

ODONTOGLOSSUM CRISPUM: A TALE OF LOVE, LOSS, AND SCIENTIFIC DISCOVERY

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ABSTRACT. This is the story of *Odontoglossum crispum* (= *Oncidium alexandrae*), from the 19th century to the present day. It is a love story because *Odontoglossum crispum* was considered by many to be the most beautiful of all orchid species. It was collected by the hundreds of thousands from the cloud forests of its native Colombia and exported to Britain, the rest of Europe and the USA. Vast numbers were lost in transit. When they arrived, many perished due to a lack of understanding of its needs in cultivation. Only the 'best' forms were grown, and the remainder discarded. Today, much of its native habitat has either disappeared or been despoiled due to human actions. Few plants remain in cultivation in the UK. It was one of the first species to be grown commercially from seed, most notably in the UK by Charlesworth & Co., following the scientific discovery by Noël Bernard that orchid seeds required the participation of a suitable fungus to germinate under natural conditions.

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Introduction. J. P. Hartley famously wrote, "The past is a foreign country: they do things differently there" (Hartley 1953). Colombia was indeed a very different place in the 19th century. Reading past travellers' accounts (e.g., Hamilton 1827) of their journeys throughout Colombia, the overwhelming impression is one of the abundance of wildlife. The time when the mountains of Colombia were still cloaked with forest is not that long ago, almost within touching distance. When my grandfather, George Ernest Seaton, was born in 1876, the Andean forests must have been home to what today seem almost incredible numbers of orchids. Now just fragments of forest remain. Each new generation accepts the current condition of the environment as being the norm - a phenomenon known as 'shifting baseline syndrome'. In the absence of historical information we are largely unfamiliar with what we are missing, what has been lost. As early as 1801, Alexander von Humboldt was lamenting the destruction of the natural environment (Wulf 2015). Claes wrote in 1891, "Around Pacho, where *Odontoglossum alexandrae* used to be found by the thousand, there are only a few specimens left, and

I fear that in many places they will not return due to the vandalism of certain speculators, who burned all the plants they could not carry away" (Jenny 2015a,b). The following story provides an insight into the fate of just one orchid species, *Odontoglossum crispum* Lindl., over a time span of around one hundred and fifty years.

The orchid hunters

"Whether all the botanical pressure that can be brought to bear upon our cultivators may suffice to convert *Odontoglossum Alexandrae* into *Odontoglossum crispum* ... is an extremely doubtful question." Thus, wrote Bateman in 1874 in *A Monograph of Odontoglossum*. He also said that, "as the first specimens of the white variety of *O. Alexandrae* were collected by Mr Weir it is only fitting that his name should be associated with it, just as his rival Mr Blunt has been connected with the variety distinguished by crimson spots. Both frequently acquire a reddish tint in their bulbs and leaves, a sure criterion by which *O. Alexandrae* may be distinguished from other *Odontoglossa* that closely resemble it in habit."

I am not a taxonomist by training, and want to make it clear at the outset that I have no wish to become embroiled in the pro's and con's of whether or not the much-loved *Odontoglossum crispum* should now be (correctly?) referred to as *Oncidium alexandrae* (Bateman) M.W.Chase & N.H.Williams (Pridgeon *et al.* 2009). As this is a largely historical account, and this supremely beautiful orchid has been mostly known as *Odontoglossum crispum* (and often simply 'crispum') throughout most of the time since it was first encountered by Europeans in the cloud forests of Colombia, I will (mostly) refer to it by that name. But I will admit to smiling when I came across Bateman's lines. *Plus ça change!*

Although Karl Theodore Hartweg is generally credited with the discovery of *O. crispum* in 1841, Linden said many years later that he met Hartweg in Bogotá, "and it was during an excursion that we took together that we discovered, near Pacho, *Odontoglossum crispum*, which has excited the admiration of millions during the last few years" (Anonymous 1894a). That word 'discovery' however, should perhaps be treated with some caution, and a much earlier painting that appears to be *O. crispum* can be found in the herbarium of the Royal Botanic Garden of Madrid from the Royal Botanical Expedition of the New Kingdom of Granada that took place between 1783 and 1816 (Uribe 2020).

By the late 19th century, *Odontoglossum crispum* had become probably the most coveted orchid of its day. Albert Millican's mission had been to find and secure as many plants of this beautiful species as possible. On board the *barco de vapor* (river steamboat) were crates of the precious cargo that he had collected over the previous months. After arriving in Colombia's capital, Bogotá, Millican had trekked for two days on foot and by mule over a cold treeless paramo, finally descending through forest to Pacho. Although he had been told that this small Andean village, located in a valley at around 1700 m in the Eastern Cordillera, was home to the most desirable varieties of *O. crispum*, he discovered that the conditions in the village were too warm, with the orchids soon losing their vigour if grown there. Finding the crispums was an arduous journey of three more days, high into the cool and misty cloud forests,

and on to the small village of Buenavista where there was, "an abundance of plants", with "magnificent flower spikes hanging from the branches of the trees, some so high that they were out of reach of the native climbers; others so low that they were easily retrieved by hand" (Millican 1891).

Some years earlier, José Jerónimo Trianae (for whom *Cattleya trianae* is named) had describe *crispum* as growing on the vertical trunks of very large trees with dense foliage (Bateman 1874). Later Millican would write, "Scarcely had we entered the forest on this side of the mountain when we noticed a great difference to everything we had seen before. The trees here were more fully grown next to a dense forest – whilst every trunk and branch was covered with a heavy overcoat of lichens that trapped the water, and our clothes soon became saturated through. In these natural reservoirs the *Odontoglossums* find home at between 7000–8000 feet (2100–2400 m) and at a temperature that falls as low as 50°F (10°C) at night ... we have never seen the thermometer reach more than 59°F (15°C) at midday."

Millican hired thirty *campesinos* and secured provisions for a week in the nearby village of Maripí. These were taken to the edge of the forest on the backs of mules, the men then carrying them through the forest for two days to their base on the borders of a stream. The men commenced cutting down the trees that contained the valuable orchids, carrying hundreds of plants back to their camp each night. After working for two months they had collected around 10,000 plants, in the process cutting down some 4000 trees. Clearly Millican didn't consider that felling such large numbers of trees was a problem, saying that, "In the immense forests, where a few acres of clearing are considered to be a blessing ... they will be converted into forest within three years." Sadly, he was mistaken. Neither the trees, nor the associated orchids have returned in their previous numbers.

The nineteenth century was the heyday for European plant collectors. Surviving letters and journals provide tantalising glimpses of a lost world. These were also the early days of photography, and Millican's *Travels and Adventures of an Orchid Hunter* (Millican 1891) includes images that provide further clues about his life as an orchid collector. One can



FIGURE 1. Collecting *Odontoglossum crispum* taken from *Travels and Adventures of an Orchid Hunter* (1891).

only marvel at the effort it must have taken to carry the cumbersome camera (Rouche) equipment, including fragile glass plates, over the rough terrain and into the forest. Glass negatives, were sold in boxes, and photographers could shoot and store them, and bring the box either to their own home dark rooms or back to a shop to have them developed and printed (pers. comm Rodrigo Orrantia, 2019). One image (Fig. 1) shows a group of men: mostly barefoot and wearing broad-brimmed hats with large conical crowns. Some are sat on ground that has been cleared by chopping down small trees, eating from bowls, with their axes by their sides. The picture is framed on the left-hand side by a man leaning on his axe. Millican probably took the photo himself and is on the opposite of the photograph, partly obscured in the smoky haze of the camp fire. A rifle is hanging from a large tree, below which are a great number of *O. crispum* heaped up against the trunk, some in flower. So remarkable is this image that Millican himself felt it necessary to state in his preface that because they had “not been able to successfully photograph *Odontoglossum Alexandrae*

on its native trees, or the native means used to drag the plants from their cold, damp Andean home”, plant collectors and dealers had doubted that it was possible. He was willing to show them the original negatives. The image has clearly been retouched, giving it a painterly feel, either because the negative had streaks and blotches, or perhaps someone was standing in the shade and their original image was too dark (pers. comm Rodrigo Orrantia, 2019). Another photograph in his *Adventures* shows a pile of “three thousand *Odontoglossum crispum*.”

