Many Ericaceae of the Andes have large often brightly colored flowers, and until very recently they have been considered as comprising a distinct tribe, Thibaudiaceae, which was fully treated, as regards the American species, in 1932 by A. C. Smith in Contrib. U. S. Nat. Herb. 28. At that time I compiled a synopsis from Smith's work for the Field Museum's "Flora of Peru." In this instance it was my good fortune to be able to examine many of the types concerned, and it was not from lack of appreciation of the author's intelligent interpretation of characters that I ventured to modify his classification in some ways for the Flora. I concluded that the taxonomy of the tribe would be less difficult and seemingly more natural if the character of anther-dehiscence could be taken as fundamental in spite of the "fact" (or illusion from inaccurate knowledge?) that this character is at times somewhat variable. Nevertheless, compared with any other character its consistent use would leave, I thought, a minimum of species that seem to be intermediate or connecting between this or that group. This idea supports Smith's own characterization of genera as Siphonandrioid or Thibaudioid upon whether the anther-dehiscence is by pore, characteristically terminal or sub-terminal, or by cleft, characterically lateral. Curiously enough, he failed to follow this pattern. By taking it as the basic division of the so-called tribe, the other characters adopted as delineating genera are seen in several cases to be parallel. This may place a question mark as to the significance of the taxonomy; personal taste is about all that can determine with present knowledge the drawing of the lines at least as regards the smaller circles of allied, or at least morphologically similar species which have been given group names. Unquestionably this is one of those families—in this resembling several ancient ones—in which only tendencies can mark for the mind cleavage between groupings, so few are the "gaps" or character-lines left or developed by time's changes. So there is today a continuity, apparent or real,—a flow of characters, similarities and dissimilarities, within the family that lets taxonomy grow or be designed from the accident of circumstances perpetuated by traditions.

Recently, impelled to prepare an account of the entire family in Peru, I found that the problem of distinguishing the tribes Thibaudiaceae and Vaccinin
cinieae became apparent, even as regards that country. Smith, l. c. 319-320, was well aware of this difficulty and indeed it is historic that, by and large, the character of the former, Thibaudieae, has been simply, flowers elongate, often narrow and thick in texture; that of the latter, Vaccinieae, flowers small, often broad and more delicate. Within Peru there is a Macleania with flowers only 34 mm. long, and an OrthAEAeae with blossoms only 1 cm. long. By all authorities both genera are definitely of the former tribe. In Asia there are any number of Vacciniums, at least so-called, with flowers as large to twice as large or larger. The existence of these long-flowered Vacciniums gave me no little astonishment. Familiar as I was with the small-flowered species of temperate regions, I learned with amazement from the scholarly articles of Herbert F. Copeland (The Philippine Journ. Sci. 40, 42 and 47, 1929, 1930, 1932) something of the extraordinary range of staminal characters, these simulating if not equivalent to those adopted traditionally as generic in value within the Andean Thibaudieae. Even a cursory examination of literature and icones shows that there is a remarkable simulation or state of parallelism in the floral characters of species of Vaccinium and those of genera within the Andean tribe. Is there in fact relationship: and are there many genera or only one? My own impression accords with Copeland’s, l. c. 42: 542, that Bentham and Hooker f., Drude, and others erred in relating the Vacciniums to the Far East, including the segregate genera, to the Andean group, their development probably, in spite of similarities, having been independent. Clearly only modern taxonomic methods if any will be able to unravel the historical and present relationship of these interesting plants; certainly now from the morphological evidence the taxonomy seems to be unsound and at least unsatisfactory.

