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THE BROMELIACEAE OF BRAZIL

By
LYMAN B. SMITH
Department of Botany, U. S. National Museum

With 128 illustrations by
Robert J. Downs
U. S. Department of Agriculture

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PREFACE

This paper, by Dr. Lyman B. Smith, associate curator of the Department of Botany, U. S. National Museum, is based on 25 years of study in the United States, Europe, and Brazil. Much of the paper has been derived from an unpublished manuscript prepared for the "Flora Brasilica" of the Instituto de Botânica of São Paulo. However, in order to make a more compact work appropriate for the field as well as the herbarium, bibliography has been limited to that strictly essential in Brazil and descriptions have been eliminated in favor of ampler keys.

Illustrations are provided in a proportion slightly better than one to every five species but are irregularly apportioned in order to support the key to the best effect and to cover all the 39 new species proposed.

Jason R. Swallen
Head Curator, Department of Botany
U. S. National Museum

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INTRODUCTION

The present paper is written to organize the mass of recent species of Brazilian Bromeliaceae in relation to past works to form a new basis for other branches of biological study. In doing this it takes into account the interest in the discovery and propagation of bromeliads for economic and horticultural purposes and at the same time the necessity for their destruction in limited areas to effect the control of malaria. I am indebted to a great number of people and institutions for help in the first instance and to the Serviço Nacional de Malária of Brazil and to the Rockefeller Foundation for an understanding of the public health situation.

The Bromeliaceae of Brazil have been covered exhaustively three different times in the last 60 years by their great monographer, Carl Mez.[1] His most recent treatment in 1934 and 1935 in the Pflanzenreich indicated nearly 500 species as native to Brazil, yet since then 135 additional species have been discovered and still continue to appear so rapidly that 39 of them could not be published before the present paper.

This proportionately great increase in our knowledge of the group is due to two sources unavailable to Mez—intensive collections since his monograph, and large collections in the herbaria of the United States and Brazil which, for some reason, he failed to see although they mainly predated his work. Since 1935 the collecting of bromeliads by systematic botanists has continued at much the same pace as before and has resulted in additions to the Brazilian flora, but the great increase in information has come from the horticultural side through the intensive collections of Mulford and Racine Foster and

[1] *In* Martius, Flora Brasiliensis 3, pt. 3: 173–634. 1891–1894. *In* De Candolle, Monographiae Phanerogamarum 9: 1–990. 1896. *In* Engler, Das Pflanzenreich IV. 32: 1–667. 1934–1935.

in public health through the researches of Father Raulino Reitz and Dr. Henrique Pimenta Veloso.

The Fosters have traveled widely in search of striking bromeliads but have made their greatest efforts in the rain forest area of extreme eastern Brazil, the home of the great majority of the ornamental species. I gratefully acknowledge that they have not forgotten to collect the lowly "botanicals" or nonglamorous types at the same time. Also they have the rewarding system of collecting sterile plants, which on blooming years later often prove to be species of exceptional interest. While the general collector frequently neglects or ignores bromeliads because of the great difficulty of collecting and preserving them, the Fosters have concentrated on them to the practical exclusion of all other families. As a result more than half of the new species described since 1935 have been based upon their collections.

Reitz and Veloso have concentrated their efforts on the bromeliads of Santa Catarina in connection with the campaign undertaken in recent years by the Serviço Nacional de Malária. Although Reitz has discovered a number of new species, he has made a much more important contribution to our knowledge of the variation and distribution of species already known. In fact, he has changed the status of the bromeliad flora there from the least known in the eastern rain forest to equality with the best. Veloso, using Reitz's taxonomic studies as a base, has given us a detailed picture of the ecology of the Santa Catarina bromeliads (Anais Botânicos do Herbário "Barbosa Rodrigues": 187–270. 1952) which has yet to be approached elsewhere.

Mez saw the Bromeliaceae in practically all the important European herbaria and from near chaos erected a detailed and logical system. However, he noted little from this side of the Atlantic beyond citing my early papers, and, as these dealt chiefly with non-Brazilian bromeliads, he missed not only most of the novelties but also the rich distributional data in United States and Brazilian herbaria.

For the past 25 years, thanks to Dr. F. C. Hoehne, former director of the Instituto de Botânica in São Paulo, I have enjoyed every advantage of its ample herbarium, from a constant supply of specimens to lavish facilities for publishing and illustrating the results of my studies. Nor should I forget the field experience gained at Alto da Serra and Moysés Kuhlmann's original technique for collecting epiphytes.

To Dr. P. Campos Porto, director of the Jardim Botânico do Rio de Janeiro, I am indebted not only for the opportunity to study in the garden and herbarium but also for the hospitality that enabled me

to collect in the two great national parks administered by the Jardim, Itatiaia and Serra dos Orgãos.

Dra. Heloisa Alberto Tôrres, director of the Museu Nacional, not only provided me with every facility in the herbarium but also arranged for a rapid series of field trips in Rio and Minas with the help of the whole department of botany under the leadership of Dr. F. Segadas Vianna. Here I should explain that owing to the number of people on these trips I was obliged to abbreviate the citation of collections to "Smith & Mus R," indicating that the number was mine but the expedition a joint enterprise.

Dr. Alexandre Curt Brade, both when at the Museu and later at the Jardim, has helped me exceedingly with specimens and with his detailed knowledge of botanical history and geography.

I have studied with Father Raulino Reitz in his Herbário "Barbosa Rodrigues" while enjoying the hospitality of the Seminário at Azambuja, Brusque, and have collected widely with him in eastern Santa Catarina.

As my citations will indicate, I have received help by brief meetings and by correspondence with a number of other Brazilian botanists. Among these are Dr. Felisberto Camargo, former director of the Instituto Agronómico do Norte and authority on the pineapple; Dr. J. Murça Pires, head of the department of botany of the same; Dr. A. Ducke, famous explorer of the Amazon; Father Bento Pickel, formerly of the Instituto das Pesquizas Agronómicas, Pernambuco, and his successor, Dr. Dardano A. Lima; Dr. João José Seabra of the Faculdade de Filosofia da Bahia; Dr. Amaro Macedo of Ituiutaba, Minas Gerais; Dr. Carlos Stellfeld, Director of the Museu Paranaense; Dr. Guenter Tessmann and Dr. Gert Hatschbach of Curitiba, Paraná; the late Father Eugenio Leite; and Father B. Rambo, director of the Herbário Anchieta and authority on the flora of Rio Grande do Sul. Finally, there remain a host of Brazilians too numerous to mention whose help in the herbarium and in the field is warmly remembered.

MATERIAL

I am indebted to those in charge of the following herbaria for the opportunity to study their material (abbreviations wherever possible follow Lanjouw & Stafleu, Index Herbariorum, part 1):[2]

Museo Argentino de Ciencias Naturales Bernardino Rivadavia, Buenos Aires (BA).

Bailey Hortorium, Ithaca, New York (BH).

[2] Regnum Vegetabile 2: 1–167. 1952.

British Museum of Natural History (BM).
Jardin Botanique de l'État, Brussels (BR).
Jenman Herbarium, Department of Agriculture, British Guiana (BRG).
University of Cambridge, Great Britain (CGE).
Chicago Natural History Museum, formerly the Field Museum (F).
Faculdade de Filosofia da Bahia (FF Bahia).
Conservatoire et Jardin Botanique, Geneva (G).
Gray Herbarium of Harvard University (GH).
Herbário "Barbosa Rodrigues," Itajaí, Santa Catarina (HBR).
Instituto Agronómico do Estado de São Paulo, Campinas (IAC).
Instituto Agronómico do Norte, Belém, Pará (IAN).
Instituto Biologico de Pesquisas Técnicas, Curitiba, Paraná (Inst. Biol. Pesq. Tec.).
Instituto de Pesquisas Agronómicas, Recife, Pernambuco (IPA).
Jardim Botânico de Belo Horizonte, Minas Gerais. Material studied now transferred to the Museu Nacional, Rio de Janeiro.
Royal Botanic Gardens, Kew (K).
Institut et Jardin Botanique, Liége, Belgium (LG).
Instituto Miguel Lillo, Tucumán, Argentina (LIL).
Linnean Society of London (LINN).
Botanisches Museum, Munich (M).
Museu Goeldi, Belém, Pará (MG).
University of Michigan (MICH).
Missouri Botanical Garden (MO).
Institut Botanique, Montreal (MT).
New York Botanical Garden (NY).
Muséum National d'Histoire Naturelle, Paris (P).
G. F. J. Pabst, private herbarium, Santa Catarina (Pabst).
Museu Paranaense, Curitiba (Paran.).
Museu Nacional, Rio de Janeiro (R).
Jardim Botânico do Rio de Janeiro (RB).
Riksmuseet, Stockholm (S).
Instituto de Botânica, São Paulo (SP).
University of California (UC).
United States National Museum (US).
United States National Arboretum. Material studied now transferred to the United States National Museum.
Botanischer Garten und Botanisches Institut der Universität, Vienna (WU).

The following are cited on the basis of duplicates, descriptions, and photographs:

Herbário Anchieta, Pôrto Alegre, Rio Grande do Sul (Anchieta).
Botanisches Museum, Berlin (B). Bromeliaceae mostly lost.
Botanical Museum and Herbarium, Copenhagen (C).
Komarov Botanical Institute of the Academy of Sciences of U. S. S. R., Leningrad (LE).
Botanisches Institut der Universität, Leipzig (LZ). Bromeliaceae all lost.
Naturhistorisches Museum, Vienna (W). Bromeliaceae all lost.

Whenever it seems significant, I have cited personally unverified collections and followed them with the name of the person responsible for the record. Thus there are a number of collections in European herbaria that are cited on the authority of Mez in order to give the full distributional data for the species. One instance in particular

needs comment, Mez's list of Bromeliaceae in Luetzelburg, Estudo Botanico do Nordeste 3: 104. 1923. This greatly increases our knowledge of the distribution of species in arid northeastern Brazil, yet curiously enough Mez seems to have forgotten it in his final monograph in the Pflanzenreich. My other large source of data is Reitz, who has kept me constantly informed as he adds to the flora of Santa Catarina.

In a few instances pictures, not specimens, must be cited as types of species. This is particularly the case in Baker's species described from the unpublished Icones of E. Morren. These are at Kew and in some cases can be identified with specimens at Liége, but Baker saw only the pictures.

Since duplicate collections of Bromeliaceae are relatively rare and since the important herbaria as regards the family have been covered, there seems little point in listing exsiccatae. Instead, the numbers of photographic negatives on file in the Chicago Natural History Museum, the Gray Herbarium, and the United States National Museum are noted whenever they are likely to be helpful in establishing the identity of a species.

GEOGRAPHICAL CITATIONS

The citation of localities in Brazil is extremely difficult for a number of reasons. First of all, many of the early collectors did not bother to record localities or their data were lost, with the result that "Brazil" is all we have left. Next, some of the older settlements have ceased to exist and frequently places have changed their names. Who now recognizes São Sebastianópolis as Rio de Janeiro or Desterro as Florianópolis? If it were not for Urban's great study of collectors in the introductory volume of "Flora Brasiliensis," the case would be hopeless.

More recently there is the difficulty of changes in spelling and place names by government action. Xapecó becomes Chapecó, retaining the pronunciation but bewildering the reader. In its "Index to Map of Hispanic America 1: 1,000,000" (p. 402), the American Geographical Society explains the latest Brazilian orthography and its listings cover the majority of localities involved in this paper.

However, since the publication of this index in 1945, there has been a new reform to eliminate duplication of names, not just within a state but for the whole country. Thus, where Bom Jesús could occur as the name for a dozen localities in one state, there must now be but one place with that name in all Brazil. This has been accom-

plished by giving the unadorned name to the locality with the best title to it, and modifying the name or completely changing it for the others. The words "do Norte" are added to the northernmost locality of that name and so on for the points of the compass, others are compounded with the name of the river or mountains which they adjoin. On the other hand, one state capital goes from Paraíba to João Pessoa without a backward glance. Ultimately this latest reform should clarify Brazilian geography greatly, but at the moment it is an additional confusion to one dealing for the most part with the older names for localities.