In 2021, Sotheby’s offered for sale Millican’s original manuscript in book form, with a mounted photograph portrait frontispiece signed by the author, 52 original photographs, all mounted, four full-page watercolour drawings by botanical artist J. L. Macfarlane, including a spotted *Odontoglossum crispum*, and a group of proof illustrations loosely inserted at end. At the front is a studio photograph of the bearded Millican himself. He is seated on a log, posing with his rifle and his feet planted on a jaguar skin. A bow and spears are propped up on either side.

A hazardous business

The orchid hunters in South America were travelling in the footsteps of earlier explorers, notably Alexander von Humboldt. Humboldt left Cartagena on the Caribbean coast of Colombia on April 6th 1801 with his companion Aimé Bonpland, walking “through dense forests lit by fireflies.” On reaching the Río Magdalena, Humboldt and Bonpland set off upstream by canoe towards Bogotá. Thick forests hemmed in the river on either side. It was the rainy season, and Humboldt described the humidity as being “unbearable”. They were constantly plagued by mosquitoes. The river was teaming with wildlife, with large numbers of caimans and turtles. On a later journey in 1823, Mollien describes hiring *bogas* – oarsmen - to pole his expedition up the Río Magdalena “en un frágil piragua” - a fragile canoe - from Cartagena to Honda (Mollien 1944). In the evening, if they had not reached a village, they would camp on a sandbank, their oarsmen being particularly keen to find turtle eggs (probably eggs of the endemic Magdalena River Turtle, *Podocnemis lewyana*, currently listed by the IUCN as being critically endangered due to habitat destruction - principally dams - and traditional and commercial exploitation) and destroying the nests of caimans, when they found them. The only signs of human habitation were a few primitive dwellings (*chozas*) close by or on the river banks. By the time that the orchid collectors arrived, the first paddle steamers were plying their trade on the Magdalena, making access to the interior (and the orchids) easier than it had been for those earlier, intrepid explorers.

Travelling in the tropics could be hazardous. “Many a collector who set out full of hope to seek his fortune in the form of large quantities of desirable plants, possibly of hitherto unknown, never came back, and there was never any news as to how and where he met his end” (Richter 1965). If you fell in the Río Magdalena, if you didn’t drown, you were in danger of being eaten by caimans, and if you went ashore you could be bitten by venomous snakes. Many succumbed to tropical diseases. The American collector Robert Grey describes travelling to Colombia via Jamaica with his brother in 1888 (Grey 1955). His brother soon died of yellow fever in Honda and, later,

Robert almost fell victim to the same disease. This dreadful haemorrhagic fever (think Ebola) affects the liver (hence the jaundice), with patients producing an alarming black vomit. It is thought to have arrived from Africa some time before 1650, probably aboard a slave ship and accompanied by its mosquito vector, *Aedes aegypti*, that would have bred in the casks that provided drinking water (Spielman & D’Antonio 2002). Yellow fever became endemic in the monkey populations in the forest canopy, where it was transmitted by the native mosquito *Hemagogous spegazzini*. It could be transmitted to humans whenever trees were felled, the woodcutter returning home whilst incubating the virus and becoming the source of an urban outbreak. Likewise, malaria appears to have been introduced into South America with the transatlantic slave trade, and there are references to the fever being treated with Jesuit’s bark (quinine) derived from the cinchona tree (*Cinchona calisaya*) discovered in the region around Loja in the south of Ecuador. Millican himself came to a sticky end. He was stabbed to death in 1899, in a tavern in Victoria in the district of Caldas, Colombia (Mejía Perafán 2023).

The diaries of Rosa Carnegie-Williams provide another rare insight into what it was like to travel in the country at that time (Carnegie-Williams 1884). Between 1881 and 1882 she travelled to Colombia from England with her husband (who was working on railroads in Tolima). The only viable route to the interior was via the Río Magdalena and she describes her steamboat journey upriver to Honda. Due to the shallow nature of the river, the flat-bottomed steamboats were designed to displace as little water as possible. Nevertheless, stranding on sand banks and sinking was not uncommon. In addition, the boats had to contend with the hazards of branches and fallen trees. There were frequent stops for firewood to feed the steamer’s boiler. Not being able to travel at night, the journey took between seven and nine days to travel upstream. In contrast, the return journey took around four days.

Millican was by no means the first person who visited Colombia with the intention of collecting *O. crispum*. Others had been there before him. Amongst them was Joseph Henry Chesterton, memorialised by Reichenbach in *O. crispum* var. *Chestertonii*.

Chesterton died in Puerto Berrio in 1883, and Millican describes finding a “rough cross of wood on the higher bank of the river marks the resting place of Chesterton – the well-known orchid collector who did such good service for the firm of James Veitch and Sons, long before the wholesale plunder and extermination of plants brought about by modern collectors.” Intriguingly, when travelling from Honda to Bogotá Carnegie-Williams was accompanied by an orchid hunter. She only says he was Mr. C. It seems possible that it was Chesterton.

On arrival in Bogotá, Carnegie-Williams began looking for orchids in San Victorino to decorate her new home, and visited the Colombian headquarters of Messrs. Shuttleworth, Carder and Co., a *quinta*, a small country home on the outskirts of the town, that had been purchased with the aim of cultivating orchids and other plants for export to England. An advertisement in *The Gardeners' Chronicle* 1881 (Shuttleworth & Carder 1881) for a sale by auction at Stevens' orchid rooms offers “grand masses of *Odontoglossum alexandrae* from the district from which the best varieties come” collected by Mr. John Carder “and received in splendid condition”, on behalf of Shuttleworth, Carder & Co., Orchid and New Plant Importers. Carnegie-Williams tells us how the plants were packed. “The plants are curiously arranged. Short white sticks are covered with sphagnum moss, amongst which the orchids are tied, so that the sticks resemble Jerusalem artichokes, all sprouting out of the white moss. These are then nailed into wooden boxes, and carried off over the mountains on mule-back to Honda.” Although she doesn't generally record which orchids she bought, when she travelled to Zipaquirá she says, “Out of all the orchids I saw here, only one orchid, a *crispum* with pinkish-streaked petals, and an orange labellum; this quite took my fancy.”

The damage to the native forests was considerable. The German collector Wilhelm Hennis tells a similar tale to that of Millican, saying that, “We calculate that for every three plants actually established in European gardens a tree has been felled” (Ospina 1996). Rather than venturing deep into the forests himself, Hennis purchased the exclusive right to collect plants in the woods and employed groups of local men to go into the forests to gather them (Ospina

1996). Poirier (1906) remarks that this was typical of the (later?) collectors who, rather than setting foot in the mountains themselves, would install themselves more or less comfortably in one of the villages, such as Pacho, where the plants would be brought to them.