Finding this situation as regards Vaccinium, I was compelled to question the validity of the characters traditionally defining the genera of the Thibaudieae, besides still having undetermined the distinction if any of the tribes themselves. At about this time Sleumer in Bot. Jahrb. 71: 375-422, 1941, published a comprehensive discussion with generic keys of the subfamily, and recognized the tribe Vaccinieae as properly including the Thibaudieae, conforming to my own conviction. Nevertheless, he has copied everyone else in his generic key, l. c. 386-389, dividing chiefly on the old cliche running about as usual: corolla nearly always small to mediocre, cylindric or unceolate or campanulate, thin to moderately fleshy; tubules none or more or less developed; filaments rather long,—this in contrast to: corolla nearly always large and bright colored, mostly cylindric, rarely unceolate or campanulate, nearly always fleshy or coriaceous, rarely thin; fruit mostly subcoriaceous. Clearly Sleumer is in accord that tendencies are of moment in the classification of this subfamily, for in his complete system he presents two tribes using as basic these characters so highly questionable in value;
yet in his own key and in a preceding discussion he indicates others that so far as morphological evidence suggests are far more reliable. To accomplish this taxonomic feat he retains _Vaccinium_ in his key in the traditional sense while in his division of that genus, i. e. 413-422, he describes sectional characters that even uniquely are accepted as generic in value elsewhere. His particular contributions are the merging of the tribes,—even though as just said he then keys without naming them!—and his suggestion that there are basic differences in the fruits of especially the small-flowered groups, but this is unproved and I think open to considerable doubt.

However, my concern in this taxonomic problem is not as a student but stems from the obligation to try to devise an account of its members within Peru that will not be too impractical and inconsequential, as is the case if it must be based on "flowers large," "flowers small," etc., and that will still enable me to retain so far as seems at all expedient or intelligent or reasonable, if you will, the established nomenclature as sincerely adopted or worked out by Smith and mostly followed by Sleumer. Fortunately from my standpoint, apart from _Vaccinium _ (with _Hornemannia_ ) the generic names that are oldest are Peruvian. Therefore, the status for the simulating or allied members of the tribe elsewhere may be left out of consideration here although I may remark sometimes their resemblances. It is of interest that stamen coherence and granulosity seem to be most common and developed in the New World. Furthermore there may ultimately be shown to be a structural difference between the pore and cleft types of anther orifices; the latter, as a matter of fact, may well be at least sometimes elongated pores, especially in the case of Old World species. And before considering the Peruvian plants it is necessary to note that Sleumer includes in _Vaccinium_ species with the following characters, many of these characters, let me emphasize by repetition, simulating if not the same as the sole or principal features of other "genera:" flowers solitary to racemose, pedicels articulate or continuous, petals free or more or less united, stamens exserted or included, filaments glabrous or pilose, anthers spurred (even grotesquely) to spurless, granulate or smooth, tubules obsolete to elongate, flexible to rigid, dehiscence terminal, subterminal or lateral, a round pore or a cleft (ex. char.), fruit 4-10-celled. As will be seen from the key at the end of this paper, I solve the dilemma of distinguishing the Peruvian "genera" from this complex _Vaccinium_ of the latest authority by defining the Linnean group in the sense of the usual North Temperate species.