The recent practice of dividing the states into municípios helps with the identification of many localities, and the Tábuas Itinerárias Brasileiras (Serviço Gráfico do Instituto Brasileiro de Geografia e Estatística–1950) is a very useful index to the municípios. I have also been fortunate in obtaining the latest maps for a few states, notably Paraná and Santa Catarina.

When all other resources have been used, I have appealed to the collectors and they have helped me with their own localities and often with those of past botanists. Dr. E. Asplund of the Riksmuseet, Stockholm, has been most helpful in finding the localities of Swedish botanists in Brazil. In order to save anyone the work of identifying these localities again, on page 259 I have listed those which are not explained in the "Index to Map of Hispanic America 1 : 1,000,000."

In citing localities in the text, the sequence is from the vague to the definite. First come the collections of which we know only that their origin was Brazilian, next come those that are located only as to state, followed by those with named localities within the state, and, finally, by those that are further defined by a município. Locality names which are defined only as far as the state are cited in the text in parentheses, indicating that it has not been possible to plot them on the map.

DISTRIBUTION AND ORIGIN

The map on page 7 (from Goode's series) shows the approximate position of all bromeliad localities in Brazil that it has been possible to identify. The observation that range maps represent where collectors have been rather than where plants are, is peculiarly apt in this case because of the difficulty of collecting and preserving bromeliads. Undoubtedly this situation accounts for the marked breaks in representation in eastern Brazil around the Baía–Espírito Santo boundary and around that between São Paulo and Paraná.

Yet the even more obvious contrast shown between eastern Brazil and the remainder of the country is actually much greater than it is possible to indicate. In preparing the map, it was frequently the case

Distribution of Bromeliaceae in Brazil

that in the east each spot represented several localities too near to each other to be distinguished, while each locality generally included a number of species. Elsewhere the spots usually represent a single locality and very often a single species.

From the map, representation in much of Minas Gerais compares with that about Rio de Janeiro, but the single spot which covers the

Distrito Federal represents dozens of localities, nearly a hundred species, and great quantities of individuals, while one spot in Minas indicates a single locality as a rule and that with few species and individuals.

Great general collectors who have operated in the east and also in the interior give further evidence along this line, as shown by a comparison of A. Glaziou's collections in the state of Rio de Janeiro and in Goiás, or those of F. C. Hoehne in São Paulo and Mato Grosso. In each case the collections in the east are more numerous, as might be expected from the greater amount of time spent there, but they are also significantly richer in species both totally and in relation to the remainder of the flora. Such collectors in the Amazon basin as A. Ducke, R. L. Fróes, B. A. Krukoff, J. G. Kuhlmann, R. E. Schultes, and R. Spruce afford us almost no direct contrast with the bromeliads of the east, but the family is a very insignificant part of their well rounded general collections.

Finally, we have the evidence of collectors who were interested in bromeliads almost exclusively. Dr. J. L. Collins, who traveled extensively investigating the origin of the pineapple, has told me how driving westward in Pernambuco he saw bromeliads in profusion and then abruptly could find none. The following from the unpublished report by K. F. Baker and J. L. Collins of exploration in 1938 and 1939 gives the details:

> On the return trip from Candado we had opportunity to determine more closely the exact point at which the Bromeliaceae stopped in the westward distribution. A short distance east of Salgadinho we suddenly came to the end of the Sertão and passed into the curimataú and with this change immediately passed from a situation of almost no Bromeliads to their supplying one of the dominant elements of the flora.

The Fosters in their journey to Mato Grosso repeatedly found formations that they had learned to associate with bromeliads in the east completely lacking in these plants.

Concerning the origin of the Brazilian bromeliads there seems little reason to alter the general conclusions reached in my "Geographical Evidence on the Lines of Evolution in the Bromeliaceae" (Bot. Jahrb. 66: 446–468. 1934). Using the generally accepted morphological criteria, the Brazilian bromeliads are characterized as derived rather than primitive types. The Bromelioideae, with its consistently inferior ovary and indehiscent fruit, is easily the most advanced of the three subfamilies and has its chief center in eastern Brazil with a number of endemic genera. All this would indicate that the family had arisen in western South America and migrated into Brazil.

It can be argued that structurally *Encholirium* and *Cottendorfia* are as primitive as *Puya,* but they are now widely separated from it geographically and the distribution of the other genera indicates an origin from an ancestral type close to *Puya. Encholirium* and *Cottendorfia* may have entered Brazil on the divide between the Amazon and Paraguay basins, but so long ago that no good evidence remains. The advanced genera, *Dyckia* and *Deuterocohnia,* however, clearly indicate this origin from western Bolivia. The other advanced genera, *Navia* and *Brocchinia,* barely cross the northern boundary of Brazil. *Navia,* at first considered primitive on account of its naked seeds, is now evidently advanced as occasional vestiges of wing prove this condition to be the result of reduction.

The subfamily Tillandsioideae shows evidences of at least three routes of invasion and also a strong reverse movement in the case of *Vriesia,* its largest genus in Brazil. *Tillandsia,* the most primitive genus of the subfamily, shows the height of land as the most probable route for its most primitive subgenus, *Allardtia,* as well as for *Pseudo-Catopsis* and *Phytarrhiza. Anoplophytum* very likely evolved in Brazil and spread westward like the genus *Vriesia.* The subgenus *Diaphoranthema* of *Tillandsia* seems to have invaded from the south, while a few species of the subgenus *Tillandsia* (formerly *Platystachys*) and of the genus *Catopsis* have obviously moved down the coast from the West Indies.

Judged from the extreme concentration of species and genera in eastern Brazil, the subfamily Bromelioideae must have evolved there. Such genera as *Cryptanthus* and *Nidularium* are endemic in the area, and such large and widespread genera as *Aechmea* and *Billbergia* have species ranges that almost seem to explode from that point.

ECONOMIC ASPECTS

The pineapple, *Ananas comosus,* is the one bromeliad of outstanding economic importance. It probably evolved in interior Brazil (see Baker & Collins in American Journal of Botany 26:697), but like so many other economic species it has found its greatest development far from its homeland. In fact the leading center of research on the pineapple is in Hawaii, as might be expected in connection with some three-quarters of the world's export trade in this fruit. In Brazil, although it does not figure as an export, the pineapple is widely grown and appreciated. It also produces a superior fiber but this has not found much use because of the difficulties of preparation.

Research in Brazil has been principally taxonomic as can be seen by the references to F. C. Camargo in the text.

The caroá, *Neoglaziovia variegata,* also produces an excellent fiber which is much used within Brazil. The species is native in the arid northeast where it grows without cultivation on areas too poor for most other commercial crops. For a detailed study see "O Caroá" by Lauro P. Xavier.[3]

Spanish moss, *Tillandsia usneoides,* apparently does not grow so prolifically anywhere in Brazil as it does in the southeastern United States, nor does it appear to have been systematically exploited for filler material for cushions and mattresses as has been done here.

HORTICULTURE

Interest in bromeliads as ornamentals is much more recent than in the pineapple, yet it dates back well over a century. In England the cultivation of the still popular Brazilian *Billbergia pyramidalis* was noted under another name in the Botanical Magazine in 1815 and accompanied by a colored plate. *Billbergia amoena* appeared similarly in Loddiges Botanical Cabinet in 1818 and *B. zebrina* in 1827, and *Aechmea fasciata* in the Botanical Register in 1828. The cultivation of *Bromelia antiacantha* was noted by Bertolini in Italy in 1824. By 1857 many species were in cultivation in Berlin as evidenced by the numerous citations in Beer's "Die Familie der Bromeliaceen," the first comprehensive treatment of the group. Between 1865 and 1885 there was great interest in the family in Belgium centering around Liége where Edouard Morren published many new species with elaborate colored plates in his Belgique Horticole. Also notable for work in horticultural species in the last half of the 19th century were C. Koch in Germany, Regel in Russia, Antoine in Austria, and Lemaire, Linden, and André in France. It is noteworthy that the great majority of ornamental species described in this early period as well as later were of Brazilian origin. The more recent monographers, Baker and Mez, concerned themselves less with horticulture, but fell heirs to the work left unfinished by Morren's untimely death, and published a considerable number of ornamentals nonetheless.

Horticultural activity in bromeliads developed late in the United States, although, according to Mulford Foster (Plant Life 1:71.

[3] Ministério da Agricultura, Departamento Nacional da Produção Vegetal, Divisão de Fomento da Produção Vegetal, Secção de Fomento Agricola, Paraíba.

1945), nurserymen were listing species for sale before the turn of the century. Now cultivation has developed here to the extent of supporting the Bromeliad Society, organized in 1950.

In Brazil, Glaziou was bringing live bromeliads to the imperial gardens in Rio, now the gardens of the Museu Nacional, as early as 1868. Today there are also notable collections at the Jardim Botânico in Rio and at the Instituto de Botânica in São Paulo. Beyond all comparison or possibility of estimate, however, is the private interest in bromeliads. Given a people with a deep appreciation of the colorful, and plants with vivid inflorescences that last for weeks or leaves with highly ornamental markings, the resulting interest is a foregone conclusion. Masses of cut flowers are on sale in the markets and by the roadsides and cultivation is effected simply by removing the plant from one tree and attaching it to another more conveniently situated.

BROMELIAD MALARIA

Under certain exceptional circumstances bromeliads are detrimental to public health because of the malaria-carrying mosquitoes that breed in their tanks. As explained in my article in the Smithsonian Report for 1952, there have been only three instances of serious malaria infestation attributed to bromeliad breeding mosquitoes although the disease is worldwide in tropical and warm temperate regions. The first case was in the coastal rain forest of São Paulo, the second on the British island of Trinidad, and the third and worst in Santa Catarina, again in the coastal rain forest.

The present paper attempts to estimate the possibility of the occurrence of further malaria of this origin by giving a comprehensive view of the distribution of the Bromeliaceae in Brazil. From the map (p. 7) it is immediately evident that the bromeliads are concentrated in the east along the narrow coastal slope just as is the human population. Analysis by genera and species shows that the Bromeliads which store their water in open tanks are still further concentrated in the east, while those storing water in the leaf-tissues predominate in the interior. Thus there is little probability of serious bromeliad malaria on the Planalto or in the Amazon basin. On the other hand, species of bromeliads that are proved hosts of malaria mosquitoes are recorded for practically the entire length of the Brazilian coast. *Gravisia aquilega,* the most important host in Trinidad, is found as far south as Baía, while *Vriesia gigantea* and *Hohenbergia augusta,* the worst offenders in Santa Catarina, extend north to Espírito Santo.

Fortunately much more is involved than the mere presence of the mosquito host, as Veloso has demonstrated in his detailed study noted above. To be effective in the transmission of malaria, the bromeliad species must also occur in great quantity within mosquito range of a large human population. Although there is no survey like that of Veloso to give us an idea of bromeliad concentrations in the other states of Brazil, there is reason to hope that the situation in Santa Catarina is exceptional. Certainly nowhere else have I seen or heard of such dense masses of tank bromeliads as occur there. If there remain no serious foci of bromeliad malaria, as seems to be the case, then public health is concerned only with guarding against their development. The Serviço Nacional de Malária is already doing this in the south, where I have seen their crews protecting a new beach resort by clearing bromeliads from a belt around it. In the north even this seems unnecessary. Probably the only danger there is the remote possibility of artificially stimulating the growth of bromeliads by providing a favorable habitat, as happened in the development of the cacao plantations in Trinidad.