Having collected the orchids, the next problem was how to get the booty out of the forest. Initially the men employed by Millican carried the plants to the edge of the woods on their backs. The plants were then cleaned and prepared for packing. Spacious baskets were constructed from thin poles cut in the forest. The baskets of orchids were transported on the backs of oxen to Pacho: a journey of five days. Here the orchids were placed in solid wooden cases and sent to the banks of the Río Magdalena on the backs of mules, to be transferred to river steamers that took them to the coast, a further journey of around five days. Hennis tells us that, “owing to the intense heat on the river journey the plants often perished.” They might languish for weeks on end in the hot and steamy atmosphere of Barranquilla, before being loaded on board a sailing ship or steamer. “Freight services at that time were irregular and not bound to any time-table. The crates were transported over the sea in damp, dark and warm holds, without the light, air and freedom essential to the needs of living plants” (Richter 1965). Hennis's cases went, as a rule, by mail steamer, via Colón and St. Thomas to England, the passage being made in about 27 days. In a similar vein, in 1890 Florent Claes wrote, “The ocean crossing and railway transport to the destination takes a month, sometimes two. But this lengthy journey is perhaps less fatal to *Odontoglossum* than the transport from Honda to Barranquilla, during which specimens are almost constantly subject to intense heat; this is when they suffer most, and many plants are in a state of putrefaction on arriving at the coast” (Jenny 2015a, b).

The scale of collecting

By 1887 in Colombia the orchid trade was of such significance that it began to appear in the Diplomatic and Consular Reports on Trade and Finance, alongside figures for the export of bananas and coffee etc. Collectors were obliged to pay customs duty, and most (but not all) were exported through Barranquilla.

Report No. 456 tells us that in 1887 Colombia exported 88,567 kilos of plants (including orchids).

The horticultural world in Europe soon became aware of the problems of over-collection. In 1887 the following appeared in *The Gardeners' Chronicle*: "The current number of the *Illustration Horticole*, which has just reached us, has a special interest from containing the first instalment of M. André's researches in Colombia. We shall hereafter allude in the ordinary course to M. André's plants, which, like those of Messrs. Wallace, Carder, Shuttleworth, Bruchmüller, and other collectors, will have special interest from the fact that the country is now desolated by civil war, which may prevent further explorations for some time to come. The country as being so rich in plants that, large as is the number of fine things already received, there are many more yet to be introduced. Considering the melancholy fate of thousands of Orchids torn from the trees to die on the journey to this country, we can but feel that the civil war will have some compensations in affording a fallow time to the Orchids, which otherwise would run a fair chance of extirpation, if there be not some of them extirpated already." Grey says that he collected over 60,000 odontoglossums, including *O. crispum* and some natural hybrids but, after he had dried them out and twisted off the old bulbs, only 7000 plants remained. "If I had waited until the dry season to collect the plants, nearly every plant would have lived to reach the United States" (Grey 1955).

£7,673 of "orchids" were exported from Barranquilla in 1895 (Report No. 1721); by 1896 the value of orchid exports had grown to £13,296 (report 1950). In 1899, however, the government of Colombia issued Decree 473, forbidding the cutting down of trees. Although aimed specifically at preventing the destruction of trees to obtain rubber, it meant that everyone who wished to exploit the "National Forests" needed to obtain a licence, and to provide an assurance that trees would not be cut down or destroyed in order to obtain any natural product. 1899 also marked the beginning of the Thousand Days War, that lasted almost three years.

In 1901, Frederick Boyle wrote "I have alluded to the extermination of orchids already. It is a sadly fascinating subject for those who think, and "out of the fulness of the heart the mouth speaketh. The time

is very close when *Odontoglossum crispum*, most heavenly of created things, will arrive by tens and units instead of myriads - and then will arrive not at all. Already a gentleman who boasts that he has leased the whole district where the 'Pacho' form still survives, reckons the number of plants remaining at 60,000 only. Some months ago he issued quaint proposals for a Company (limited) to secure the utmost profit on the collection of these. Business men 'smiled and put the question by,' however enthusiastic they might be as orchidists; but I believe that the statement of facts was not altogether inaccurate. It is no longer worthwhile to send out collectors of *Odontoglossum crispum*; natives of the country gather such as they find and store them until the opportunity occurs to sell a dozen or so" (Boyle 1901).

In an 1881 Sander advertisement we read that "We instructed our Mr. Louis Forget to go to Pacho, to the old collecting areas of our Mr. Oswald Kerbach, to find if he could collect some of the true Pacho varieties of *Odontoglossum Alexandrae*; and he has succeeded in finding a few, and this small consignment has reached us. These Pacho crispums are very rare, although they have been undisturbed now for many years, but we are pleased to offer again, our grand, true old Pacho varieties with the perfect type of flower" (Sander 2020). In 1906, "Forget had sent a magnificent variety of *Odontoglossum crispum*, with rounded petals of white and cinnamon" (Swinson 1970).

Later collectors would describe a much-changed environment. Florent Claes (1907) said, "At the present time the majority of the forests which surrounded this smiling spot have been cut down to make room for pasture lands or for maize or tobacco plantations. Even in 1889, *O. crispum*, in the immediate vicinity of Pacho had become extremely rare, and, in order to procure it, it was necessary for the *parasitoros* to penetrate further into the mountains and search around the other villages situated at a higher altitude. The natives, instead of returning every night with their spoils as at the time when the species grew in abundance, were obliged to carry provisions for a week."

Crispum in Europe

When we read accounts of the removal of tens of thousands of plants from the wild, we may wonder

if this isn't an exaggeration. In 1878, William Bull bought John Weeks nursery in King's Road, Chelsea. That same year he said that he had received from Colombia, "two of the largest shipments of orchids so far achieved, reached an estimated total of two million plants" - mainly *O. crispum* and *Cattleya mendelii* (in Orejuela-Gärtner 2011). In 1881, Hugh Low and Co. advertised for sale upwards of three hundred *Odontoglossum crispum* in spikes or in bud in *The Gardeners' Chronicle*. By 1886, tens of thousands of the 'Pacho' form of *crispum* were being imported by Frederick Sanders into his nursery in St Albans. Frederick Boyle describes 12 glasshouses set side by side, each 180 feet (55 m) in length (Swinson 1970). In the first there were no less than 22,000 pots containing *O. crispum*. They were sold in quantities of up to 10,000 a time. In 1885, Aimé van den Bogaerde set up an import business in Perry Barr in Birmingham focusing on importation of the 'Pacho' forms of *O. crispum* (Hermans & Hermans 2016). In 1894, he advertised a fine importation of *O. alexandrae* in the *The Gardeners' Chronicle* to be sold by auction at Messrs. Protheroe and Morris. And later the same year an immense importation of the "best large-petalled Pacho type."

Williams (1894) says, "many growers have hundreds (of *crispums*), and some thousands, in their collections". "*O. Alexandrae* is to-day the most popular of all Orchidaceous plants whatever, it being grown literally by the million in this country" (Burbidge 1886). And of course, it wasn't just *crispum* that was being collected. A customs receipt for Albert Millican from Cartagena de las Indias, dated 6th July, 1889, indicates 125,000 'Josephinas' (*Miltoniopsis vexillaria*) for export for Mr Brooman White esquire of Andaroch (sic), destination Chelsea. He paid 18 "pesos oro". Millican's book is dedicated to the selfsame R. Brooman White, who later became a member of the Orchid Committee of the Royal Horticultural Society (Hermans & Hermans 2014).