In the Andean complex, one of the most puzzling components has been named _Diogenesia_ Sleumer, Notizbl. 12: 121. 1934 based on _Vaccinium _ sect. _Leptothamnica_ Benth. & Hook. f. in part and proposed by Sleumer as distinct, reasonably enough perhaps at the time, on a variability in stamen-number and a described difference in leaf-anatomy; the latter suggested _Thibaudia_
to Niedenzu and to Hörold, while the former characteristic belongs also to *Sphyrosperrnum* from which its fasciculate or racemose flowers, smooth coriaceous calyx and more or less obvious stipules differentiate it. However, two years later Sleumer, *ib. c.* 13: 114 retained it in Vaccinium while in 1941, *Bot. Jahrb.* 71: 395. he resurrected it, recognizing six species and remarking the slight distinction from *Themistoclesia* Klotzsch. Actually in 1934, *Notizbl.* 12: 134, he had described one of these species himself as a *Themistoclesia* which in 1932 had been proposed as new by Smith, *ib. c.* 424, as *Thibaudia laxa* and in 1936 was regarded by him, with the support of Camp as a *Vaccinium*; *cf. Brittonia* 2: 264. Maybe the reason these serious students have had such a time making up their minds singly or collectively as to the generic identification of these plants is that actually there is only one natural genus as well as only one tribe with a number of often poorly marked sections. However this may be, the case at least typifies the lack of any really fundamental knowledge for the establishment of sound criteria upon which to build the classification, whatever terms may be used. On such evidence as has been published, Smith was probably correct the first time since the species comprising *Diogenesia* seem to be connecting entities from *Thibaudia* to *Themistoclesia* on the one hand and to *Vaccinium* on the other; as regards the former, the calyx is merely costate and against the latter, as to Andean forms at least, the anther dehiscence is aberrant. Sleumer saw fruiting differences here which if actual are of dubious value. The other Peruvian species of this alliance, according to this disposition, must be called *Thibaudia octandra* (Sleumer. Macbr., comb. nov. *Diogenesia octandra* Sleumer *Notizbl.* 12: 121. 1934. This and the other species comprising the Sleumer genus I think best regarded as a section of *Thibaudia* if one accepts as fundamental the character of anther-dehiscence, the section connecting closely *Themistoclesia*, and like it also *Vaccinium* except for the anther clefts or (and), the habit. In passing I may remark that the existence of intermediate species to groups distinct enough as regards the majority of the species concerned is not in practical taxonomy necessarily an argument for the merging of the larger genera into one. Theoretically at least, the living representatives of any group may be simply and equally diversified, but in nature this is rarely if ever the case, due to various factors such as isolation or contact with similar or dissimilar entities, etc., so that we have families and more often genera, so called by the taxonomist, sometimes demarcated very satisfactorily, again, as here, not at all clearly or, one may say, precariously, and thus ever subject to a new evaluation or interpretation by his fellows if not by himself.

As to the other genera that have been grouped with *Vaccinium* primarily on the fact that they have small flowers, the vegetative characters, as the key at the end of this discussion indicates, are almost universal; it is only
because I don’t know the true or most serviceable definition of *Vaccinium* that I retain them as possibly separate. It is interesting and perhaps significant that Vacciniums (so-called at any rate) of the Old World may have solitary pedicelled flowers, and at least one, by some regarded as a distinct genus, has a winged calyx. In the New World both large and small-flowered species have a winged calyx, but in the large-flowered plant the anther dehiscence is not unlike that of the wing-calyxed plant of the Old World which remarkably enough has coherant anthers. The genus *Disterigma*, even by Klotzsch, Linnaea 24. 1851, regarded as a section of *Vaccinium* (and this author was the first to consider the Linnean genus an aggregate and to separate Andean and other groups), may in fact be more properly a part of *Themistoclesia*; the presence of the bracts, in degree developed, is of doubtful significance on account of its occurrence elsewhere and the lack of uniformity in its development in all species known; it may be merely a character of convenience and more properly sectional in taxonomic value. Some of the species in these groups have anthers that apparently approach those of the large flowered groups (to speak of these so idiomatically), but the equal or subequal stamens with free filaments accord with the tendency at least of the species by tradition grouped together here.

This brings us to a consideration of the first named large-flowered plant, *Ceratostema* Juss., and probably the most important thing to say about it now is that the anther dehiscence as to type is not known. Nevertheless Sleumer has defined it as having anthers dehiscing by a pore which, until the type species *C. peruvianum* can be rediscovered, may be accepted as a reasonable supposition since the few species that resemble it most have this sort of dehiscence. This author, Notizbl. 12: 287. 1935, proposed the genus *Pellegrinia* for those species formerly included in *Ceratostema* but which have continuous instead of articulate pedicels and retrorsely pilose filaments. Smith, Bull. Torr. Club 63: 308. 1936 accepted this segregation, stressing the latter character, but restricted the Sleumer genus to those species having dehiscence by means of a pore. It seems correct to regard *Pellegrinia* in this sense but only as a section of *Ceratostema* with (presumably) pore dehiscence, since the only character I apparently do not see elsewhere is the retrorse filament pubescence, and even in this subfamily a solitary character seems scarcely sufficient for a group name, especially in floristic work. According to both Sleumer and Smith, the existence of articulate or continuous pedicels is not in itself diagnostic; at any rate it seems clearly enough to be either obscurely or sharply defined within groups not segregated.

