

His services to science were recognised by all the great learned Societies, and he was a Foreign Member of the Royal Astronomical Society of London. He was a man of a singularly noble personal character, and his death is deeply regretted by a wide circle of friends.

#### THE COLONIAL AND INDIAN EXHIBITION

**CANADA.**—This section of the Exhibition will be remembered chiefly for its agricultural machinery in motion, its fur, and agricultural trophies, and its large collection of furniture. The collection of fruits in the agricultural trophy has probably never before been equalled either in number, variety, or perfection of preservation, the colours of the several fruits being extremely well preserved in various solutions, such as dilute sulphurous acid for the lighter coloured fruits or salicylic acid for the darker ones. Besides these, however, there were numerous exhibits which, though less imposing to the general visitor, were of considerable interest, such, for instance, as the collection of timbers, and manufactures therefrom, photographs of American timber-trees, &c. The enormous sizes of many of the American Coniferæ were well illustrated by magnificent planks of such woods as the Douglas fir (*Pseudotsuga Douglasii*), some sixteen feet high and about ten feet in diameter, large slabs of hemlock spruce (*Tsuga canadensis*), also enormous logs of black walnut (*Juglans nigra*), and many others. Perhaps the most compact and interesting collection of timbers, however, was that from New Brunswick, where the woods were arranged so as to form a kind of design, the lower or basal portion being formed of trunks of trees, with their barks remaining, about three feet high, over this were arranged sections of the wood in frames composed of the young branches with the bark on; and above these, again, panels of the same wood as shown below, cut longitudinally and with a cross section at the base, both polished to show the grain or figure, and on the panel of each wood was painted a very good representation of a spray or branch of the plant itself. Each specimen was properly named, so that the whole thing was very complete. The series of photographs before alluded to are correct representations of the tree flora, each photograph being framed with the wood of the tree illustrated. The general use of the bark and wood of the cedar of British Columbia (*Thuja gigantea*), for useful and ornamental articles, was well shown in the exhibits of mats, native head-dresses, masks cut from the solid wood and grotesquely painted, spoons, whistles.

**Fiji.**—Though the space occupied by these islands was but small, the exhibits were of an interesting character, including a fine set of native timbers, for the most part scientifically named, and including some large blocks of Fijian sandalwood (*Santalum yasi*), roots of the kava (*Piper methysticum*), which is generally used in the Society and South Sea Islands in the preparation of an intoxicating beverage by chewing the root, ejecting the saliva into large bowls, and then fermenting it; or by pounding the root between two stones, then putting it into a bowl, pouring water upon it, kneading it, and afterwards straining it. The taste is said to be like that of soap-suds, but a liking for it is easily acquired, and it is said to quench the thirst better than any other beverage. A spirit prepared from it in Germany was sold in the Exhibition under the name of yagona or kava schnaps. This spirit, which is something of the nature of a liqueur, is described as having medicinal properties, and is recommended for its remarkable soothing and stimulant effects, restoring faded energies and exhausted nerve-power. Cocoa-nut fibre and oil of course form large staples of produce in Fiji, and were fully represented in the Exhibition, as well as dilo nuts and oil (*Calophyllum inophyllum*). Some excellent samples of sugar, grown and manufactured in

the islands, and tea, also grown and prepared in Fiji, as well as many other products, were shown in quantity. Great credit is due to the Executive Commissioner, the Hon. J. E. Mason, for making the resources of his colony known by the [distribution of small samples, during the period the Exhibition was open, to any one having a real interest in their development.

**Victoria.**—Besides the splendid collection of water-colour drawings of Australian plants exhibited on the north side of the Court, the fine series of Victorian woods, the golden arch, and the native encampments, all of which attracted a considerable amount of attention, the products of the genus *Eucalyptus* in the shape of oils and resins, exhibited by Mr. Joseph Bosisto, M.P., and President of the Commission, were amongst the most interesting and important. Samples of the oil of *Eucalyptus amygdalina*, rectified and non-rectified, were shown. This is the best quality of eucalyptus oil, and the oil for the preparation of which Mr. Bosisto's firm has become noted. A sample of the essential oil of eucalyptus of commerce was also shown, and described as being obtained from the allied varieties of *E. amygdalina*, but not from the true species. So many varieties of this species are known that it is difficult for bushmen who collect the leaves to distinguish those of the true species from its congeners, forming, as they often do, a compact jungle or bush growing in close proximity to each other. The oil is rubefacient, antiseptic, disinfecant, and a deodorant of great power. The essential oil of *Eucalyptus globulus*, the blue gun-tree of Victoria, having tonic, stimulant, and antiseptic properties, as well as those of *E. oleosa*, *E. dumosa*, *E. citriodora*, *E. goniocalyx*, *E. obliqua*, &c., were also shown. A sample of eucalyptol from *E. amygdalina* and *E. globulus* is described in the Catalogue as "a homologue of camphor, and appears to be two steps higher in the series. Its vapour, mixed with air, is agreeable when inhaled, and is employed as a therapeutic agent in bronchial and diphtheritic affections." Amongst resins were those of the red gum of Victoria (*E. rostrata*), described as a thoroughly soluble and delicate mucilaginous astringent, and *E. resinifera*, Australian kino. Fine samples of the resin of the Australian grass-tree (*Xanthorrhæa hastilis*) were also shown. This is obtainable in large quantities; it is of a deep amber colour, soluble in spirit, and is used for staining wood to imitate cedar and oak, and is also used in this country in French polish to deepen the colour of light mahogany and other woods.