It appears that the market in *crispum* may have become saturated by 1894, however. An article describing an orchid sale that took place in the same year at Messrs. Protheroe and Morris's Rooms (Anonymous 1894b) states that, "*Odontoglossum crispum* from Pacho, of which over a hundred lots were

offered, would hardly sell. One lot of four pieces sold for three shillings, but when grouped six lots together fetched only seven to ten shillings, and ten together eleven to thirteen shillings, ultimately falling to about five shillings for similar quantities. One would think the work of exterminating this beautiful species might now cease for a time."

Cultivation

Reading past accounts, it can seem nothing short of miraculous that any orchids reached the shores of England alive. The problem was particularly acute with plants collected from the cooler regions, such as *O. crispum*. Hennis says, "Owing to the peculiarly soft nature of the plants, they are so liable to decay that in some instances seven eighths of the consignment would be dead on arrival" (Ospina 1996). Tens of thousands of orchids perished before they reached English shores, or did not recover from the effects of the journey (Richter 1965).

Initially, despite repeated warnings from collectors in the field, "they (the orchids) had invariably succumbed under the stifling atmosphere (in stove houses) to which ... they were remorselessly consigned" (Bateman 1874). In time, however, growers came to recognise the importance of understanding the differing requirements of individual species. An article in *The American Florist* (Anonymous 1887a) tells us that a better understanding of *crispum*'s cultural requirements was leading to improved results. "Its home is on the Eastern Cordilleras, in the neighbourhood of Bogotá, about 9,000 feet (2700 m) above the sea. It is here found in great quantities, growing on trunks and branches of trees on the margin of forests, seldom in the full sunshine or in dense shade. The temperature of this locality varies from 55° to 70°F (13 to 21°C); rain falls nearly every day in the year, and heavy fogs prevail at night, which in the woods condense and run down the trees in miniature streams. The cultivation of this lovely species was but little understood until the last few years. Formerly it was the universal practice to kill them in hot stoves then again, they were relegated to cool green-houses, with temperatures of 40 to 50°F (5 to 10°C). Though they will do fairly well in this temperature, a higher one is more suitable, and will better develop the spikes of bloom. Most growers

now keep them in the neighbourhood of 60°F (15°C). In this country a lean-to house with a north aspect is very desirable, and where numbers are grown I think it necessary. They require to be always shaded from the sun. The house may be kept cooler in the summer by elevating the shading about eighteen inches above the glass, with space on top from the wall of one foot."

Boyle says, "The cool house at 'Woodlands' contains about three thousand plants, mostly odontoglossums. It is a 'lean-to,' of course. Not all the most successful growers use this form of building. Baron Schröder's world-famous Odontoglossums dwell in an oblong structure which receives an equal quantity of light from every side. Even the hardiest of epiphytal orchids are conscious of influences which we cannot grasp, and those who understand them are unwilling to lay down fixed rules. But experience shows that under ordinary conditions cool species thrive in a 'lean-to' better than in a house of full span. It may be because the back wall retains moisture and gives it out all day steadily, whilst the air is saturated and dried by turns if fully exposed to a hot sun. Or it may be because the full light of a span-roof is too strong in most situations" (Boyle 1901).

Joseph Chamberlain's grower, Burberry, wrote extensively about orchid culture for a number of publications, including *The Yearly Calendar on Orchid Culture* for *The Orchid Review* in 1894 and 1895, and *The Amateur Orchid Cultivator's Guide Book* (Burberry 1895), emphasising the importance of mimicking, as far as possible, the natural conditions under which the orchids were found. One can easily imagine that at first growers must have been unfamiliar with epiphytes often growing on the branches of trees. Once their needs were understood, however, cultural techniques improved, and large private collections established. Plants were generally grown in terracotta pots (Catalogues of the time contain illustrations of orchid pots with extra drainage for example) or wooden baskets. Orchids generally require free-draining composts, and initially to have been largely peat-based. Williams (1894) recommended using "good rough fibrous peat and live sphagnum moss." As is the case today, there must have been much experimentation and later osmunda fibre, derived from the densely matted roots of the beautiful Royal fern

(*Osmunda regalis*), became the potting medium of choice as it provided ample air around the roots, whilst being water-retentive. It only decomposed slowly, and whilst doing so was a source of nutrients. Nevertheless, its use required skill for repotting. The use of hot water pipes for heating was in many respects ideal, producing a wonderful buoyant atmosphere, together with a high relative humidity. It was however, very labour intensive, as boilers would have to be tended throughout the night. Shading was provided by wooden lath blinds, that were constantly deployed or rolled up to maintain optimum light levels whilst maintaining appropriate temperatures during the summertime.

The collectors

"Victorian collectors and growers haunted the auction rooms. Lord Randolph Churchill always sat on the left of the auctioneer and Mr Chamberlain on the right" (at Stevens' auction rooms) (Yearsley 2005). At its height in the mid-nineteenth century orchid cultivation was essentially an exclusive hobby pursued by the wealthy, who assembled vast private collections and employed their own growers to care for their plants. The sizes of the collections were truly astounding. In 1886, Castle says, "Writing in 1841, Mr. Jas. Bateman said that the collections of orchids were innumerable", and if that was the case then, what would be said now?" "The plants were then numbered by hundreds now amateurs possess thousands, and one, Mr. R. Warner, has even had as many as 12,000 plants of one species, *Odontoglossum Alexandrae*."

As an example, the British Parliamentarian, Joseph Chamberlain wore a fresh orchid in his buttonhole whenever he appeared in the House of Commons and, although a little blurred, photographs and paintings show it was often an *Odontoglossum*, probably frequently *O. crispum*. The orchids were delivered daily from Birmingham, where there was a range of glasshouses attached to his home at Highbury Hall running 247 feet (75.3 m) from east to west, seven of which were devoted exclusively to the cultivation of orchids. "The cool odontoglossum house measured 54 feet by 10 feet (16.5 by 3 m) and was located along the north side of the connecting corridor, running along the north – cooler - side, at right angles to the other

glasshouses.” It “contains a fine collection of many healthy plants, among which are many superb forms of *O. crispum*, which is a great favourite. A rigid process of selection, however, is carried out, and only the best forms are retained” (Anonymous 1893).

John Day’s Scrapbooks

What was so special about *Odontoglossum crispum*? Why did its introduction create such a stir? Why the obsession? What did the imported plants look like? Once again it is James Bateman that provides us with a clue when he writes that a plant discovered in 1863 by Weir was, “not only a new species, but one of surpassing beauty” (Bateman 1874). Bateman had named the plant *Odontoglossum Alexandrae*. To this day, with 278 awards, *O. crispum* remains the most awarded species by the RHS (Hermans & Hermans 2016).

O. crispum was known to be extremely variable. Many plants from the Pacho region had pure white flowers, with fewer of the highly spotted or marked forms much sought after by collectors. On the other hand, the more open ‘starry’ forms were mixed with densely marked forms. Fortunately for us, many of the more desirable (dare I say ‘better’?) forms were painted by botanical artists of the time. Perhaps best known amongst these was John Day, whose work eventually became known as his ‘Scrapbooks’ (Cribb & Tibbs 2004).

It had not occurred to me that there would be so many. There they were, fifty-three volumes in total, occupying both tiers of the tea-trolley. They had been brought upstairs into Kew’s new library from their home in a locked cupboard in the Orchid Herbarium. It was like receiving a birthday present. Which box should I open first?