Finally, the needs of public health, though paramount, are not wholly irreconcilable with those of horticulture. Destruction of bromeliads when necessary involves only a narrow belt around a settlement and this is not the only means of control nor even the most feasible one in some instances. The species involved are both common and wide-ranging and their extinction is virtually impossible as long as any forest remains.

PRELIMINARY RECORDS

All necessary preliminary records have been brought together here and placed in alphabetical order so that they can be more easily consulted in monographic studies and so they will not encumber the text when it is used for purposes of identification.

Aechmea bicolor L. B. Smith, sp. nov. FIGURE 100

A *Ae. candida* E. Morren, cui affinis, laminis foliorum valde acutis longioribus angustioribusque subtus omnino cinereo-lepidotis, spinula sepalorum brevi, placentis apicalibus differt.

Stoloniferous; leaves in a slenderly crateriform rosette, 5–6 dm. long, much exceeding the inflorescence, covered beneath with fine appressed cinereous scales, sheaths broadly elliptic, 13 cm. long, blades linear, acute with a thick pungent apical cusp, 25 mm. wide, flat, laxly serrulate with teeth 0.5 mm. long, densely cinereous-lepidote above

becoming more or less glabrous with age; scape slender, erect, white-flocculose when young; scape-bracts lanceolate, acuminate to a thick pungent apex, elsewhere membranaceous, erect, about equaling the internodes, the lowest serrulate; inflorescence simple, laxly cylindric, 5–8 cm. long, white-flocculose; floral bracts broadly ovate, acute, thin, the lowest about equaling the ovary, the others much shorter; flowers polystichous, sessile, divergent; sepals yellow, 4 mm. long exclusive of the slender 1 mm. mucro, connate for nearly half their length, the free lobes broadly ovate and rounded; petals 9 mm. long, white, bearing two lacerate scales above the base, blades elliptic, obtuse, stamens included; ovary broadly obconic, 5–6 mm. long; epigynous tube shallowly crateriform, placentae apical, ovules apiculate.

Type in the U. S. National Herbarium, No. 1952441, collected on trees in dense forest, between Ituaçú and Jequié, State of Baía, Brazil, altitude 480 meters, Oct. 18, 1948, by M. B. Foster (No. 2450).

Aechmea blanchetiana (Baker) L. B. Smith, comb. nov.

Tillandsia blanchetiana Baker, Handb. Bromel. 182. 1889.

Aechmea cariocae L. B. Smith, nom. nov.

Chevalieria comata Mez in DC. Monogr. Phan. 9: 153. 1896. In part: as to description but not as to basonym.

Aechmea castanea L. B. Smith, sp. nov. FIGURE 111

A *Ae. cariocae* L. B. Smith, cui affinis, bracteis florigeris brunneo-lepidotis, sepalis glabris minutissime armatis differt.

Leaves many in a spreading rosette, 1.7 m. long, covered on both sides with a membrane of coalesced scales, thick, coriaceous, sheaths castaneous-lepidote, blades linear, acute with a stout brown apical cusp, 7 cm. wide, buff-lepidote, subdensely serrate with ascending brown teeth 2 mm. long; scape over 35 cm. long, 2 cm. in diameter, brown-flocculose; scape-bracts erect, very densely imbricate, their sheaths elliptic, 8 cm. long, dark castaneous, covered with brown appressed scales but becoming glabrous, their blades ligulate, acute, to 10 cm. long, entire, subcoriaceous; inflorescence simple, densely strobilate with about 15 rows of flowers, slenderly conical, 29 cm. long, 10 cm. in diameter; floral bracts cymbiform, enfolding the base of the flower, thick, woody, the truncate rugose apex densely brown-lepidote, the terminal mucro not more than 3 mm. long; flowers spreading; sepals free, strongly asymmetric with a broad wing, 16 mm. long, coriaceous, thick, glabrous, the delicate mucro less than

0.5 mm. long; petals fleshy, imperfectly known; epigynous tube conspicuous, broad-based.

Type in the Gray Herbarium, collected at Santa Teresa, State of Espírito Santo, Brazil, Aug. 5, 1940, by M. B. & R. Foster (No. 831).

Aechmea chlorophylla L. B. Smith, sp. nov. FIGURE 107

A *Ae. bromeliifolia* (Rudge) Baker, cui affinis, bracteis florigeris sepalisque nullo modo retusis, petalis basi appendiculatis differt.

Leaves 5 dm. long, green, wholly covered with coarse pale appressed scales, sheaths broadly elliptic, 12 cm. long, blades ligulate, acute, 3 cm. wide, laxly serrate with spreading teeth 3 mm. long; scape 4 dm. long, 4 mm. in diameter, densely white-flocculose; scape-bracts thin, roseate, white-lepidote, the lower ones elliptic, about equaling the internodes, serrate near their apices, the upper ones lanceolate, much exceeding the internodes and massed below the inflorescence, entire; inflorescence simple, densely strobilate, ellipsoid, 7–9 cm. long, 35–40 mm. in diameter, covered with white appressed scales; floral bracts suberect, broadly cymbiform, broadly acute or obtuse and apiculate, thick-coriaceous and bicarinate or tricarinate but near the apex rather thin and distinctly nerved, about equaling the ovary; sepals strongly asymmetric, 12 mm. long, connate for 2 mm., unarmed; petals erect, 20 mm. long, bearing 2 lacerate scales at base, fleshy, quickly turning black; epigynous tube broad, conspicuous, placentae apical, ovules long-caudate.

Type in the Gray Herbarium, collected at Santa Teresa, State of Espírito Santo, Brazil, Aug. 6, 1940 (bloomed in cultivation, June 1942), by M. B. & R. Foster (No. 830).

ADDITIONAL SPECIMEN EXAMINED:

ESPÍRITO SANTO: Near Santa Teresa, 1939, *M. B. & R. Foster* 176-b (GH).

Aechmea comata (Gaud.) Baker var. **makoyana** (Mez) L. B. Smith, comb. nov.

Aechmea lindenii var. *makoyana* Mez, Engl. Pflanzenreich IV. 32:159. 1934.

Aechmea leucolepis L. B. Smith, sp. nov. FIGURE 110

A *Ae. sphaerocephala* (Gaud.) Baker, cui affinis, bracteis superioribus scapi integris, inflorescentia lepidibus albidis adpressis obtecta differt.

Forming dense clusters; flowering shoot to 4 m. high (! Foster); leaves to 4 m. long (! Foster), the single leaf of the type 1.1 m. long, wholly covered with pale appressed scales, the sheath elliptic, 3 dm.

long, dark castaneous, the blade ligulate-attenuate with a stout terminal cusp, 11 cm. broad, very laxly serrate with dark uncinate teeth 5 mm. long; scape stout, only the upper 15 cm. known, glabrous, dark castaneous; upper scape-bracts subfoliaceous, entire, large, erect, densely imbricate; inflorescence simple, densely strobilate, ellipsoid, 14 cm. long, 9 cm. in diameter including the sepals, covered with appressed white scales; floral bracts cymbiform, enfolding the ovary and the bases of the sepals, very thick and woody, broadly truncate with a slender terminal mucro 3 mm. long; sepals 27 mm. long including the slender 3 mm. long mucro, connate for 3 mm., the free lobes ovate, asymmetric, dark castaneous, coriaceous; petals and stamens included, imperfectly known; epigynous tube infundibuliform, 5 mm. long, seeds apparently abortive.

Type in the U. S. National Herbarium, Nos. 1952447 and 1952448, collected between Milagres and Maracás, State of Baía, Brazil, altitude 450 meters, Oct. 18, 1948, by M. B. Foster (No. 2452).

Aechmea lingulata var. **froesii** L. B. Smith, var. nov.

A var. *lingulata* ramis rectis plus minusve recurvatis, bracteis florigeris breviter mucronulatis, sepalis majoribus differt.

Type in the herbarium of the New York Botanical Garden, collected between Colonia Itatinga and Bom Gosto, State of Baía, Brazil, November 1942, by Ricardo de Lemos Fróes (No. 19970).

Aechmea lingulata var. **patentissima** (Mart. ex Schult.) L. B. Smith, comb. nov.

Billbergia patentissima Mart. ex Schult. in R. & S. Syst. 7: pt. 2: 1270. 1830.

Aechmea maculata L. B. Smith, sp. nov. FIGURE 107

A *Ae. bromeliifolia* (Rudge) Baker, cui valde affinis, vaginis foliorum et scapi bracteis purpureo-maculatis, bracteis florigeris apiculatis differt.

Caudex 6–9 dm. long (! Foster); flowering shoot 45 cm. high; leaves rosulate, 27 cm. long, the sheath broadly elliptic, 13 cm. long, covered with white appressed scales, densely and coarsely purple-spotted above, serrate toward apex, the blade ligulate, acute with the extreme apex reflexed, 4 cm. wide, flat, white-lepidote beneath, soon glabrous above, laxly serrate with brown spreading teeth 2 mm. long, concolorous; scape erect, 7 mm. in diameter sparsely white-flocculose; scape-bracts elliptic, thin, roseate, the lower ones erect, about equaling the internodes, white-lepidote, serrulate at apex, the upper ones

divergent, imbricate and massed below the inflorescence, involute, glabrous; inflorescence simple, strobilate, cylindric, 4 cm. long, 2 cm. in diameter, white-flocculose; floral bracts suborbicular, retuse and then apiculate, 10 mm. long, thick and bicarinate with thin apex and margins, dark brown; sepals 8 mm. long, connate for 3.5 mm., the free lobes asymmetric, subquadrate, ecarinate, unarmed; petals 17 mm. long, bearing fimbriate scales near the middle of the claw, blades elliptic; stamens included; epigynous tube 1 mm. long, placentae apical; ovules caudate.

Type in the Gray Herbarium, collected on the Pico de Piedade near Belo Horizonte, State of Minas Gerais, altitude 1,300 meters, July 10, 1940, by M. B. & R. Foster (No. 561).

Aechmea mitis (Mart. ex Schult.) L. B. Smith, comb. nov.

Billbergia mitis Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1267. 1830.

Aechmea mutica L. B. Smith, sp. nov. FIGURE 96

A *Ae. macrochlamyde* L. B. Smith, cui habitu persimilis, inflorescentia bipinnata, sepalis subduplo minoribus inermibus differt.

Flowering plant 60–65 cm. high; leaves 5–6 dm. long, sheaths elliptic, 16–19 cm. long, much wider than the blades, subdensely and minutely brown-lepidote, blades linear, rounded to a stout pungent terminal cusp, not at all narrowed at base, 3 cm. wide, sparsely and very inconspicuously pale-lepidote, laxly serrate with spreading brown teeth 2 mm. long; scape slightly curved, 5 mm. in diameter, white-lanate, becoming glabrous; scape-bracts lance-oblong, acute, pungent, subcoriaceous, sparsely pale-lepidote, the lower exceeding the internodes, serrulate near their apices, pale green, the upper densely imbricate and massed beneath the inflorescence, roseate; inflorescence densely bipinnate, cylindric, 14–17 cm. long, 6 cm. in diameter, white-lanate especially on the axis; primary bracts spreading, thin, roseate, the lower ones linear and exceeding the spikes, the upper triangular and much shorter; spikes sessile, cylindric, densely 3–4-flowered; rhachis not excavated; floral bracts broadly ovate, acuminate, 20 mm. long including the slender terminal mucro, exceeding and concealing the sepals, thin, prominently nerved, roseate; flowers apparently distichous, sessile, erect; sepals free, asymmetric, elliptic, obtuse, 9 mm. long, unarmed; petals 17 mm. long, blue, bearing 2 bidentate scales at base; epigynous tube 2 mm. long, placentae apical, ovules apiculate.

Type in the Gray Herbarium, collected at Santa Teresa, State of Espírito Santo, Brazil, altitude 765 meters, July 27, 1939, by M. B. & R. Foster (No. 293). Duplicate in the Museu Nacional, Rio de Janeiro.