**New South Wales.**—Minerals, wools, timber, and furniture made of the timber, were the principal objects exhibited. None of the woods called for any special remark except, perhaps, a small collection either known or considered to be adapted for wood-engraving, and these specimens were of little or no value in themselves, being badly selected, and in many cases much split or cracked. The collection was more valuable as giving a clue to the source of the woods considered suitable for engraving purposes than for any qualities of their own. Among the woods so exhibited were *Bachhousia myrtifolia*, *Hymenoporum flavum*, *Xanthoxylum brachyanthum*, *Acacia Cunninghami*, *Duboisia myoporoides*, *Dysoxylon Fraserianum*, *Gmelina Leichhardtii*, *Hemicycelia australasica*, *Weinmannia rubifolia*, *Eugenia myrtifolia*, *Pentaceras australis*, and others. Amongst fibres and fibrous barks was the bark of the small-leaved nettle-tree (*Laportea photiniphylla*), also a fishing-net, cordage, and a dilly bag made from the fibre by the aborigines of the northern coast districts. The collection from New Guinea exhibited in this Court was of considerable interest. The utilisation of the bony seed shells of *Pangium edule* for decorating the skin drums is one not seen by us before. The seeds produce a rattling sound when shaken similar to those of *Thevetia nereifolia*, which are used for like purposes in British Guiana.

*South Australia.*—The centre of attraction here was undoubtedly the scene on the Murray River wherein the habits of the aborigines were depicted. Wool figured largely, and the applications of emus' eggs for a great variety of purposes were fully illustrated. A good collection of small specimens of the woods of the colony was shown, as well as a collection of fruits and seeds.

*Western Australia.*—A fine collection of the timbers of the colony was exhibited in this Court, and outside near the basin adjoining. The principal woods shown were jarrah (*Eucalyptus marginata*), and karri (*E. diversicolor*). Of the former, one of the principal attractions in the Court was a log, some seven feet long, over four feet in diameter, and weighing nearly five tons, carefully polished on one end to show the cross section, and in the middle to show the longitudinal structure. The wood has a very fine deep red colour, and "for the durability of its timber," Baron Mueller says, "is unsurpassed by any kind of tree in any portion of the globe." When carefully selected and dried, it is proof against the attack of teredo, termites, or any other wood-borers. It is consequently in great demand for jetties, piles, railway-sleepers, fence posts, and all kinds of underground work, as well as for planking and frames of ships. This fine block of wood, and a fine slab or counter-top of figured jarrah and other West Australian woods, have been presented to the Museum of the Royal Gardens, Kew. Amongst the plants exhibited as being used for tea by the natives were the following:—The leaves and flowers of *Verticordia pennigera*, known, it is stated, to the settlers in the earlier days of the colony, and used medicinally. The taste is said to be similar to Chinese tea. Another kind of native tea proved upon examination to be furnished by *Kunzea Muelleri*.

*Queensland.*—Of vegetable products exhibited from this colony the collection of woods was the most noteworthy, not only for the number of species, but for the care shown in their selection and preparation. The two enormous trunks of cedar (*Cedrela Toona*), each some fifteen feet high, and one with a girth of twenty feet five inches, will as long be remembered for their majestic size by those interested in tree growth as the number and brilliancy of the opals will be remembered by those interested in gems.

*New Zealand.*—Next to the collection of birds and minerals, the timbers of New Zealand held a prominent place, and the furniture made from the most important and beautiful woods, such as mottled kauri (*Dammara australis*), and totara (*Podocarpus totara*) was well illustrated. The beauty of these woods is so great that it is remarkable they should still remain comparatively unknown amongst cabinet-makers in this country.