My mission was to look at all of the illustrations of *O. crispum*. Such was Day’s fascination with the species that, between 1866 and 1887, he painted different specimens of *O. crispum* on over forty occasions. Leafing through the treasure trove that is the ‘Scrapbooks’ gives us a tantalising glimpse of a lost world. It is not only the watercolours that are illuminating, but the accompanying notes are a valuable historical document in themselves, with

comments not only about the plants, but often where they had been collected and by whom. For example, we learn that Day purchased *Odontoglossum crispum* var. *flaveolum* from Stevens’s in 1882. It was the most yellow form that he had seen and had been collected by Shuttleworth and Carder.

Day’s first painting was of a plant imported 21st September 1865 that had bloomed in December 1866. The painting is headed *Odontoglossum bluntii* (Fig. 2), with a note that it was, “the first plant of this species to bloom in this country” (i.e., the UK) adding that, “the texture of the flower is exquisitely beautiful – it is dazzling white with the light sparkling through each of its countless cells, as if made of hoar frost.” A further illustration of *O. bluntii* (with a sub-heading *O. Alexandrae*) is Dated Feb. 26th, 1870. It had been sent by Mr Bowman May 13th, 1869, from New Granada. Sadly, Bowman died in 1868 of a violent bout of dysentery when not yet 30 years old (Anonymous 1868).

Day clearly took time and trouble to measure and produce accurate representations. On the page illustrating *O. crispum* var. *veitchianum* (Mr H.J. Veitch and all his experienced staff considered it to be the very best they had ever seen,) he tells us that he has measured the flowers with compasses and taken care to represent the colour and number of spots accurately. In another instance he apologises for the lack of accuracy of the purple colouration, because he had done the painting by gaslight.

Every plant has a story to tell, and once again we encounter Chesterton. Day notes on a painting dated July 5th 1880, and headed *Odontoglossum crispum* var. *chestertonii*, “From Sanders’ sale at Stevens’ April 15th 1880 an imported plant collected near Pacho, New Granada and blooming now from an old bulb (Fig. 3). This is one of the most splendid and richly spotted varieties I ever saw and although I have drawn it many times, I couldn’t resist the temptation of drawing it. The colour of the spots is a rich Sienna Brown (burnt sienna) – without any purple in it at all. The purple spotting is much more common. I sent the flowers to Professor Reichenbach and he calls it *O. chestertonii*.” 1881 Day paints a further specimen dated Feb 3rd 1881 and headed *Odontoglossum chestertonii* that he considers to be an even finer example, because the

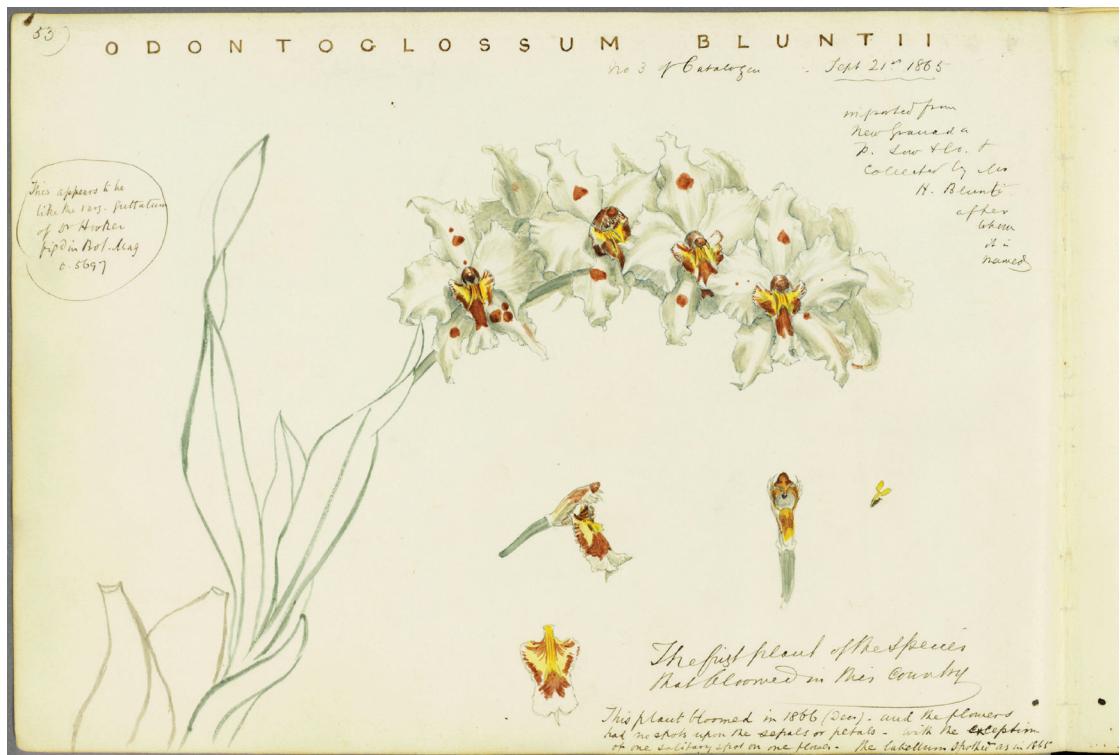


FIGURE 2. Painting of *Odontoglossum bluntii* from John Day's Scrapbooks. Reproduced with permission from the Royal Botanic Gardens, Kew.

petals are spotted (and they are not in the previous example). Although he tells us that Reichenbach considers it to be *O. chestertonii*, he says that, “there is nothing in the bulbs to distinguish it from ordinary varieties of *O. crispum*.”

Prices paid

Growers competed for the ‘finest’ varieties, and the prices that could be paid at the time for the most desirable varieties are almost beyond belief. Volume 1 of *The Orchid Review* tells us that Baron Schröeder’s collection included some of the ‘best’ forms. He bought the cultivars ‘Baroness Shröeder’ in 1886 for 100 guineas (today about £45,000) and ‘Apiatum’ from Sander for 160 guineas (today about £70,000). In another note, Day expresses surprise, at the high price paid for a weak plant with only three flowers. In 1886, Sir Trevor Lawrence paid 150 guineas for a very fine spotted variety... John

Day says it was stronger than the variety bought by Baron Schröeder.

Over the years, the various varieties of crispum that Forget sent from time to time from the area near Bogotá in Colombia, where they all originated, had brought Sander several thousands of pounds. In 1904, he sold a plant to H. T. Pitt for £800, then repurchased a division two years later. In the same year an *Odontoglossum crispum* Fred K. Sander, was sold to Pitt for £1,500. Pitt’s rival for these orchids was Baron Schröder who out-bid him for a plant of *O. crispum* var. cooksonianum, the deal being struck at £1,250. According to the Baron’s son, “it turned out to be a very robust strong-growing variety which he kept on dividing and dividing, with the result that in the course of a few years he only kept a specimen bulb of it, but also sold about £3,000 worth of back bulbs.” In modern terms these prices for single plants were enormous; “they were the last echoes of the great era which was now receding into history” (Swinson 1970).



FIGURE 3. Painting of *Odontoglossum crispum* var. *chestertonii* from John Day's Scrapbooks. Reproduced with permission from the Royal Botanic Gardens, Kew.

Will the real *Odontoglossum crispum* stand up?

Whilst we were sitting drinking coffee in a café in Mexico City in 2000, Miguel Soto told me that he loved taxonomy because it was like being a detective. I now understand what he meant. Sorting out the history of the naming of crispum has been an interesting journey. Its great variability led to crispum being named on three separate occasions. Lindley named the first example as *Odontoglossum crispum* in 1852.