ADDITIONAL SPECIMEN EXAMINED:

ESPÍRITO SANTO: Santa Teresa, Aug. 5, 1940, *M. B. & R. Foster* 806 (GH).

Aechmea nervata L. B. Smith, sp. nov. FIGURE 105

A *Ae. lamarchei* Mez, cui verisimiliter affinis, bracteis florigeris tenuibus valde nervatis, sepalis breviter connatis differt.

Flowering plant 6 dm. high; leaves unknown; scape straight, 6 mm. in diameter; scape-bracts erect, densely imbricate, broadly elliptic with a pungent brown terminal cusp, covered with fine white appressed scales, the lowest ones serrulate near the apex, the central ones over 10 cm. long, the higher ones entire; inflorescence simple, strobilate, cylindric, acute, 9 cm. long, 25 mm. in diameter, white-flocculose, becoming glabrous; floral bracts erect, densely imbricate, very broadly ovate with a long soft acuminate apex, 16 mm. long, about equaling the sepals, nearly flat, thin, strongly nerved; sepals 8 mm. long, connate for 2 mm., the free lobes asymmetric, subelliptic with an acute but soft apex; petals imperfectly known, bearing 2 subentire scales near the base; epigynous tube 1.5 mm. long, placentae apical, ovules apiculate.

Type in the Gray Herbarium, collected on the litoral at Vitória, State of Espírito Santo, Brazil, July 1939, by M. B. & R. Foster (No. 176-A).

Aechmea nudicaulis (L.) Griseb. var. **aureo-rosea** (Antoine) L. B. Smith, comb. nov.

Hoplophytum aureo-roseum Antoine, Wien Ill. Gartenzeit. 6: 97, *pl. 1.* 1881.

Aechmea ornata var. **hoehneana** L. B. Smith, var. nov. FIGURE 104

Differt inflorescentia graciliore, floribus gracilioribus, petalis azureis.

Differs from the typical variety in its more slender inflorescence and flowers and blue petals.

Type in the Gray Herbarium, collected at Paiól do Meio, State of São Paulo, Brazil, Sept. 19, 1940, by Augusto Gehrt. Duplicate in the Instituto de Botânica, São Paulo (No. 43156).

ADDITIONAL SPECIMENS EXAMINED:

SÃO PAULO: São Bernardo, Aug. 15, 1895, *G. Edwall* (SP).

PARANÁ: In swamp near sea level, Caiobá, Sept. 1, 1939, *M. B. & R. Foster* 452 (GH).

Aechmea podantha L. B. Smith, sp. nov. FIGURE 95

A *Ae. fulgente* Brongn., cui affinis, floribus pedicellatis, ovario verrucoso differt.

Climbing (! Foster); flowering shoot 45 cm. long; leaves to 42 cm. long, the sheaths elliptic to suborbicular, 12 cm. long, subdensely and minutely brown-lepidote, the blades ligulate, subacute and apiculate, slightly narrowed toward the base, 3 cm. wide, subdensely serrulate with antrorse teeth 1 mm. long, sparsely and obscurely pale-lepidote, lustrous; scape curved, 3 mm. in diameter, glabrous; scape-bracts erect, densely imbricate, elliptic, acute, red, membranaceous, obscurely lepidote, the lower ones serrulate; inflorescence laxly bipinnate, pyramidal, 12 cm. long, 7 cm. in diameter, glabrous; primary bracts triangular, the largest only 5 mm. long; branches spreading and lax with a few distichous flowers; rhachis slender, geniculate; floral bracts minute, suborbicular; flowers suberect, on pedicels 1 mm. long; sepals 4 mm. long, connate for 1.5 mm., verrucose, the free lobes strongly asymmetric, retuse; petals imperfectly known, their blades 4 mm. long; ovary globose, red, verrucose, epigynous tube very short, placentae apical, ovules caudate.

Type in the Gray Herbarium, collected at Santa Teresa, State of Espírito Santo, Brazil, Aug. 7, 1940, by M. B. & R. Foster (No. 842).

Aechmea ramosa Mart. var. **festiva** L. B. Smith, var. nov.

Differt sepalis rubris, ovariis albis.

Differs from the typical variety by its red sepals and white ovaries.

Type in the Gray Herbarium, collected at Linhares, Municipio Collatina, State of Espírito Santo, Brazil, altitude 20 to 40 meters, Aug. 2, 1940, by M. B. & R. Foster (No. 770).

Aechmea stelligera L. B. Smith, sp. nov. FIGURE 98

A *Ae. tomentosa* Mez, cui affinis, inflorescentia laxa, bracteis primariis angustis, axibus gracilibus differt.

Epiphytic, plant incompletely known but undoubtedly over a meter high; leaves unknown; scape straight, slender; scape-bracts erect, densely imbricate, lanceolate, acute, entire, over 2 dm. long, chartaceous, rose (! Vasconcellos), brown-lepidote; inflorescence laxly subpyramidal, tripinnate, 4 dm. long, covered with fine brown stellate trichomes; primary bracts linear-lanceolate, the upper ones shorter than their axillary branches; spikes laxly 7–8-flowered; rhachis geniculate, slender; floral bracts acicular from a broadly triangular base, 2 mm. long; flowers more than 2-ranked, sessile, suberect; sepals

12 mm. long, connate for 1 mm., subelliptic, strongly asymmetric, the terminal mucro 1 mm. long; petals about 2 cm. long, each bearing 2 oblong obtuse entire scales near the base; ovary subcylindric, becoming ellipsoid, epigynous tube infundibuliform; placentae extending almost the whole length of the cell, ovules caudate.

Type in the U. S. National Herbarium, No. 2059452, collected in Areia, State of Paraíba, Brazil, Sept. 15, 1944, by Jaime M. Vasconcellos. Duplicate in the Instituto de Botânica, São Paulo (No. 52358).

The collector records the flower as yellow, but it is not clear whether he means to include the petals or not. In the dried material they appear much darker than the sepals.

Aechmea triangularis L. B. Smith, sp. nov. FIGURE 106

A *Ae. bromeliifolia* (Rudge) Baker, cui affinis, laminis foliorum caudato-acuminatis, bracteis florigeris nullo modo retusis, petalis purpureis differt.

Flowering plant to 37 cm. high; leaves to 5 dm. long, covered with a membrane of pale appressed scales, the sheaths elliptic, 18 cm. long, 9 cm. wide, near the apex densely serrate with dark spreading spines 5 mm. long, green with small red spots, elsewhere entire and dark brown, the blades narrowly triangular, caudate-acuminate, 4 cm. wide at base, laxly serrate with spreading or antrorse teeth; scape erect, 3 mm. in diameter, white-flocculose; scape-bracts broadly elliptic, thin, rose-lake (! Foster), inconspicuously lepidote with white appressed scales, the lower ones much shorter than the internodes, caudate, serrate near the apex, the upper ones much longer than the internodes, divergent, serrate throughout; inflorescence simple, strobilate, cylindric, 6 cm. long, 2 cm. in diameter exclusive of the petals, densely lepidote with white subappressed scales; floral bracts orbicular, apiculate, 8 mm. long, exceeding the ovary, coriaceous, bicarinate; sepals 6 mm. long, connate for 2 mm., the free lobes asymmetric, subquadrate, retuse, unarmed; petals 12 mm. long, lavender to purple turning black the second day (! Foster), bearing 2 fimbriate scales high on the claw, blade broadly elliptic, obtuse; epigynous tube almost none, placentae apical, ovules caudate.

Type in the Gray Herbarium, collected at Santa Teresa, State of Espírito Santo, Brazil, Aug. 7, 1940 (bloomed in cultivation Apr. 22, 1941), by M. B. & R. Foster (No. 829).

Aechmea triticina var. **capensis** L. B. Smith, var. nov.

A var. *triticina* scapi bracteis supremis serrulatis, bracteis florigeris sepala superantibus differt.

Type in the Museu Nacional, Rio de Janeiro, Nos. 46221 and 46223, collected near Cabo Frio, State of Rio de Janeiro, Brazil, October 1899, by E. Ule.

Araeococcus goeldianus L. B. Smith, sp. nov. FIGURE 52

A *A. micrantho* Brongniart, cui affinis, inflorescentiae ramis divergentibus paulo ramosis leviter flexuosis differt.

Stemless, 7 dm. high; leaves few in an ellipsoid rosette, the outer ones reduced to acute sheaths, the inner about equaling the inflorescence; sheaths elliptic, about 25 cm. long; blades ligulate, acute, narrowed toward the base, flat, 4 cm. wide, laxly serrulate; scape erect, slender; scape-bracts imbricate, lanceolate; inflorescence laxly tripinnate, 28 cm. long; lower primary bracts like the scape-bracts but smaller, much shorter than the axillary branches; branches divergent, 10 cm. long, few-branched, slightly flexuous, slender, very laxly flowered; floral bracts suborbicular, 3 mm. long, apiculate, minutely serrulate, membranaceous; flowers spreading; sepals free, oblong, asymmetric, 2 mm. long, truncate and apiculate; petals and stamens unknown; fruit globose.

Type in the herbarium of the Museu Goeldi, No. 1067, collected on trees or granite rocks at Cunani, Territorio de Amapá, Brazil, Oct. 15, 1895, by J. Huber (No. 983). Fragment and photograph in the U. S. National Herbarium.

Billbergia amoena (Lodd.) Lindl. var. **viridis** L. B. Smith, var. nov.

Differt petalis omnino viridibus.

Differs from the typical variety in having its petals wholly green instead of dark blue at the apex.

Type in the Gray Herbarium, collected at Santa Teresa, State of Espírito Santo, Brazil, July 27, 1939 (bloomed in cultivation June 1940), by M. B. & R. Foster (No. 246).

Billbergia euphemiae E. Morr. var. **nudiflora** L. B. Smith, var. nov.

Differt inflorescentia subdensa, axi fere recto, bracteis florigeris omnibus vel fere omnibus minutis.

Differs from the typical variety by its subdense inflorescence, nearly straight axis, and in having all or nearly all the floral bracts minute.

Type in the Gray Herbarium, collected at Itapemirim, State of Espírito Santo, Brazil, altitude 900 meters, July 7, 1939, by M. B. & R. Foster (No. 159). Duplicate in the Museu Nacional, Rio de Janeiro.

ADDITIONAL SPECIMENS EXAMINED:

ESPÍRITO SANTO: Monte Carlo, Collatina, July 19, 1939, *M. B. & R. Foster* 217 (GH). Cachoeiro de Itapemirim, Aug. 17, 1940, *M. B. & R. Foster* 969 (GH, US).

Billbergia euphemiae E. Morr. var. **saundersioides** L. B. Smith, var. nov.

Differt foliis pallide maculatis, haud transverse vittatis.

Differs in its leaves which have pale spots instead of transverse bands.

Type in the U. S. National Herbarium, No. 2120883, collected near Maracás, State of Baía, Brazil, Oct. 19, 1948 (bloomed in cultivation December 1953), by M. B. Foster (No. 2470).

Billbergia fosteriana L. B. Smith, sp. nov. FIGURE 122

A *B. saundersii* Hort. Bull. cui affinis, inflorescentia erecta, foliis transverse zonatis differt.

Terrestrial, stoloniferous, flowering shoot 45–60 cm. long; leaves few, to 85 cm. long, densely pale-lepidote and cross-banded beneath, the sheaths as long as or longer than the blades, forming a very slender tube, the blades ligulate, acute and apiculate, 3 cm. wide, laxly serrulate; scape erect, slender, white-flocculose; scape-bracts suberect, lanceolate, 9 cm. long, membranaceous, rose fading to stramineous by anthesis, white-flocculose, the upper ones much exceeding the internodes; inflorescence erect, simple, laxly few-flowered, white-flocculose; axis slender, geniculate; floral bracts much shorter than the pedicels, ovate, acute; pedicels divergent to spreading, very slender, to 18 mm. long; flowers erect, making an angle with the pedicels; sepals elliptic, apiculate, 20 mm. long, lavender; petals 50 mm. long, green with blue-green apices, bearing 2 fimbriate scales at the base and 2 dentate lateral folds above them; stamens and pistil included; ovary subcylindric, 12 mm. long, epigynous tube infundibuliform.