There are in Peru two further similar groups, *Siphonandra* Klotzsch and *Periclesia* A. C. Smith. Each is marked by having the filaments nearly connate in contrast to the distinct ones of *Ceratostema*. The first named has five calyx lobes about 2 mm. long, the anther pore terminal, the second four
calyx lobes 1-2.5 cm. long, the pore oblique. The type of Ceratostema has five calyx lobes 1-1.5 cm. long, and four species known and accepted the pore of the anther is more or less oblique. As to the number of calyx lobes this varies elsewhere, as also the number of stamens which here are either 8 or 10.

A nice sectional difference is the union of the filaments, but I cannot regard this of sufficient importance to maintain plants generically distinct unsupported by other characters, for one finds the filaments cohering in degree in other groups, and in a recently described species of Periclesia from Ecuador they are less completely joined than in the original species. How far one limits genera here will of course accord with one's interest, and in the Flora I endeavor to let generic names encompass species that resemble each other in more ways than they do an adjoining group, thus avoiding a taxonomy that is level.

Taxonomy like architecture—and they are comparable—is most successful when the monotony of “window just with window mating, door on door exactly waiting” is avoided. Here, for instance, to treat Ceratostema as four genera instead of one weakens in my viewpoint the significance of the basic characters upon which the original species and its group-name rests and upon which three of the four “genera” lean; for they certainly cannot be said to stand alone as equals, and to treat them as such serves only to obscure their apparent and probably real relationship. If in this there is error, it is no greater under one name than under four and in the meantime the classification is much more practical or expedient. To accord with these ideas so far as regards the plants of Peru only two changes in nomenclature are necessary, both allied to plants already classified here by the great Bentham.

Ceratostema flexuosum (A. C. Sm.) Macbr., comb. nov. Periclesia flexuosa A. C. Sm. Contrib. U. S. Nat. Herb. 28: 357. 1932. There are two species in Ecuador of this relationship, C. lanceolatum Benth. and P. Reginaldii Sleumer, the latter rather less characteristic of the segregate genus.

Ceratostema pilosum (A. C. Sm.) Macbr., comb. nov. Siphonandra pilosa A. C. Sm. i. C. 355. Scarcely differs from C. ellipticum Benth. & Hook. f. except in the more permanent denser pubescence and in some measurements, but apparently no intermediates are as yet known.

Closely allied in my opinion to Ceratostema is the genus Orthaea Klotzch, which I think should be limited to the type and to those species agreeing with it in having alternately unequal filaments as well as anthers opening by terminal or subterminal pores. If one regards the latter feature as fundamental, it is evident that the relationships of Orthaea is with both Vaccinium and Ceratostema, from both of which the former character—unequal stamens—weakly distinguishes it. It seems necessary to give this character more taxonomic value than is probably really justified (cf. Smith, i. c. 324)
in order to maintain, as seems desirable at present, the traditionally recognized genera, these more accurately spoken of probably as generic names. It is noteworthy, however, that only relatively few species with anther pores have unequal stamens. The genus accordingly was placed by Smith, followed by Sleumer, near Cavendishia Lindl., and perhaps these species connect the groups. The Lindley genus nevertheless has the long or narrow anther clefts of Thibaudia from which only its obviously unequal stamens doubtfully separate it, except that conveniently, the more or less deciduous and often conspicuous floral bracts are rarely elsewhere so well developed. The little genus Satyria Klotzsch is like Orthaea a purely intermediate concept rather more like Thibaudia than Cavendishia, but it displays an extreme development in the union of the stamens. Its counterpart among the genera with pore-dehiscing anthers is found in Siphonandra included above in Ceratostema, but Satyria has slightly more character of its own.