In 1864, Bateman, referring to a plant collected by Weir, said “As the wild specimens of the flowers that he sent home to the Horticultural Society indicated not only a new species, but one of surpassing beauty, I did not hesitate at once to dedicate it to the illustrious Princess whose name it will henceforth bear (Bateman 1874), Alexandra, Princess of Wales.” And so, we have *Odontoglossum Alexandrae*. Also in the same year (1864) Reichenbach named a specimen *Odontoglossum bluntii*. Born in the UK, Henry Blunt was a prolific

collector in Brazil and the northern Andes for Messrs Hugh Low & Co. (Manning 2010).

Soon after its discovery it became obvious that *Odontoglossum crispum* was a very variable species - many of the so-called varieties were likely natural hybrids. Millican said, “*O. odoratum* is the most conspicuous, as much for the heavy ramification of its spikes as for its potent/strong perfume – that can make the air quite oppressive. The plants are almost hidden along the path in masses of lichens and difficult to find. The natives said *O. crispum* had been found here, with occasionally a few *O. odoratum* and *O. corodinci* mixed with the others.” Veitch (1906) considered that *O. crispum* var. *Chestertonii* was a natural hybrid between *O. crispum* and *O. luteopurpureum*, “the flowers being exactly intermediate in shape between the two species ...” A quote from the *American Florist* (large number of crispums were also imported at this time into the United States) emphasises the point. “Often among a batch of imported plants scarcely two

will produce flowers exactly alike. Two extreme forms are *virginalis* a rare variety, with snow-white flowers, its chaste beauty being enhanced by a dash of lemon on the crest and *Wilckeana*, with flowers fully four inches across, and heavily blotched with chestnut on a yellow ground, which fades with age to a white. Between these types there is a legion of intermediate forms, many of them so different as to be treated as distinct species ... The great diversity of types undoubtedly arise from the intercrossing of *O. crispum* with other species, especially with *O. gloriosum*. The hybrids from this source produce smaller and more or less spotted flowers, and strong plants always give branching spikes, which the true *O. crispum* does not, or rarely", and, "A collection of all the varieties would form a very interesting study. I have a collection of dried flowers so arranged as to show the ascending stages from the small and fragrant form of *gloriosum* called *odoratum*, to the large, round flowers of a good type of *crispum*" (Anonymous 1887b).

Claes (1907) describes *crispum* as growing in four distinct locations: Fusagasugá, Pacho, Chiquinquirá and Vélez. The flowers of those in the region of Fusagasugá were described as being starry and without substance, and growing in the company of *O. luteopurpureum*, *O. gloriosum* and *O. lindleyanum*. He considered the type collected in the region of Pacho to be, "undoubtedly the most beautiful that exists: its robustness, the great beauty and the texture of the flowers ...", commenting that unfortunately the mountains didn't extend very far, and the unscrupulous manner in which they had been collected in the last few years had rendered it difficult to find even a few hundred plants a year there. "At the time of Funk and Schlim *crispum* abounded in the woods." "Plants from the Pacho region carry flowers in two parallel lines, flowers touching one-another – gives a most beautiful aspect to the plant. This is rare farther north, where the flower stalks are longer and flowers are more widely spaced. In both Pacho districts it grows with the widely diffused *O. gloriosum* and *O. lindleyanum*." He also collected *O. × Wilckeana* var. Madame Florent Claes (and had seen good forms of it in a house in Pacho).

"The Chiquinquirá 'type' has flowers of fairly regular form, smaller generally than Pacho forms, but they make up for it by the longer flower stems that

often extend more than six inches beyond the leaves before the first buds. They are noted for the varieties with large spots." He was put on the track of these flowers by, "poor Millican, long since dead." The large spotted forms were not uniformly distributed in the zone, being found only on certain mountain sides. Exceptionally some forms were comparable to those of Pacho. Among the other species more or less abundant were *O. gloriosum*, *O. lindleyanum* and *O. Hunnewellianum* and, in restricted areas, *O. triumphans*. Those in the region of Vélez, the 'Vélez type' were found principally in the high mountains around the little village of Bolívar, where *O. gloriosum* and *O. Hunnewellianum* flourished.

Growing *Odontoglossum crispum* from seed

Some of the early imports must have arrived with seed capsules attached. Orchid seeds are like dust, little more than a tiny ball of living cells enclosed in a loose papery envelope, designed to catch the merest breath of air. Learning how to get the seeds to germinate in those early days must have been quite a challenge. Nevertheless, probably with a lot of trial and error, succeed they did.

Although it is generally well-known that the first orchid hybrid (*Calanthe* × *Dominii*) was made by John Dominy of Veitch and Company, and flowered in 1856 (Arditti 1992), it is perhaps less widely appreciated that a number of species were raised from seed before that date. It appears that the first orchids were raised at Glasnevin Botanical Gardens in Dublin around 1844. In 1849, Moore (curator at the botanical garden) reported that the first four to flower were *Cattleya forbesii*, *Epidendrum crassifolium*, *E. elongatum* and *Phaius albus* (Moore 1849). He recommended growing imported plants in a mixture of "turfy moss" (i.e. loose peat), sharp sand and broken potsherds. Hopkinson (1896) recommended that seed should be shaken as evenly as possible over the surface of the compost of a pot where another orchid was growing. The compost should be in good condition with, "a perfectly even surface", and free from sphagnum moss, as the moss could outgrow and smother the seedlings. Pots were kept in the shade at an appropriate temperature and kept moist, but not wet. Orchid seeds were also found

to germinate when “sown on blocks of wood, pieces of tree fern stems, strips of cork [and] upon moss” (Veitch 1886). Jim Durrant (pers. comm. 2017) told me that he recalled Sydney Rothwell, who had been a grower for Charlesworth’s, telling him that at one time orchid seeds were sown on damp muslin, and that large plants were specifically set on one side to be used for the purpose.

Odontoglossums appear to have been particularly challenging. Veitch writes in 1885, “Great as is the difficulty of raising seedlings from Orchids requiring a high temperature for their cultivation, it is still greater in those that receive ‘cool treatment,’ if we except *Masdevallia*. Odontoglossum provides a striking instance of this, paradoxical as it may seem, especially as so many undoubted natural hybrids between different species of this genus have appeared in the importations of the last ten years.” However, by 1894 Williams writes, “we are every day becoming more familiar with seedling varieties and hybrids which have been raised in English gardens.” Different clones of *crispum* were being crossed with the aim of producing “superior forms”. By 1907, M. Lucien Linden’s nursery in Brussels was described as home to more than a thousand *crispum* seedlings (Rolfe 1907).

As the 19th century grew to its close Noël Bernard discovered that, in nature, orchid seed must be infected by mycorrhizal fungi in order to germinate (Bernard 1899). Furthermore, the fungi were generally specific to individual genera or groups of genera. The fungi were isolated either from the roots of seedlings that had been sent to him by orchid growers, or from those collected in the wild. On seeing a photograph in the 1906 volume of *The Orchid Review* (Bernard 1906), showing *Odontoglossum* seedlings germinating on a “nutrient jelly” slope, contained in a test-tube closed by a cotton-wool plug covered with a tinfoil cap, after infection with a fungus previously isolated from a fungus “found on the roots of *Odontoglossums* [sic]” written by Bernard. I began to wonder what exactly was in that “nutrient jelly”. In an earlier paper (1904) Bernard refers to growing orchid seedlings symbiotically on “une décoction de salep gélosée”. Salep is derived from orchid tubers, and it appears that the setting agent was agar.