Type in the U. S. National Herbarium, No. 2120880, collected near Maracás, State of Baía, Brazil, Oct. 18, 1948 (bloomed in cultivation December 1953), by M. B. Foster (No. 2447 in part).

Billbergia iridifolia (Nees & Mart.) Lindl. var. **concolor** L. B. Smith, var. nov.

Differt petalis omnino pallide aureis.

Differs from the typical variety in having the petals pale yellow throughout instead of dark blue at the apex.

Type in the Gray Herbarium, collected at Itapemirim, State of Espírito Santo, Brazil, in 1939, by M. B. & R. Foster (No. 160).

ADDITIONAL SPECIMEN EXAMINED:

ESPÍRITO SANTO: On rocks, Vitória, Aug. 9, 1940, *M. B. & R. Foster* 873 (GH).

Billbergia minarum L. B. Smith, sp. nov. FIGURE 120

A *B. lietzei* E. Morr. et *B. leptopoda* L. B. Smith, quibus affinis, bracteis florigeris superioribus minutis differt.

Flowering plants 3–10 dm. high (! Foster); leaves in a tubular rosette, to 54 cm. long, maroon-green mottled with cream-white spots, covered with coarse white appressed scales, becoming glabrous above, the sheath indistinct, somewhat darker than the blade, the blade narrowly triangular, acuminate, about 2 cm. wide at base, very laxly serrulate; scape curved, 2 mm. in diameter, nearly glabrous; scape-bracts lanceolate with an acuminate involute densely white-lepidote apex, to 10 cm. long, thin, roseate, the upper ones much exceeding the internodes; inflorescence pendent, pseudosimple with very short 1-flowered branches, lax with 9 flowers in 2 rows; axis geniculate, very slender, glabrous; lowest floral bract like the scape-bracts but smaller, the upper ones minute, shorter than the pedicels; flowers spreading to reflexed, glabrous; pedicels slender, to 3 mm. long; sepals oblong, broadly acute, to 22 mm. long, the apical third dark blue and the remainder green; petals linear, obtuse, 5 cm. long, exceeding the stamens, green except for the dark blue apex, bearing 2 scales at the base; pollen grains ellipsoid, sculptured, bearing a longitudinal fold when dry; ovary obconic, to 10 mm. long, epigynous tube short, placentae linear, ovules apiculate.

Type in the Gray Herbarium, collected on rocks in dry woods, Gobernador Valadores near the Rio Doce, State of Minas Gerais, Brazil, altitude 600 meters, July 28, 1940, by M. B. & R. Foster (No. 766).

Billbergia tweedieana Baker var. **latisepala** L. B. Smith, var. nov.

Differt sepalis brevibus subduplo longioribus ac latis.

Differs from the typical variety in having sepals barely 13 mm. long, about twice as long as wide.

Type in the Gray Herbarium, collected at Cantagallo, State of Rio de Janeiro, Brazil, by A. Glaziou (No. 15476). Duplicate in the Muséum National d'Histoire Naturelle, Paris.

Billbergia tweedieana Baker var. **minor** L. B. Smith, var. nov.

Differt planta minore, sepalis majoribus, late acutis.

Differs from the typical variety in its much smaller stature and broadly acute sepals 24 mm. long.

Type in the Gray Herbarium, collected at Santa Teresa, State of Espírito Santo, Brazil, altitude 765 meters, July 27, 1939, by M. B. & R. Foster (No. 277). Duplicate in the Museu Nacional, Rio de Janeiro.

Bromelia interior L. B. Smith, sp. nov. FIGURE 80

A *B. glaziovii* Mez, cui affinis, inflorescentia aliquid elongata, sepalis parvis bracteas florales superantibus differt.

Propagating by rhizomes; flowering plant low, probably little more than 5 dm. high at most; leaves 5–10 dm. long, sheaths suborbicular, 7 cm. wide, glabrous above and the lower half beneath, the upper half beneath covered with coarse brown subspreading scales, blades linear, acuminate, not at all constricted at base, 2 cm. wide, glabrous above, covered with white appressed scales beneath, laxly serrate with uncinate teeth 4–7 mm. long, the basal teeth recurved, the others ascending; scape erect, elongate; scape-bracts subfoliaceous, densely imbricate; inflorescence ellipsoid or short-cylindric, much longer than wide, 4 cm. in diameter; primary bracts broadly elliptic, covering all but the apices of the flowers, the lowest with small foliaceous blades; branches short, few-flowered; floral bracts oblong, obtuse, cucullate, carinate, serrulate, white-lepidote; flowers subfasciculate, subsessile, 32–39 mm. long; sepals oblong, obtuse and cucullate, 12–15 mm. or rarely to 20 mm. long, carinate, conduplicate, densely white-lepidote; petals erect, lilac; filaments connate for 5 mm.; ovary slenderly ellipsoid, densely white-lepidote.

Type in the U. S. National Herbarium, No. 2046592, collected in campo at Quintas, Município Goiás, State of Goiás, Brazil, July 6, 1951, by A. Macedo (No. 3260).

ADDITIONAL SPECIMENS EXAMINED:

MATO GROSSO: Between Coxipó da Ponte and Cuiabá, March 1911, *Hoehne in Rondon* 4518 (R); October 1914, *J. G. Kuhlmann* 86 (R). Campo Grande, Sept. 10, 1936, *Archer & Gehrt* 168 (SP, US). Aquiduana, Noreste R. R., Sept. 24, 1940, *Foster* 1075 (GH). Braco, Rio Arinos, Sept. 26, 1943, *Baldwin* 3103 (GH, US).

SÃO PAULO: Itapura, Sept. 29, 1940 (bloomed in cultivation April 1944), *Foster* 1101 (GH).

Cryptanthus duartei L. B. Smith, sp. nov. FIGURE 67

A *C. maritimo* L. B. Smith, cui affinis, bracteis florigeris linearibus sepala subaequantibus, petalis aureis differt.

Stemless; leaves 35 cm. long, the sheaths broadly elliptic, 2 cm. long, serrulate, glabrous, the blades linear-triangular, filiform-acuminate, not at all constricted at the base, 12 mm. wide, glabrous above, covered beneath with pale appressed scales, laxly serrulate with pale ascending teeth 0.5 mm. long; floral bracts linear, about equaling the sepals, membranaceous, subcucullate, densely lepidote toward the apex; sepals 13 mm. long, unequally connate 4–5 mm., oblong, broadly cuspidate-acute, subcucullate, membranaceous, lepidote; petals 4 cm.

long, obtuse, bright orange; stamens and style included; ovary obconic, 5 mm. long.

Type in the U. S. National Herbarium, No. 2121558, collected on micaceous quartzite soil of rocky campo, Serra do Cipó, State of Minas Gerais, Brazil, November 1949, by A. P. Duarte. Duplicate in the herbarium of the Jardim Botânico, Rio de Janeiro (No. 76607).

Cryptanthus marginatus L. B. Smith, sp. nov. FIGURE 70

A *C. lacerdae* Antoine, cui affinis, foliis rubescente marginatis, sepalorum partibus liberis latioribus atrisque differt.

Plants closely aggregated; leaves about 12 in each flat rosette, to 20 cm. long, covered beneath with pale coarse appressed scales, sheaths small and inconspicuous, blades linear-lanceolate, acuminate, 3 cm. wide, becoming glabrous above except near the base, very light green with a narrow reddish margin, the broad flat median band somewhat darker than the equally broad undulate marginal bands, densely serrulate with teeth 0.5 mm. long; fascicles few-flowered, axillary, the distal perfect, the central staminate (! Foster); floral bracts lance-oblong, acute, exceeded by the sepals, thin, lepidote; sepals 11 mm. long, connate for 6 mm., the free lobes subquadrate with broad wings and thick triangular lepidote apiculus, dark; petals obtuse, 25 mm. long, white.

Type in the Gray Herbarium, collected near Santa Teresa, State of Espírito Santo, Brazil, July 25, 1939 (bloomed May 14, 1941), by M. B. and R. Foster (No. 243).

Cryptanthus minarum L. B. Smith, sp. nov. FIGURE 69

Foliis homomorphis, laminis ad basin versus attenuatis, subtus brunneo-lepidotis, supra glabris et verisimiliter linea ampla pallida mediana notatis; laminis sepalorum late ellipticis apiculatis serrulatisque.

Complete caudex unknown, stout; leaves all alike, to 39 cm. long, the sheaths oblong, barely differentiated, the blades ligulate, acuminate, tapered gradually toward the base, 35 mm. wide, covered beneath with brown appressed scales, glabrous above and apparently marked with a broad pale median stripe (not absolutely certain in the dried material), subdensely serrulate with pale upcurved teeth 1 mm. long; inflorescence 3 cm. in diameter; floral bracts oblanceolate, acuminate, about equaling the midpoint of the sepals, serrulate and lepidote toward the apex; sepals 15 mm. long, connate for 8 mm., alate-carinate with the wings decurrent on the ovary, the free lobes broadly

elliptic, apiculate, serrulate, lepidote near the apex; petals 4 cm. long; stamens and pistil included; ovary subcylindric, 11 mm. long.

Type in the Museu Nacional, Rio de Janeiro (No. 46186), collected at Itabira do Campo, State of Minas Gerais, Brazil, June 1902, by A. Melo Matos.

Cryptanthus pickelii L. B. Smith, sp. nov. FIGURE 72

A *C. incrassato* L. B. Smith et *C. diversifolio* Beer, quibus affinis, foliorum laminis supra linea lata pallida mediana pictis differt.

Short-caulescent; leaves densely brown-lepidote, becoming glabrous above, sheaths elliptic, subdensely serrulate, blades caudate-acuminate, laxly and minutely serrulate, marked above with a broad pale median stripe, dimorphic, those of the outer leaves linear-lanceolate, distinctly contracted toward the base, to 35 cm. long, 25 mm. wide, blades of the inner leaves narrowly triangular, not at all contracted toward the base, not over 15 cm. long, 13 mm. wide; inflorescence compound with the flowers fasciculate in the axils of foliaceous bracts; floral bracts elliptic, exceeding the ovary, membranaceous except for the thick pungent apex, serrulate, brown-lepidote; sepals 16 mm. long, carinate, lepidote, connate for 9 mm., the free lobes ovate, acute, entire; petals imperfectly known, about 2 cm. longer than the sepals, exceeding the stamens, white.

Type in the herbarium of the Instituto de Pesquisas Agronómicas, collected in forest, Toró, Escola de São Bento, near Tapera, Municipio São Lourenço da Mata, Pernambuco, Brazil, Mar. 12, 1925, by Bento José Pickel (No. 909 in part). Also the cotype, collected in the Mata do Corrego da Bexiga, Escola de São Bento, May 1927, by B. J. Pickel (No. 909 remainder).

Cryptanthus pseudoscaposus L. B. Smith, sp. nov. FIGURE 68

A *C. acauli* (Lindl.) Beer, cui affinis, stolonibus elongatis nudis, foliis subtus brunneo-lepidotis, floribus subduplo minoribus, bracteis sepalisque lepidotis differt.