*Cape of Good Hope.*—The centre of attraction in this Court was undoubtedly the diamonds and diamond-polishing. Of the vegetable products a collection of native medicinal plants was shown, and their uses were well described in the catalogue of Cape exhibits, and for the most part are to be found also in Pappé's *Flora Capensis Medica Prodomus*. There was also a very fine collection of well-seasoned and polished wood slabs, amongst them being Outeniqua yellow-wood (*Podocarpus elongatus*), an extremely valuable, fine-grained wood of a light yellow colour, useful for furniture, planks, flooring-boards, beams, &c. One slab of this fine wood—which was almost entirely hidden during the Exhibition by a counter being built over it, and measures about twenty feet long by five feet in diameter—has been presented to the Kew Museum, together with a fine set of other Cape woods, many of which might become useful in this country were they better known, notably the stinkwood or laurel wood (*Oreodaphne bullata*), a dark-coloured wood much resembling walnut in appearance, but heavier and considerably stronger, so that it has been recommended quite recently for gun-stocks. In the colony it

is very highly prized for nearly every kind of work connected with building and cabinet-making, being little inferior if not equal to teak in strength and durability.

*Natal.*—Raw vegetable products largely predominated in this Court. Sugar, maize, tea, and tobacco were the principal staples. The cultivation and manufacture of tea is a new industry for Natal, and the result is that an article of very good quality has been produced, Natal tea having been on sale during the period of the Exhibition and well spoken of, so that there seems every probability of a future trade in this article with Natal. Amongst tanning materials we noticed the root, both entire and broken, of the Elands Bontjis (*Elephantorrhiza Burchellii*), which has attracted some attention of late as a valuable tanning material. Preserved native fruits, such as granadilla (*Passiflora maliformis*), papaw (*Carica Papaya*), amatungulu (*Carissa grandiflora*), and others, were exhibited, as well as a variety of hard woods, many of which were without scientific names.

*West African Settlements.*—Under this head was included the Gold Coast, Lagos, Gambia, and Sierra Leone. The exhibits consisted largely of raw products of both the vegetable and animal kingdoms, together with some native manufactures, such as textiles from indigenous palm fibre or grasses, carvings in wood, &c. Oil seeds were shown in variety as well as in bulk, and notable amongst them were the kernels of *Elais guineensis*, malukeh seeds (*Polygala rarifolia*), which only occasionally finds its way to this country, physic nuts (*Jatropha Curcas*), benniseed (*Sesamum indicum*), and others as well known. Some very large balls of rubber were exhibited from Sierra Leone, and some fine masses of a kind of gum copal from the Gold Coast.

*Ceylon.*—Vegetable products abounded in this Court. On the walls were exhibited no less than 362 specimens of native vegetable drugs, got together by the Director of the Royal Botanic Gardens, Peradeniya. A very fine series of planks of the principal useful or ornamental timbers were exhibited, amongst them being tamarind, satinwood, ebony, calamander, and nedun (*Pericopsis mooniana*). The most attractive of the Ceylon woods is certainly calamander, but this is said to be now extremely scarce, and as it is of slow growth, the supply is very limited. Satinwood trees are common "in the northern, eastern, and north-western forests, but the proportion of these which yield 'flowered satinwood' is very small, and this description of wood is therefore comparatively high in price." Notwithstanding this scarcity of "flowered satinwood," several of the show-cases which contained the exhibits of tea, cardamoms, &c., and some of the barrels containing coffee, were of flowered satinwood. The Ceylon collection on the whole was one of particular interest.

*India.*—The extent of space occupied by our Indian Empire, and the varied and interesting character of the exhibits, will long be remembered. The contents of the art courts do not come within our notice, but there was sufficient material in the Economic Court for an extended notice. Space, however, will not allow us to say more than a few words on the unrivalled collection of the raw products of India—such a collection, indeed, as in all probability was never brought together at one time before. In such a collection it would be impossible to individualise any of the exhibits—those most striking, such as the bamboo bridge, will remain fresh in the memory—but it is in such details as the individual contents of the several shops that the interest of the economic botanist lies. To obtain any idea of the contents and value of the Indian Economic Court, we must refer our readers to the recently-issued "Special Catalogue of Exhibits," a large portion of which has been compiled by Dr. Watt, who had charge of the Economic Court during the Exhibition. This catalogue is a valuable and interesting record of one of the most important sections of the whole Exhibition.

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.

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#### PECACUANHA 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 HUNGARY<sup>1</sup>

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-

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

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