In the selfsame 1906 issue of *The Orchid Review*, writing in his *Calendar of operations for April*, Black describes attending a lecture by Professor Henslow who had described what happens when an orchid seed germinates, and necessity of a specific fungus, thus explaining why, “To ensure success it was necessary to sow *Odontoglossum* seeds … on pots containing *Odontoglossum* plants, *Cypripedium* (*Paphiopedilum*) on *Cypripedium* etc.” (Black 1906). Black wondered if it would be possible for some of the orchid-growing scientists to cultivate these fungi and hand them round to growers as an inoculum for pans of seedlings. As late as 1971, John Blowers recommended that amateurs try the symbiotic method of seed raising in which, “seeds are sown around host plants to obtain the aid of endophytic fungi for germination and the early stages of development. These fungi live in orchid plants and their composts” (Blowers 1971).

Joseph Charlesworth

Joseph Charlesworth (1851–1920) was one of the first (perhaps the first) commercial growers to use Bernard’s technique of growing orchids from seed using a symbiotic fungus. He had become dissatisfied with the relatively unproductive method of sowing seed directly onto orchid compost and, being impressed with Bernard’s discovery, became determined to learn how to do this himself. He was advised to meet John Ramsbottom, a mycologist at the British Museum of Natural History. Ramsbottom visited Charlesworth’s nursery in Haywards Heath in 1913 (Arditti 1990). The fruits of this encounter can be seen in a photograph of one of Charlesworth’s glasshouses (Anonymous 1922a), with row upon row of cultures growing on slopes in Erlenmeyer (conical) flasks under shade. Heating was provided with four-inch diameter cast iron pipes. The legend to the photograph reads under the heading of “Joseph Charlesworth’s system of raising seedlings by the pure culture method” … “The glass flasks are partially filled with a suitable compost, and after being sterilised by heat the necessary fungus is added. A few weeks later the seed is sown and germinates rapidly with considerable regularity.” When I first saw the photograph, I assumed that the flasks contained an agar-based medium - but

references in *The Orchid Review* clearly refer to, “*a compost* which is first sterilised and then infected with the necessary fungus” (Anonymous 1922b). Mr David Lumsden sheds more light on Charleworth’s method in 1928 saying, “Credit is given to M. J. Ramsbottom and M. Charleworth, who started the work of raising Orchids commercially by the fungus method with phenomenal results. The method consists of sterilising a peat mixture and subsequently inoculating it with a fungus. After the fungus has permeated the compost the seed is sown” (Anonymous 1928).

Charleworth’s interests went deeper than establishing a methodology for growing orchids from seed using Bernard’s discoveries, he was interested in the underlying science. His thin microtome sections of seeds and roots with their associated fungi, including those of odontoglossums, were shown at the 1921 Chelsea Flower Show as part of a scientific exhibit (Anonymous 1921). It seems likely that these are same images that can be seen in a paper concerning mycorrhiza (not just orchids) from a 1922 Messrs. Charleworth’s and Co. catalogue (Ramsbottom 1922–1923).

By intercrossing the best white forms of crispum, Messrs. Charleworth produced *Odontoglossum crispum* ‘Premier type’, that first flowered in 1917. *Odontoglossum crispum* ‘The Premier’ was awarded an FCC by the RHS in 1917. The 1922 edition of Charleworth’s catalogue included, “a new type of *Odontoglossum crispum* is illustrated by a coloured plate. About ten years ago, two varieties of the old plain Pacho type were crossed and produced seedlings of a greatly improved strain. From these the best was selected with another grand variety of the imported class, the result being a type of crispum so far superior to anything possible to import that it might almost be called a new species; it is now known as Charleworth’s ‘Premier Type’” (Anonymous 1922c). These symbiotically raised plants had long, arching spikes carried numerous round flowers with petals that were often heavily fringed and ruffled, sometimes suffused with violet, and of good substance and with a golden yellow crest on the lip (Eigeldinger 1957).

Against the odds perhaps, some of the original clones remain in cultivation as “heritage plants”. Jim Durrant, showed me *Odontoglossum crispum*

‘Premier type’ Avalanche FCC/RHS. There is a black and white photograph of the flower in Charleworth’s catalogue for 1932, where it is described as “a magnificent variety, very large flower, perfect shape with beautifully serrated petals, lip prettily pencilled with rose.” A “splendid plant” with four strong bulbs, well leafed and one lead, was advertised for £52.10.00 (around £3,200 today).

In 1921 and 1922, Lewis Knudson published a discovery that was to revolutionise the raising of orchids from seed: this was that many species will germinate asymbiotically in the presence of simple sugars (Knudson 1921, 1922). Suddenly it became possible to grow large numbers of seedlings of tropical species (and hybrids) with comparative ease, and Knudson’s asymbiotic method using simple laboratory techniques largely replaced the symbiotic technique. A short video clip made in 1967 (britishpathe.com/video/orchid-nursery) gives some idea of how seed was sown at Charleworth’s, a time when most people were using Erlenmeyer flasks, and cotton bungs.

Where do we go from here?

What happened to the tens of thousands of crispums (or is it hundreds of thousands?) that were imported into the UK and beyond? They mostly perished. In part, this is the legacy of two World Wars, when the large private collections were mostly dismantled, but it is also due to the difficulty of its cultivation outside of its Colombian home. A small number of plants remain in commercial nurseries in the UK, in Orchid Foundations such as the Mather Foundation and the Eric Young Orchid Foundation in Jersey, and in private collections. Whether they are ‘pure’ crispum or not remains an interesting question. These plants typically have unbranched spikes, and large, round flowers with good substance, as exemplified by the ‘Premier’ type bred by Charleworth’s. Many are probably triploids and tetraploids. In contrast, those in Colombia often bear branched spikes (Fig. 4), with numerous blooms that are more star-shaped. These plants are *Odontoglossum crispum* var. *leemannii*, named in honour of Friedrich Carl Lehmann. And yet, in the past these branched forms were clearly admired in Britain, and an article in the 1896 volume of *The Orchid Review* (Anonymous



FIGURE 4. *Odontoglossum crispum* var. *lehmannii* photographed by the author at an orchid show at Jardín Botánico de Bogotá Celestino José Mutis.

1896) has a photograph of a plant with a “large panicle with nine side branches, beside the terminal one, and an aggregate of sixty-five flowers.” Indeed an herbarium specimen of *O. crispum* var. *lehmannii* was deposited in Kew’s Lindley Herbarium in 1906 (Fig. 5).

Legal importation of wild-collected orchids into the UK continued into the early 1970’s. David Sander (1969) quotes an extract of a letter from a collector (the mysterious George) in Cuenca, Ecuador, in April 1955 who writes, “I know where to get *Odont. crispum*! This plant is rare and takes weeks to collect in quantity – please immediately write (to Guayaquil) how many you want of it and at what price ...” Although crispums can still be found today in some localities in good numbers (Dalström *et al.* 2020), their numbers can only be a pale reflection of what it was like in the past. According to the Colombian Red Data Book (Calderón-Sáenz 2007) *O. crispum* is a Colombian endemic still

to be found growing between 2300 and 3000 m above sea level in the Cordillera Oriental from Cundinamarca to Santander; Macizo Colombiana in the departamento of Cauca and in the surroundings of the Nudo de Los Pastos in Nariño y Putumayo. It is currently listed as being endangered in the wild (Calderón-Sáenz 2007). It was thought to have virtually disappeared from the wild more than fifty years ago (Richter 1965), and today it remains seriously affected by excessive over-collection. Illegal collection of orchids continues to be a problem, with confiscated plants taken to Jardín Botánico José Celestino Mutis in Bogotá. It has been estimated that in the last 45 years its population has been reduced by more than 50% due to excessive exploitation and deterioration of its habitat, leading to further erosion of its genetic base and potential loss of the variability that is likely to become increasingly important with the local impacts of global climate change.