Stolons arising from the inflorescence, elongate, naked, at first erect and scape-like; leaves about 15 in each rosette, all alike, to 18 cm. long, completely covered beneath with brown appressed scales, soon glabrous above, sheaths small and inconspicuous, blades linear-lanceolate, filiform-acuminate, 22 mm. wide, subdensely serrulate, the center channeled, the sides undulate; fascicles few-flowered, axillary; floral bracts broadly ovate, slightly exceeded by the sepals, membranaceous, lepidote; sepals 10 mm. long, connate for 4 mm., the free lobes subsymmetrical, lance-ovate, with a thickened pungent apex, densely pale-lepidote; petals obtuse, 14 mm. long, white.

Type in the Gray Herbarium, collected between Domingos Martins and Vitória, State of Espírito Santo, Brazil, altitude 75 meters, July 14, 1939, by M. B. & R. Foster (No. 208). Duplicate in the Museu Nacional, Rio de Janeiro, and in U. S. National Herbarium.

Cryptanthus sinuosus L. B. Smith, nom. nov.

Cryptanthus undulatus Otto & Dietr. Allg. Gartenz. 4:299. 1836. In part. Nomen illegitimum, because of the citation of *Tillandsia acaulis* in its synonymy.

Dyckia heloisae L. B. Smith, sp. nov. FIGURE 16

A *D. hilaireana* Mez, cui affinis, foliis integerrimis, pedicellis elongatis differt.

Subacaulescent, 4–5 dm. high; leaves 10–12 cm. long, entire, the sheaths large, suborbicular, almost black, the blades narrowly triangular, 2 cm. wide at base, thick, rigid, pungent, glabrous above, covered beneath with cinereous appressed scales; scape stout, to 6 mm. in diameter, glabrous at least in age; scape-bracts subfoliaceous, the upper ones much shorter than the internodes; inflorescence laxly racemose, many-flowered, glabrous at least in age; floral bracts narrowly triangular, the lower ones exceeding the pedicels; pedicels slenderly clavate, spreading, frequently curved upward toward the apex, to 14 mm. long; sepals broadly ovate, apparently broadly acute, 9 mm. long; stamens free above the very short tube with the petals; capsule ovoid, short-beaked, about equaling the sepals.

Type in the U. S. National Herbarium, No. 2120193, collected on rocky crest, Serra do Cipó, 5 kilometers north of Chapeu de Sol. Município Jaboticatubas, State of Minas Gerais, Brazil, altitude 1,100 meters, Apr. 29, 1952, by L. B. Smith (No. 6698), F. Segadas-Vianna, W. A. Egler, L. Dau, Z. Lopes da Silva, W. T. Ormond & G. C. Machline.

Encholirium bradeanum L. B. Smith, sp. nov. FIGURE 2

Inter generis species valde singularis, a speciebus omnibus laminis foliorum angustissimis quam longitudine spinarum angustioribus differt.

Flowering plant over 7 dm. high; leaves rosulate, 24 cm. long, appressed-pale-lepidote on both sides, the sheaths small and inconspicuous, the blades linear, 4 mm. wide at base, laxly serrate with slender curved mostly subopposite spines 5 mm. long; scape 8 mm. in diameter, glabrous at least with age; scape-bracts suberect, foliaceous and much exceeding the internodes but the highest small, entire, and shorter than the internodes; inflorescence simple, many-flowered,

dense except near the base, 20 cm. long, 4 cm. in diameter, glabrous at least with age; floral bracts narrowly triangular, exceeding the pedicels; flowers spreading; pedicels 6 mm. long, stout, sulcate; sepals broadly ovate, 5 mm. long; petals and stamens very imperfectly known but apparently free; capsule ovoid, stout, 9 mm. long, dark castaneous; seeds surrounded by a falcate wing.

Type in the U. S. National Herbarium, No. 2104402, collected from cultivated material in the Jardim Botânico do Rio de Janeiro, originating from the region of Diamantina, State of Minas Gerais, Brazil, Feb. 8, 1952, by L. B. Smith & A. C. Brade (No. 5652).

Neoregelia bahiana (Ule) L. B. Smith var. **viridis** L. B. Smith, var. nov.

Differt foliis omnino viridibus.

Leaves wholly green in contrast to the typical variety which has the inner leaves red on the upper side.

Type in the Gray Herbarium, collected on the Serra de Piedade, near Belo Horizonte, State of Minas Gerais, Brazil, altitude 1,300 meters, July 10, 1940 (bloomed in cultivation, June 1, 1943), by M. B. & R. Foster (No. 573).

Neoregelia coriacea (Antoine) L. B. Smith, comb. nov.

Karatas coriacea Antoine, Phyto-Iconogr. 51, *pl. 30, fig. 1.* 1884.

Neoregelia fluminensis L. B. Smith, sp. nov. FIGURE 58

A *N. macahensis* (Ule) L. B. Smith, cui affinis, foliis omnibus similibus angustioribus utrinque lepidibus magnis pallidis adpressis densissime obtectis, pedicellis brevioribus sepalis apiculatis, subsymmetricis differt.

Stoloniferous; leaves all alike, to 36 cm. long, completely covered with coarse pale appressed scales, sheaths broadly elliptic, 11 cm. long, their scales brownish, blades ligulate, rounded and apiculate, 27 mm. wide, laxly serrulate with teeth 0.5 mm. long, green; scape 6 cm. long; inflorescence simple, about 12-flowered; outer bracts ovate, 3 cm. long, membranaceous, densely lepidote; floral bracts oblong, obtuse and apiculate, membranaceous, lepidote; pedicels slender, 14 mm. long; sepals 15 mm. long, connate for 3 mm., the lobes slightly asymmetric, broadly elliptic and apiculate; fruit globose, 6 mm. in diameter.

Type in the Gray Herbarium, collected at Teresópolis, State of Rio de Janeiro, Brazil, Aug. 21, 1940, by M. B. & R. Foster (No. 982).

Neoregelia hoehneana L. B. Smith, sp. nov. FIGURE 56

A *N. ampullacea* (E. Morr.) L. B. Smith, cui affinis, stolonibus arcuato-dependentibus, bracteis florigeris sepala subaequantibus, sepalis obtusis valde asymmetricis, petalis obtusis omnino albis differt.

Stemless, propagating by long slender arching-pendent stolons; leaves about 10 in each rosette, even the inner ones only 15 cm. long, bearing minute dark appressed scales, the sheaths ample, 6 cm. long, forming a subcylindric or ellipsoid tank, densely lepidote, the blades linear, flat, broadly rounded and apiculate, 25 mm. wide, green, very sparsely lepidote, very sparsely serrulate with teeth less than 0.5 mm. long; inflorescence few-flowered, hidden in the center of the leaf-rosette; floral bracts oblong, obtuse, about equaling the sepals, thin, greenish white, subglabrous; pedicels slender, 5 mm. long; sepals short-connate, 12 mm. long, broadly obtuse, strongly asymmetric, green centrally; petals 22 mm. long, white, the blades elliptic, obtuse; stamens included; ovary ellipsoid, 7 mm. long.

Type in the Instituto de Botânica, São Paulo, No. 44469, collected in Caraguatatuba, State of São Paulo, Brazil, Nov. 13, 1940, by A. Gehrt.

Neoregelia johannis (Carr.) L. B. Smith, comb. nov.

Nidularium johannis Carr. Rev. Hortic. 56: 432. 1884.

Neoregelia kuhlmannii L. B. Smith, sp. nov. FIGURE 60

A *N. coriacea* (Antoine) L. B. Smith, cui affinis, foliis viridibus, pedicellis brevissimis differt.

Plant propagating by long rhizomes 7 mm. in diameter; leaves suberect, 25 cm. long, the sheaths broadly elliptic, 11 cm. long, pale green, densely and finely brown-lepidote, the blades ligulate, broadly rounded or even somewhat retuse and apiculate, 5 cm. wide, subentire, green, concolorous, glabrous above, inconspicuously pale-lepidote beneath; scape 3 cm. long, 4 mm. in diameter; scape-bracts suborbicular, 15 mm. long, thin, densely lepidote; inflorescence simple, few-flowered, less than 3 cm. in diameter; outer bracts broadly ovate, acute, nearly equaling the sepals, thin, lepidote toward the apex; floral bracts lance-linear, flat, rounded and apiculate, slightly exceeded by the sepals, thin, sparsely lepidote; pedicels 5 mm. long; sepals lance-linear, acute, slightly asymmetric, 30 mm. long, connate for 8 mm., glabrous; only immature petals and stamens known; ovary subcylindric, 2 cm. long.

Type in the Instituto de Botânica, São Paulo, No. 55355, collected at Fazenda Japuhyba, Angra dos Reis, State of Rio de Janeiro, Brazil, by Moysés Kuhlmann (No. 2652).

Neoregelia leprosa L. B. Smith, sp. nov. FIGURE 57

A *N. macahensis* (Ule) L. B. Smith, cui affinis foliis angustioribus lepidibus magnis pallidis adpressis densissime obtectis, pedicellis brevioribus differt.

Leaves all alike, to 22 cm. long, covered on both sides with coarse cinereous appressed scales, sheaths broadly elliptic, 6–8 cm. long, their scales with brownish centers, blades ligulate, rounded and apiculate, becoming broadly retuse by the reflexing of the apex, 28 mm. wide, subdensely serrulate with teeth less than 1 mm. long, green, darker beneath; scape unknown; inflorescence simple, about 20-flowered; outer bracts broadly ovate, 3 cm. long, thin, lepidote; floral bracts exceeded by the sepals, membranaceous, lepidote; pedicels slender, to 13 mm. long; sepals strongly asymmetric with the acuminate apex extending 3 mm. above the wings, subfree, 14 mm. long, the median part red-purple and lepidote toward the apex, the wings white; petals 18 mm. long, white, their blades broadly ovate, acute; ovary ellipsoid, 7 mm. long.

Type in the Gray Herbarium, collected on the Serra do Cipó, State of Minas Gerais, Brazil, July 13, 1940, by M. B. & R. Foster (No. 656). Duplicate in U. S. National Herbarium.

Neoregelia macrosepala L. B. Smith, sp. nov. FIGURE 61

A *N. farinosa* (Ule) L. B. Smith, cui verisimiliter affinis, vaginis foliorum angustioribus, purpureo suffultis, sepalis majoribus paulo asymmetricis lepidotis differt.

Propagating by short, ascending stolons; leaves about 15 in a spreading rosette, 50–85 cm. long, coarsely pale-lepidote on both sides, sheaths elliptic, 12–20 cm. long, tinged with purple, blades ligulate, rounded and apiculate, 40–45 mm. wide, laxly serrulate with basal teeth 2 mm. long; scape short; scape-bracts densely imbricate; inflorescence many-flowered, 6 cm. in diameter; outer bracts ovate, acute, thin, densely lepidote; floral bracts lanceolate, to 7 cm. long, nearly or quite equaling the sepals, straight; pedicels slender, to 30 mm. long; sepals slightly asymmetric with inconspicuous wings, lanceolate, acuminate, 38 mm. long, connate for 2 mm., sparsely lepidote becoming glabrous; ovary ellipsoid, 12 mm. long.

Type in the Gray Herbarium, collected at Cachoeiro de Itapemirim, State of Espírito Santo, Brazil, Aug. 17, 1940, by M. B. & R. Foster (No. 968). Duplicate in U. S. National Herbarium.

ADDITIONAL SPECIMEN EXAMINED:

ESPÍRITO SANTO: Vargem Alta, Aug. 15, 1940, *M. B. & R. Foster* 929 (GH).

Neoregelia melanodonta L. B. Smith, sp. nov. FIGURE 66

A *N. zonata* L. B. Smith, cui affinis, stolonibus robustis, foliorum laminis brevibus latisque regulariter minuteque albido zonatis, bracteis florigeris amplis cuspidatis differt.