There remains the question of defining Thibaudia R. & P. itself which in any case, all known species considered, seems to close the circle back to Themistoclesia etc., or to Vaccinium sens lat., if you prefer, via the section Dnogenesia (of Thibaudia, that is). And to this one might add Anthopterus Hook. as a further connecting link, the anther clefts short, the calyx winged. But a majority of the species can readily be placed here on the anther character and I would include several groups proposed or maintained on, it seems, inconsequential features. These for Peru are: Macleania Hook., Psammisia Klotzsch, Demosthenesia A. C. Sm., Semiramisia Klotzsch, Anthopterus Hook, and, of course, Diogenesia Sleumer. Naturally not all the species described under these names are Thibaudias, only those that agree with each type especially as regards the anther dehiscence. Admittedly there are a few with dehiscence irregular or apparently intermediate, but as far as my observation goes none with the dehiscence definitely by terminal or sub-terminal pore; in any case, for the majority the status is clear.

In recognizing these groups Sleumer has followed Smith, limiting the genus of Ruiz and Pavón to include only species with anther tubules flexible, rarely longer than the cells, these smooth to slightly granular, corolla as calyx not winged. But consider Sleumer’s own definition of Vaccinium which seems correct, so to speak: these same characters exist there in much variation and the genus is admittedly closely related to the plants we are discussing. Moreover, by defining Thibaudia, by comparison so illogically, what an arbitrary taxonomy results for species that even in one respect are at variance to this limitation. Thus we find the name Anthopterus designating plants that resemble most Thibaudia except that the corolla has five wings; well, of course this emphasis on the character may be a matter of taste, but certainly in view of the nagling of corollas and calyces to winged elsewhere, it seems to me that Hörold, Bot. Jahrb. 42: 274. 1909, acted wisely when he transferred
it to Thibaudia, thereby indicating its basic relationship rather than its casual, however striking, unique character which ought not to be permitted to isolate it from its fellows.

Variations of the same character are apparent in Ceratostema. Those who accept it as of generic value will find logical the generic names created to accommodate other more or less aberrant species: thus, those with calyx 5-angled-winged with the lobes, no stipules, Polyclita A. C. Sm.; calyx terete, aristate stipules obvious, Demosthenesia A. C. Sm., both with pedicels continuous, these being typically but not always articulate in Thibaudia. The persistence or evidence of stipules occurs in other cases, as in Ceratostema, and its importance as a generic character does not seem to be proved. Likewise in many genera the articulation of the pedicels is in degree apparent to not at all; of course, anatomical studies may show something conclusive in this respect. Then there is the matter of the tubules, their quality in terms of rigidity or flexibility and their length in proportion to the anther cells. Again compare the variation accepted here in Vaccinium; or limit Thibaudia as mentioned above and adopt for species with elongate tubules Plutarchia A. C. Sm., if the calyx is terete or Agapetes G. Don of Asia, if it is winged or angled, the former with ecalcarate anthers often slightly unequal filaments (in this demonstrating how closely Thibaudia, sens. lat. merges with Orthaea etc., as already suggested), the latter (Agapetes) with anthers often bicalcarate, the filaments quite equal.

Finally, we have the generic names Semiramisia, Macleania and Psammisia for all the other species with anthers dehiscing by clefts but with tubules more or less rigid, or erect, usually not longer than the cells, these strongly granular. The first with short anther clefts is apparently a species connecting the Ceratostemas via Orthaea, but in its long membranous tubules it carries over nicely the second and third segregates into Thibaudia as to type. Macleania and Psammisia were early combined by me for the Flora, as their distinction from each other rests on the development in degree of a spur on alternate or all anthers (Psammisia), or not at all (Macleania). In the former the stamens are said to be always free and the dehiscence always by elongate cleft, while in the latter the cleft is sometimes indefinite and the anthers are rarely free. Now we have already observed that stamen coherence is an intangible quantity occurring again and again with almost any other combination of characters; so too with granulosity which exists in Vaccinium, Disterigma, Ceratostema and Thibaudia, and obviously here the spurs (apart from the fantastic anther appendages in Vaccinium) are apparent or not in species that otherwise, and admittedly, are related. Therefore all of these names seem pretty clearly to be obscuring the sequence of species-development if they are maintained, and more naturally ought to be included at most as sections in Thibaudia. I venture to predict that the Andes will yet yield
isolated novelties that will exemplify further extremes in another characters
as in granulosity and in appendages, and these may even be so pronounced
that it will be in order to regard them is distinct as already we have for
anther-coherence the ultimate possible degree attained in Satyria, complete
tubule atrophy and lateral dehiscence in Lateropora A. C. Sm., etc.

