ipecacuanha experiments may prove another instance of the folly of giving up the cultivation of new crops as hopeless until the most exhaustive experiments have been carried out. It may be that there are even harder varieties of ipecacuanha than the 'Kew variety' to be found."

SUNSPOT OBSERVATIONS IN HUNGARY¹

THE Observatory, of which the first volume of Publications is now before us, was founded by Cardinal Haynald in 1878 in connection with the archiepiscopal gymnasium at Kalocsa in Hungary. Preliminary geodetic operations, of special importance as supplying an inde-

pendently determined point of reference for the Hungarian survey, with the examination and adaptation of instruments, cost much time and labour; so that only a fragmentary part of the energy of the establishment has hitherto been available for purely astronomical work. The Director, however, Dr. C. Braun, has wisely embraced the rule of concentration which governs most successful campaigns, and is hence enabled to present, in lieu of a multitude of scattered and perhaps useless observations, the connected results of four years' solar study, unpretending in aim, but thoroughly well executed, and developed with much clearness and not a little originality. The time, it is true, has somewhat gone by for visual solar work of the kind here described; and Dr. Braun, like all other astronomers, is getting ready his camera. Still, it is well worth while to consider what has been learned—even at a somewhat disproportionate cost of labour—by graphical delineation pursued through fifty consecutive solar rotations.

The instrument employed was the smaller of two excellent Merz refractors possessed by the Kalocsa Observatory. It is of four Paris inches aperture, is equatorially mounted, and appears to possess uncommonly fine definition. To its eye-end was fitted an apparatus invented and constructed by Dr. Braun himself, by means of which an image of the sun 22 centimetres in diameter was projected, after total reflection from a right-angled prism, upon a sheet of drawing-paper. In this way nearly 5000 drawings of spots were executed during the years 1880 to 1884. For their reduction two expeditious methods—one graphical, the other computative—were devised; and the resulting heliographical latitudes are rendered strictly comparable with those derived by English observers, through the application of a small correction due to a difference in the adopted elements of the solar rotation. Now that sunspot observations have become cosmopolitan, it seems indeed a pity that there should not be unanimity on this point among astronomers. Dr. Braun conforms, however, to the solar prime-meridian chosen at Greenwich, so that the longitudes given in his maps practically coincide with Greenwich longitudes.

The highest grade of accuracy was not aimed at in these observations. Their object was the collection of materials for studying the processes of spot-formation and the relation of spots to prominences, with side-glances towards a possible, but every year less and less probable, transit of "Vulcan." The determination of the solar rotational elements, or of the minute changes of latitude of spots, was left to observers provided with the means of executing refined micrometrical measurements. Nor was the estimation of maculated area attempted. Yet with all these limitations, much of interest remains to be gathered from the paper before us.

The results are portrayed in fifty maps, each representing the aspect of the sun's surface between the parallels of 40° north and south, during one synodical rotation. The indication of the solar meridians which on successive days were central at mean mid-day (Kalocsa time) renders it easy to trace the fluctuating appearance of the actual visible disk throughout each period. The maps further contain two long sinusoid curves—one denoting the heliographical latitude of that point on each meridian of which the position-angle on the east limb was 90°, the other showing the latitude of the points similarly situated on the west limb. Hence the position-angle of any given spot as it traversed either edge of the sun can at once be deduced—a datum obviously much facilitating inquiries into the connection of spots with prominences.

To each map corresponds a table, in which, besides the heliographical position of each spot, something of its history and peculiarities is set forth—the number of times it was observed, the epochs of its appearance and disappearance, with a general description of its size and shape. Especial interest attaches to a table in which Dr. Braun

¹ "Berichte von dem Erzbischöflich-Haynaldschen Observatorium zu Kalocsa in Ungarn." Von Carl Braun, S. J. (Münster i. W.: Aschendorff, 1886.)