Caudex 35 mm. in diameter (! Foster); leaves many, 15–20 cm. long, pale-lepidote on both sides, the sheaths broadly elliptic, about as long as the blades and slightly darker, blades broadly ligulate, rounded and apiculate becoming retuse by the recession of the apex, 5 cm. wide, sparingly dark-spotted, laxly serrate with black teeth 1.5 mm. long, very regularly and finely marked beneath with white cross-lines; scape very short; inflorescence few-flowered, fusiform, 1 cm. in diameter; outer bracts ovate, cuspidate-acute, serrulate, densely lepidote; floral bracts like the outer bracts but narrower, nearly equaling the sepals; pedicels slender, 20 mm. long; sepals definitely asymmetric, elliptic with an involute-subulate apex, 23 mm. long, connate for 2 mm.; petals light blue (! Foster); ovary ellipsoid, 14 mm. long.

Type in the U. S. National Herbarium, No. 2057905, collected at Cuibiça, State of Espírito Santo, Brazil, Aug. 14, 1940 (bloomed in cultivation October 1952), by M. B. & R. Foster (No. 897).

Neoregelia myrmecophila (Ule) L. B. Smith, comb. nov.

Nidularium myrmecophilum Ule, Verh. Bot. Ver. Brand. 48: 132. 1907.

Neoregelia oligantha L. B. Smith, sp. nov. FIGURE 62

A *N. cruenta* (R. Graham) L. B. Smith, cui affinis, omnibus partibus minoribus, inflorescentia pauciflora, sepalis paulo asymmetricis differt.

Propagating by short ascending stolons; leaves few, 26 cm. long, covered on both sides with pale coarse appressed scales but becoming glabrous above in extreme age, sheaths broadly elliptic, 10 cm. long, blades ligulate, rounded and apiculate, 23 mm. wide, laxly serrulate with strongly uncinate teeth about 1 mm. long; scape very short; inflorescence few-flowered, about 2 cm. in diameter; bracts thin, old and poorly preserved in the only specimen seen; pedicels slender, 12 mm. long; sepals slightly asymmetric, lanceolate, acute, 23 mm. long, connate for 1.5 mm.; ovary ellipsoid, 8 mm. long.

Type in the Gray Herbarium, collected in the Parque Nacional, Ipatinga on the Rio Doce, Município of Antonio Dias, State of Minas Gerais, Brazil, July 26, 1940, by M. B. & R. Foster (No. 742).

Neoregelia pauciflora L. B. Smith, sp. nov. FIGURE 65

A *N. zonata* L. B. Smith, cui affinis, foliorum vaginis intus atro-purpureis, laminis brevibus supra regulariter transverseque albido lineatis, bracteis florigeris brevissimis differt.

Stolons elongate, slender, horizontal; leaves about 12, 15 cm. long, minutely and sparsely lepidote on both sides, sheaths elliptic, as long as or longer than the blades, dark purple above, blades broadly ligulate, rounded and apiculate, 35 mm. wide, laxly serrulate with dark teeth 1 mm. long, marked above with fine regular white cross-lines; scape very short; inflorescence fusiform, few-flowered, less than 2 cm. in diameter; floral bracts shorter than the pedicels, ovate, acute, membranaceous; pedicels slender, 25 mm. long; sepals slightly asymmetric, narrowly lanceolate, acuminate, 20 mm. long, connate for 1 mm.; petals 35 mm. long, white (! Foster); ovary slenderly ellipsoid, 7 mm. long.

Type in the Gray Herbarium, collected at Santa Teresa, State of Espírito Santo, Brazil, altitude 765 meters, July 26, 1939, by M. B. & R. Foster (No. 265).

Neoregelia princeps (Baker) L. B. Smith, var. **phyllanthidea** (Mez) L. B. Smith, comb. nov.

Aregelia princeps var. *phyllanthidea* Mez in DC. Monogr. Phan. 9: 76. 1896.

Neoregelia uleana L. B. Smith, sp. nov. FIGURE 59

A *N. leucophoea* (Baker) L. B. Smith, cui affinis, foliorum laminis angustioribus acutis et subulato-mucronatis differt.

Leaves 32 cm. long, bearing dark brown appressed scales, the sheaths broadly elliptic, 10 cm. long, densely lepidote, dark castaneous except for the pale apex, the blades ligulate, acute with a subulate 5 mm. long mucro, 3 cm. wide, apparently concolorous, densely lepidote beneath, becoming glabrous above, laxly serrate with black ascending teeth 2 mm. long; scape 8 cm. long, 2 cm. in diameter; scape-bracts very broadly ovate with a short triangular apex, thin, densely lepidote, the lowest serrate; inflorescence simple, many-flowered, 6 cm. in diameter; outer bracts like the scape-bracts, the highest nearly equaling the sepals; floral bracts linear, slightly exceeded by the sepals, cucullate, mucronulate, thin, densely brown-lepidote toward the apex; pedicels slender, 25 mm. long; sepals lanceolate, acute, somewhat asymmetric, 34 mm. long, connate for 5 mm., brown-lepidote inside, glabrous outside; only very immature petals and stamens seen; ovary ellipsoid, 18 mm. long.

Type in the Museu Nacional, Rio de Janeiro, No. 46406, collected from cultivated material in the gardens of the Museu, May 1896, by E. Ule.

There is no record of the origin of *Neoregelia uleana* nor of *N. leucophoea* which appears to be its nearest relative.

Nidularium apiculatum L. B. Smith, sp. nov. FIGURE 77

A *N. terminale* Ule, cui affinis, foliis multo minoribus angustioribusque, scapo humile differt.

Propagating by short basal offshoots; leaves about 15 in a flat rosette, to 33 cm. long, sheaths elliptic, 10 cm. long, sparsely pale-lepidote, blades ligulate, broadly acute and apiculate, 27 mm. wide, glabrous at maturity, laxly serrulate with teeth 0.5 mm. long, bearing a broad pale median channel toward the base; scape 10 cm. high, distinctly separating the inflorescence from the rosette; scape-bracts foliaceous but much reduced, densely imbricate; outer bracts of the inflorescence subfoliaceous with elongate spreading blades, red-striate; floral bracts oblong, acute, much exceeded by the sepals, serrulate, membranaceous, lepidote; sepals 18 mm. long, connate for 7 mm., the free lobes elliptic, broadly rounded and apiculate at least in drying, entire; petals and stamens unknown.

Type in the Gray Herbarium, collected under trees, Mount Itatiaia, State of Rio de Janeiro, Brazil, June 30, 1939, by M. B. & R. Foster (No. 124).

Nidularium apiculatum L. B. Smith var. **serrulatum** L. B. Smith, var. nov.

Differt sepalis dense serrulatis.

Differing from the typical variety by its densely serrulate sepals.

Type in the Gray Herbarium, collected on rocks in shade, Mount Itatiaia, State of Rio de Janeiro, Brazil, June 30, 1939, by M. B. & R. Foster (No. 121).

Nidularium innocentii Lem. var. **lineatum** (Mez) L. B. Smith, comb. nov.

Nidularium lineatum Mez, Repert. Sp. Nov. Fedde 12:412. 1913.

Nidularium itatiaiae L. B. Smith, sp. nov. FIGURE 76

A *N. longifloro* Ule et *N. paucifloro* Ule, cuibus affinis, sepalis minoribus altiore connatis late rotundatis mucronulatisque differt.

Leaves rosulate, to 31 cm. long, coarsely appressed-lepidote beneath, sheaths broadly elliptic, 12 cm. long, blades ligulate, broadly acute and apiculate, 35 mm. wide, laxly serrulate with teeth less than 1 mm. long, glabrous above at maturity; scape 9 cm. long; scape-bracts subfoliaceous, densely imbricate; outer bracts of the inflorescence broadly ovate with minute blades, red, serrulate, lepidote; floral bracts elliptic, acute, 25 mm. long, membranaceous, serrulate, densely and coarsely appressed-lepidote; sepals 17 mm. long, connate for

8 mm., the free lobes broadly ovate, mucronulate, entire or erose; petals and stamens unknown.

Type in the Gray Herbarium, collected on trees near Maromba Falls, Mount Itatiaia, State of Rio de Janeiro, Brazil, June 30, 1939, by M. B. & R. Foster (No. 118).

Orthophytum amoenum (Ule) L. B. Smith, comb. nov.

Sincoraea amoena Ule, Bot. Jahrb. 42: 191, *fig. 1 A–F.* 1908.

Orthophytum disjunctum L. B. Smith, sp. nov. FIGURE 85

A *O. folioso* L. B. Smith, cui affinis, foliis utrinque lepidibus patentibus obtectis, inflorescentia fere omnino laxa, bracteis primariis spicas subduplo superantibus dense serratis differt.

Stoloniferous, aggregated, 35–50 cm. high; leaves 15–17 cm. long, covered with pale-cinereous spreading scales, sheaths small and inconspicuous, blades narrowly triangular, acuminate, 17–20 mm. wide, flat, densely serrate with spreading teeth 3 mm. long; scape erect, slender, densely cinereous-flocculose; scape-bracts foliaceous but spreading and almost completely exposing it; inflorescence elongate, lax except for the extreme apex, densely cinereous-flocculose; primary bracts foliaceous but only about twice as long as the axillary spikes, curving-reflexed; spikes subglobose, 15–20 mm. long, few-flowered; floral bracts broadly ovate with an acuminate recurved apex, 13 mm. long, pectinate-serrate; sepals narrowly triangular, 11 mm. long; petals 12 mm. long, white, the scales borne well above the base.

Type in the U. S. National Herbarium, No. 1952419, collected on rocks at Queimada, between Campina Grande and Caruaru, State of Paraíba, Brazil, altitude 450 meters, Oct. 11, 1948, by M. B. Foster (No. 2419).

ADDITIONAL SPECIMEN EXAMINED:

PERNAMBUCO: Mun. Quipapá: Engenheiro Pelada, *Silva & Leal* 247 (RB).

Orthophytum maracasense L. B. Smith, sp. nov. FIGURE 84

A *O. folioso* L. B. Smith, cui affinis, foliis utrinque lepidibus adpressis obtectis, bracteis primariis superioribus spicas subduplo superantibus differt.

Caudex short and thick but evident; flowering plant 3 dm. high; leaves 3 dm. long, covered with white appressed scales but becoming more or less glabrous above with age, sheaths small and inconspicuous, blades narrowly triangular, acuminate, 3 cm. wide, laxly serrate with spreading teeth 3 mm. long; scape erect, white-flocculose; scape-

bracts foliaceous, large, spreading and exposing most of the scape; inflorescence densely cylindric except at base, 13 cm. long, densely white-lepidote; primary bracts foliaceous, spreading, the lowest elongate, the others not more than twice as long as the axillary spikes; spikes subglobose, 3 cm. long; floral bracts broadly ovate with an acuminate spreading or recurving apex, 2 cm. long, pectinate-serrate; sepals narrowly triangular, acuminate, 15 mm. long; petals slightly exceeding the sepals, white, appendaged well above the base.

Type in the U. S. National Herbarium, No. 1952463, collected in Table Rock area near Maracás, State of Baía, Brazil, altitude 900 meters, Oct. 21, 1948, by M. B. Foster (No. 2471).

Orthophytum navioides (L. B. Smith) L. B. Smith, comb. nov.

Cryptanthopsis navioides L. B. Smith, Contr. Gray Herb. 129: 31, *pl. 3, figs. 4–6.* 1940.

Orthophytum rubrum L. B. Smith, sp. nov. FIGURE 83

Ab omnibus speciebus adhuc cognitis inflorescentia digitata, spicis elongatis rubris differt.

Leaves numerous, 55 cm. long, covered at first with white appressed scales, the sheaths suborbicular, 2–3 cm. long, pale brown, becoming glabrous and lustrous, the blades linear-triangular, caudate-acuminate, 2 cm. wide, laxly serrate with pale ascending spines 2 mm. long, becoming glabrous above; scape elongate; scape-bracts foliaceous, spreading; inflorescence digitate from a few spikes; primary bracts foliaceous, about twice as long as the spikes, spreading; spikes ellipsoid, densely many-flowered, 4 cm. long, 25 mm. in diameter, red; floral bracts divergent, broadly ovate, acuminate, 2 cm. long, serrate, nerved, soon glabrous; sepals triangular, mucronulate, 12 mm. long, the posterior ones very broadly alate-carinate; petals 15 mm. long, white, appendaged well above the base; stamens included; ovary subglobose.

