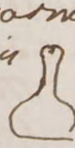
25, WILTON PLACE.
S.W.

Dec 7/74

My dear Gray

Yours of 26th Nov with proof of notes on Boraginaceae recd this morning was very welcome I have now so far advanced with the Order as to have made up my mind as to the general arrangement except Cynoglossum & a few small allied genera which I have still to do

I have 4 tribes Cordieae Ehretieae Heliotropieae & Borageae — the three former with terminal styles the latter with the style basal or between prominent lobes of the ovary — Cordieae characterised as usual Heliotropieae by the stigma although it is not quite constant In Tournefortia sarmentosa and a few others the style is like this without any ring and apparently stigmatic at the end — in a nearly allied



lastly Lithospermeae with the flat or small areola on a flat receptacle.

Anchuseae comprehend Symphytum Borago Trachystemon Anchusa Lycopsis Nonnea

Lithospermeae have first Pulmonaria and Alkanna which are almost Anchuseae then Mertensia Endogonia Myosotis Moritzia (Moratia) with ebracteate racemes Antiphytum Macromeria Onosmodium Moltkia Lithospermum Arnebia Macrotomia Lobostemon Echium Onosma and Cerinthe with bracteate racemes

Before I go further a word about gynobasis I am much puzzled about what to call it — It is the same when quite flat or in Echium or style like as in ~~[illegible]~~ Eritrichium (Krynitzkia) as you will observe — but it is not strictly a gynobasis

I take it that the prolongation of the summit of the pedicel or floral receptacle above the floral whorls so as to raise the carpels is called gynobasis when it is produced vertically so as to become a

species there is a very small ring which is more conspicuous in another passing into the normal one of T. Heyneano

I keep Coldenia and Heliotropium large and comprehensive as you have done but I think Orthostemon or Schleidenia makes a good section distinct from Euheliotropium but as I cannot work up all the species I am not particular about sections

I cannot keep up Piptoclaina [?] as a genus - H. supinum & H. Europaeum can never be put into separate genera - my section Platygyne for H. curassavicum is not a good one several other species have nearly or quite that stigma - annular as in the whole genus but the central apiculus very little prominent so as to give the whole stigma a peltiform or almost umbrella shape - I do not keep up Heliophytum but think I must retain Cochranea for the nutlets are perfectly consolidated in pairs into two 2-celled pyrenes or carpels

An approach to the Heliotropoid stigma is in several Lithosperma the two globular stigmas separated by the bifid end of the style sometimes twice as long as the stigmas sometimes very short or quite disappearing

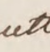
Now as to Borageae - the genera run into each other woefully but I think we may have three or four subtribes first Echinospermum and its allies with a conical or columnar receptacle which perhaps may associate with Cynoglossum etc which I have not sufficiently looked at

then perhaps genera like Bothriospermum [?] Gastrocotyle [?] - perhaps Asperugo with the conical or protruding receptacle with ventrally attached nutlets as in Echinospermum [illegible] but the areola concave and bordered as in Anchusa

Then Anchusa with the nutlets with a concave and bordered areola but placed on a flat receptacle

prominent border of a  in this section the border 1 is an outgrowth in the course of ripening inside is a hard ring 2 which has separated circumscissly from a corresponding prominent ring on the receptacle and without this ring when the nut is fully ripe and falls off there is a concavity both in the nut and in the part that has remained persistent on the receptacle. Moreover attached to the concavity usually of the nut sometimes of the receptacle there is a shrivelled white substance usually calld a strophiola or caruncula - but which is nothing of the kind whether a strophiola means a dilatation of the funicle or a production of the testa of the seed round the funicle. Looking at the nuts before they are ripe the cavity between the nut and the receptacle does not exist it is only as the ~~[illegible]~~ that outer ring in which on the vessels harden that the inner substance gradually dries up and forms this unmeaning appendage which I do not well know what to call.

The real funicle in most Borageæ is filiform and passes through a very small hole in the bottom of the hardened shell of the nutlet on the side next the style. I have sometimes traced it almost to the base of the style. In many Lithospermum the little hole is very conspicuous you mention it in Eritrichium floribundum

Eritrichium is I think properly excluded on your sketch to include Krynitzkia - I must exclude however DC's sections Preocharis and Endogonia - Decandolle's Preocharis are true Mertensias DC's small flowered species & his Endogonia make a genus between Mertensia and Myosotis the nutlets are either  or  or something of the kind attached by almost a point and usually stipitate on a flat or nearly flat receptacle and smooth and shining or pubescent usually angular. The species are I believe all either east Asiatic or Japanese I must take Turczaninow's name Endogonia unless I recognize it in some other published genus not yet identified.

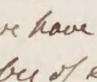
You ask if Torrey (Bot Wilkes 13 A) E. muriculatum is Myosotis muricata Hooker

the answer is certainly not – but it appears to be the same as Coulter's n. 500 and one of Nuttall's just coming into flower named by him Myosotis hirta. ~~Coulter's~~ Douglas's plant M. muricata Hook et Arn. is quite different & is larger, the terminal cyme on a long peduncle, rather dense, with several branches (2 or 3) starting from the same point, the flowers larger with a broad limb and the nuts considerably muricate.

Are you aware that the original ~~Amsinckia~~ Amsinckia lycopsioides is not the Lithospermum lycopsioides Lehm in Hook & Arn. which is from Coulter – the latter differs from the rest of the genus in the flowers being all axillary or accompanied by leafy bracts and the corolla lobes are narrow and almost imbricate. It has however the true Amsinckia calyx.

I cannot identify the Mexican Antiphytum – A. linifolium I had already examined and (I believe with Weddell) put it into Eritrichium. The Brazilian ones are quite distinct. Suffrutescent all the leaves opposite, bracteate inflorescence flowers and nuts (stipitate on a flat receptacle) nearly of Moritzia (Moratea).

styles to the pistil or pistils, disk when it is dilated horizontally beyond the carpels or more or less enclosing them – Now the part in question in Boragea is neither but is composed of the receptacle closely combined with the persistent base of the pistil. In the flower we have usually



then the two lobes of each pair belonging to one carpel must of course be connected with each other and with the style and therefore the apparently homogeneous mass must consist partly of the base of the carpels, but we cannot say how much is carpel how much is receptacle for there is no line of separation. On consulting with Dr Hooker we think it best when speaking of the ovary to call the support disk which it chiefly consists of (for we cannot adopt a theoretical terminology) – and when in fruit as the whole persistent part becomes clearly distinct from the nutlets (avowedly portions only of the fruit) we call it _receptacle_

There is another difficulty in terminology in the so called perforate nuts that is those in which the areola of attachment is concave and surrounded by a

Pray send as soon as you can the proofs of what you print on the gamopetalae and any observations you make, as I am pressing on as hard as I can work.

If you can manage to keep Eutoca distinct from Phacelia and not separate naturally allied species to associate them with strangers I should be ready to adopt the distinction – but Cosmanthus Whitlavia etc cannot be naturally kept up.

I have been today (8th) at Cynoglossum etc. I see Rindera must include Mattia I must keep up Paracaryum except one or two species I think Boissier is wrong in taking from Mattia. Cynoglossum remains large and includes several that have been wrongfully put into Echinospermum – I think I shall keep up Omphalodes as limited by Boissier but have not yet examined it

Ever yours George Bentham