So, what is to be done? The word conservation can mean different things to different people. For some it means in situ conservation, conservation of the natural habitat and the orchids within that habitat. For others ex situ conservation is important, conserving plants in cultivation, whether for reintroduction or purely for pleasure. Both have their part to play. Few would disagree that conserving plants in their natural habitats should be a priority, whether it is in private reserves such as that of the Colombian Orchid Society, or national parks for example. Such reserves may also have an important educational role to play by engaging with a wider public within the host country, thereby promoting orchid conservation. Foreign ecotourists can also provide a valuable additional source of income.

Where plants are maintained in cultivation, however, it is important to recognise that, no matter how long-lived, all plants eventually die, and a continuous program of propagation is essential. More than fifty years ago John Blowers said that, “A valuable service may be rendered to the orchid world by raising from seed rare species that are now threatened with extinction” (Blowers 1971). Here we encounter the problem of maintaining genetic diversity in so-called ‘living collections’, where cultivation of populations of plants, rather than just one or two specimens is desirable. Orchid seed banking has the potential to store large amounts of genetic diversity in a small space

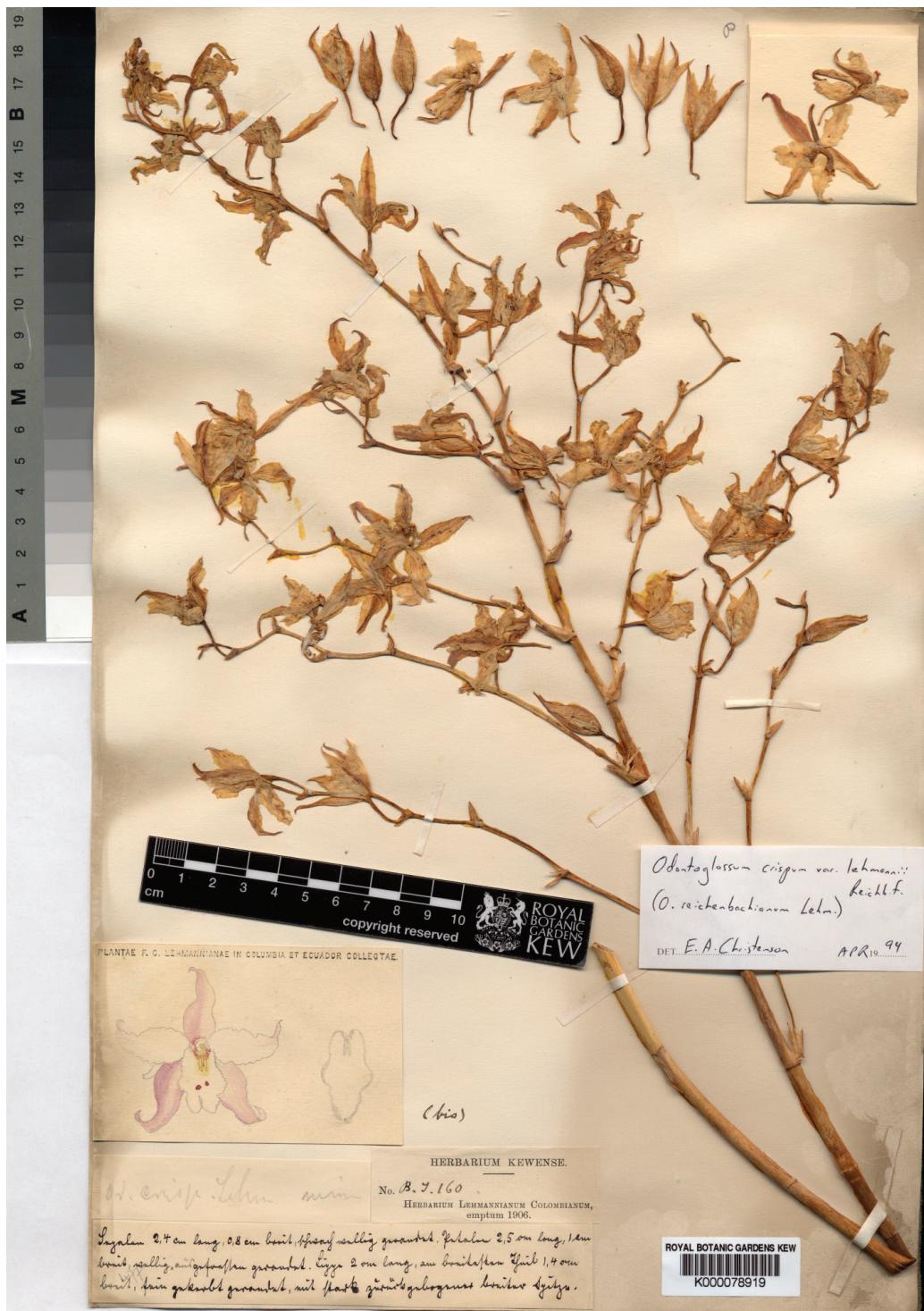


FIGURE 5. *Odontoglossum crispum* var. *lehmannii* in the Lindley Herbarium. Reproduced with permission from the Royal Botanic Gardens, Kew.



FIGURE 6. Type specimen of *Odontoglossum crispum* (= *Oncidium alexandracae*) in the Lindley Herbarium. Reproduced with permission from the Royal Botanic Gardens, Kew.

(Seaton & Pritchard 2008), and the establishment of a network of orchid seed banks within Colombia is to be encouraged. Good seed banking practice dictates that, as far as is practical seed of individual species should be stored in at least two different locations, for added security of collections.

It would be interesting to see if we could germinate *crispum* symbiotically today, especially as the Charlesworth's plants were reported as being more vigorous than asymbiotically grown plants. This might best be tried in its native Colombia, as it seems unlikely that the roots of plants in cultivation in the UK today will contain the appropriate fungal symbiont. Although less is known about the mycorrhizal fungi of epiphytic orchids when compared with terrestrial species (Zettler *et al.* 2003), symbiotically raised seedlings of epiphytes raised for reintroduction may establish more easily than asymbiotically raised plants. Thus, storing orchid fungi should be considered as equally important as storing the seeds (Zettler 1997). In future it may also be possible to store orchid seeds and their symbiotic fungi together in alginate beads (Wood *et al.* 2000).

And the amateur grower? It has often been said that we will only conserve what we know, and education

is one of the key components of any conservation programme. Orchid shows provide an opportunity to engage with the wider public, and *Odontoglossum crispum* can act as an ambassador and flagship for orchid conservation in general.

We are left with an interesting question. Are the plants seen in cultivation in the UK 'pure' *crispum*, or hybrids? I would suggest that it is possible that the 'Premier' type bred by Charlesworth's from the Pacho form could well be 'pure' *crispum*. Where is 'pure' *crispum* to be found today? The answer, of course, is that it is the type specimen housed in the Lindley Herbarium at Kew (Fig. 6). As a number of 'Premier' types still seem to exist in cultivation, and certainly *Odontoglossum crispum* Avalanche FCC/RHS was alive and well a few years ago, it would be worthwhile comparing the DNA of the type specimen with that of 'Avalanche'.

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