There's many a family in which the living representatives are so spaced
that their classification may be likened to the cadence of the simple melody
of a folk-song; there's many another as here in which one or more lines
of development like the themes of a symphony vary and intertwine to lose
themselves more or less completely, only to reappear sometimes and then
not rarely in crescendo; then often there is the dramatic pause—there the
taxonomist is wont to draw his generic lines—but listen, the violins are
softly or brightly picking up melodies heard and not forgotten; and so seems
to be the case for the characters of the plants we have been discussing;
like themes in the movement of a symphonic poem they flow on and on, and
group-names drawn at the seeming breaks in their development may be
expedient at times for convenience, but are only illusory pauses in the bio-
logical development, for the circle in such families is complete, the themes
are never really ended! The following key, beginning and ending on itself,
as it were, may suggest that this imaginative comparison, this fantasy, if
you will, may in fact be not far removed from reality.

Anther orifice rarely somewhat longer than broad, in this case oblique, usually
pore-like or flaring and terminal or oblique, less frequently subterminal or
lateral but the orifice then often oval, the flowers small, scarcely fleshy;
stamens equal or nearly except in Orthaea the filaments unequal, free or
lightly cohering, rarely more or less connate (another orifice a pore or
terminal;) anther sacs rarely granular (flowers then small, often sessile).
Stamens equal or subequal, when slightly unequal anther pores oval,
sublateral.

Filaments free or essentially; flowers scarcely fleshy, often urceolate or
campanulate, rarely 12 mm. long; pedicels continuous or articulation
obscure; fruit fleshy or if dry more or less fragile.

Anther orifice typically a terminal or oblique sometimes flaring or open
pore (Peruvian species at present left here rarely with oblique long-
oval introrse orifice;) stamens 10 (8); fruit a berry, sometimes
dry; calyx not winged.............................. Vaccinium

Anther orifice oval, more or less lateral; calyx sometimes winged.

Pedicels obsolete or short-bracted at calyx base;
stamens (10 (5) .......................................... Disterigma

Pedicels obvious, not bracted terminally; stamens
various in number.
Flowers solitary; calyx as fruit not winged... \textit{Sphyrospermum}  
Filaments sometimes more or less connate; flowers 
  fleshly, cylindric, usually showy; pedicels articulate 
  except section \textit{Pelligrinia}; fruit coriaceous or firm 
  but often edible; anther orifice as in \textit{Vaccinium}.... \textit{Themistoclesia}

Stamens unequal the filaments of two lengths, the anther 
  pores terminal or nearly; pedicels articulate............. \textit{Orthaea}

Anther orifice usually narrow and long or longer than broad (elagate-oval 
  as in \textit{Satyria}, rarely indefinite), lateral; stamens often unequal, more or 
  less connate, the anther sacs often somewhat to very granulate; flowers 
  commonly large and fleshy or if small the stamen character is definite, 
  typically at least.

Stamens obviously unequal (filaments or anthers;)
  pedicels articulate. 
  Filaments firmly connate; anthers unequal the clefts 
    flaring or elagate.............................. \textit{Satyria} 
  Filaments free or nearly the anther clefts 
    narrow or long................................ \textit{Cavendishia} 

Stamens equal or subequal; pedicels usually articulate 
  except section \textit{Anthopterus}, connecting species with 
  short anther clefts, winged calyx. 
Pedicels not bracted below the calyx; another orifice 
  sometimes short. (Cf. \textit{Vaccinium}, but not typically). 
  Anther orifice an elagate usually narrow cleft........ \textit{Thibaudia} 
  Anther orifice short, long-oval, little longer than 
    broad........................................ \textit{Sphyrospermum}; \textit{Themistoclesia} 
Pedicels bracted below the calyx; anther cleft sometimes 
  elongated................................. \textit{Disterigma}