Type in the U. S. National Herbarium, No. 2057911, collected on Table Rock, near Maracás, State of Baía, Brazil, in 1948, by M. B. Foster (No. 2444), and flowered in cultivation in 1952.

Orthophytum saxicola (Ule) L. B. Smith, comb. nov.

Cryptanthopsis saxicola Ule, Bot. Jahrb. 42: 193, *fig. 1 G–K.* 1908.

Quesnelia edmundoi L. B. Smith, sp. nov. FIGURE 113

A *Q. laterale* Wawra atque *Q. blanda* (Schott) Mez, quibus affinis, foliis grosse subdenseque serratis, inflorescentia cylindrica magna, bracteis florigeris cucullatis subcoriaceis differt.

Known only from fragments, the flowering shoot over 4 dm. high; leaves 4–5 dm. long, bearing appressed brown scales throughout, the sheaths elliptic, ample, the blades ligulate, rounded and apiculate, 4 cm. wide, subdensely serrate with straight or slightly curved spines 4 mm. long; scape straight, 6 mm. in diameter, brown-lepidote; inflorescence strobilate, cylindric, 15 cm. long, 3 cm. in diameter; floral bracts in about 8 ranks, erect, broadly ovate, acute, cucullate, 25 mm. long, slightly exceeding the sepals, subcoriaceous except for the thin narrow margins, glabrous, nerved toward the apex; sepals oblong, slightly asymmetric, broadly obtuse, 14 mm. long; petals and stamens unknown; ovary globose, epigynous tube infundibuliform, 2 mm. long, ovules borne at the top of the cell.

Type in the U. S. National Herbarium, No. 2121556, collected at Barreiras, Baixada Fluminensis, at the base of the Serra de Teresópolis, State of Rio de Janeiro, Brazil, Dec. 8, 1948, by Edmundo Pereira and A. P. Duarte (No. 1522). Duplicate in the herbarium of the Jardim Botânico do Rio de Janeiro (No. 65289).

Vriesia segadas-viannae L. B. Smith, sp. nov. FIGURE 40

A *V. penduliflora* L. B. Smith, cui affinis, ramis inflorescentiae prophyllatis, bracteis florigeris quam sepalis subduplo brevioribus differt.

Stemless, 8 dm. high; leaves 4 dm. long, finely and densely brown-lepidote throughout, the sheaths elliptic, 16 cm. long, very dark castaneous except near the apex, the blades ligulate, acute, 45 mm. wide; scape erect, slender, glabrous; scape-bracts ovate, acute, slightly exceeding the internodes; inflorescence bipinnate, 3 dm. long, glabrous at least with age; primary bracts like the scape-bracts, about equaling the sterile bases of the branches; branches erect or suberect, very slender, the lateral ones 9 cm. long including the abortive apical flower, 3–4-flowered, the terminal 7-flowered, the sterile base short and bearing one or two prophyllae; floral bracts becoming downwardly secund with the flowers, broadly ovate, acute, carinate, thin, about half as long as the sepals; pedicels obconic, 8 mm. long; sepals oblong, obtuse, 20 mm. long; petals and stamens unknown; capsule cylindric, acute, 3 cm. long, coma pale brown.

Type in the U. S. National Herbarium, No. 2120196, collected at Palacio, Serra do Cipó, Município Jaboticatubas, State of Minas Gerais, Brazil, altitude 1,200 meters, Apr. 28, 1952, by L. B. Smith (No. 6755), F. Segadas-Vianna, L. Dau & W. T. Ormond.

Vriesia splendens (Brongn.) Lem. var. **longibracteata** (Baker) L. B. Smith, comb. nov.

Tillandsia longibracteata Baker, Journ. Bot. 26: 81. 1888.
Vriesia longibracteata Mez in DC. Monogr. Phan. 9: 568. 1896.

TYPE LOCALITY: Venezuela; Mountains of Tovar. Type collected by Fendler (No. 2449).
DISTRIBUTION: Tobago, Trinidad, Venezuela, British Guiana.

Vriesia splendens var. *longibracteata* can be said to differ from the typical variety only in its concolorous leaf-blades, yet its different range makes a designation for it desirable.

Wittrockia azurea L. B. Smith, n. sp. FIGURE 90

Ab omnibus speciebus adhuc cognitis sepalis minimis, petalis azureis differt.

Flowering shoot 2 dm. high; leaves rosulate, 4 dm. long, green with a pale median band, obscurely pale-lepidote, the sheaths elliptic, 8 cm. long, entire except near the apex, the blades linear, acuminate, contracted toward the base, 13 mm. wide, laxly serrulate; scape erect, slender, much exceeding the leaf-sheaths, covered and much exceeded by the foliaceous bracts; inflorescence compact, few-flowered, less than 3 cm. in diameter; primary bracts subfoliaceous, elongate, forming a stellate involucre about the inflorescence; floral bracts oblong, obtuse, about equaling the center of the sepals, densely serrulate, membranaceous, lepidote; sepals oblong, obtuse, 12 mm. long, connate for 3 mm., thin, glabrous, nerved; petals 15 mm. long, bearing 2 fimbriate scales at base, the free lobes elliptic, obtuse, cucullate, blue; stamens included; ovary obconic, 6 mm. long, epigynous tube 1.5 mm. long, placentae central, ovules apiculate.

Type in the herbarium of the Instituto de Botânica, São Paulo, No. 51968, collected in virgin rain forest, Fazenda da Companhia, Coronél Pacheco, State of Minas Gerais, Brazil, Aug. 30, 1944, by Ezechias P. Heringer (No. 1536).

Wittrockia campos-portoi L. B. Smith, sp. nov. FIGURE 89

A *W. smithii* Reitz, cui affinis, foliis viridibus, scapo elongato, inflorescentiae bracteis primariis angustis, petalis callosis apice flavis differt.

Leaves rosulate; scape elongate; raising the compact involucrate inflorescence well above the leaf-sheaths; primary bracts 14 cm. long, obscurely pale-lepidote, the sheaths ovate, ample, concealing all but the apices of the few flowers in each axil, the blades linear, acuminate, 15 mm. wide, reddish, laxly and minutely serrulate; floral bracts

broadly ovate, subacute, 2 cm. long, entire, membranaceous, white; sepals 28 mm. long, connate for 7 mm., the free lobes lanceolate, acute but not pungent, subsymmetric, green; petals 5 cm. long, highly connate, the free lobes 15 mm. long, elliptic, obtuse, cucullate, yellow, the tube green and white, bearing calli above the base; stamens included; ovary globose, 6 mm. long, epigynous tube lacking, placentae central.

Type in the U. S. National Herbarium, No. 2104774, collected from cultivated material received from the Jardim Botânico do Rio de Janeiro, by L. B. Smith. Duplicate in the Herbário "Barbosa Rodrigues."

SYSTEMATIC TREATMENT

CHARACTERS OF THE FAMILY

Herbs or rarely shrubby perennials, largely epiphytic. Roots usually present, but often serving merely as holdfasts in the epiphytic species. Leaves spirally arranged, usually rosulate, dilated-sheathing at the base, simple, entire or spinose-serrate, bearing peltate scales at least when young, and these serving to absorb moisture. Inflorescence simple or compound, of spikes or racemes, usually bearing brightly colored conspicuous bracts. Flowers perfect or sometimes functionally unisexual, that is with both stamens and pistil but only one functional, rarely strictly staminate (*Cryptanthus*). Perianth heterochlamydeous, the sepals and petals free or connate. Stamens 6 in 2 series; filaments free, or joined to the petals or to each other. Styles 3-parted. Ovary superior to inferior, 3-celled. Placentae axile, extending the length of the cell or variously reduced. Fruit capsular or baccate. Seeds naked, winged, or plumose. Embryo small, situated at the base of the copious mealy endosperm.

KEY TO SUBFAMILIES AND GENERA

1. Seeds variously appendaged (naked in *Navia,* but the ovary superior and the fruit dehiscent); ovary wholly or in part superior (wholly inferior in *Pitcairnia anomala*); fruit a capsule (but indehiscent in a few species of *Pitcairnia*).
   2. Seeds with entire appendages, not plumose; ovary usually wholly or in part superior; leaves often spinose-serrate; plants almost always terrestrial. ..... Subfamily 1. **Pitcairnioideae**
   2. Seeds plumose; ovary nearly or quite superior (in the Brazilian genera); leaves always entire; plants chiefly epiphytic.
      Subfamily 2. **Tillandsioideae**
1. Seeds always naked; ovary wholly or in very large part (*Acanthostachys*) inferior; fruit always baccate, fleshy to coriaceous; leaves usually spinose-serrate; plants often epiphytic..... Subfamily 3. **Bromelioideae**

Subfamily 1. PITCAIRNIOIDEAE

1. Seeds appendaged; sepals convolute with the left side of each overlapping the right of the next one (except in *Brocchinia*).
   2. Petals free; filaments not forming a tube; flowers always perfect.
      3. Ovary wholly superior.
         4. Petals naked; herbs.
            5. Seeds broad, with a wing surrounding at least three sides; plants usually large and coarse.
               6. Petals broad, much more conspicuous than the sepals, strongly twisted together after anthesis; seed-wing little if at all produced. (Fig. 1.) ..... 1. **Puya**
               6. Petals narrow, inconspicuous; seed-wing produced dorsally. (Figs. 2, 3.) ..... 2. **Encholirium**
            5. Seeds narrow, caudate-appendaged or apiculate at each pole; petals not twisted together after anthesis.
               7. Seeds or ovules merely apiculate; placentae basal. (Fig. 4.) 3. **Cottendorfia**
               7. Seeds long-caudate; placentae usually extending almost the height of the cell.
                  8. Petals white, separate after anthesis; sepals not over 5 mm. long, thin, flat; plants slender. (Fig. 5.) ..... 4. **Lindmania**
                  8. Petals brightly colored, more or less massed together after anthesis but not twisted; sepals larger and firmer; plants relatively robust. (Fig. 6.) ..... 5. **Connellia**
         4. Petals each bearing a single large scale near the base; spreading shrubs; scape with a definite cambium layer; inflorescence paniculate. (Fig. 7.) ..... 6. **Deuterocohnia**
      3. Ovary at least partly inferior.
         9. Flowers large and conspicuous, usually zygomorphic; petals often appendaged, several times as long as the ovary; ovules numerous. (Figs. 8–11.) ..... 7. **Pitcairnia**
         9. Flowers minute, regular; petals naked, usually shorter than the ovary; ovules few. (Fig. 12.) ..... 8. **Brocchinia**
   2. Petals joined centrally to a tube formed by the bases of the filaments but their margins free, yellow or orange; flowers sometimes with one sex aborted; seeds winged. (Figs. 13–20.) ..... 9. **Dyckia**
1. Seeds naked; sepals cochlear with both posterior ones overlapping the anterior. (Fig. 21.) ..... 10. **Navia**

Subfamily 2. TILLANDSIOIDEAE

1. Appendage of the seed basal, straight at maturity. (Fig. 22.)
   2. Petals free or slightly joined, the corolla-tube then deeply included in the calyx.
      3. Petals naked; inflorescence of one or more distichous-flowered spikes or rarely simple and polystichous or even one-flowered. (Figs. 22–30.) 11. **Tillandsia**
      3. Petals each bearing two scales (or very rarely a single one) on the inner face. (Figs. 31–48.) ..... 12. **Vriesia**

2. Petals joined or closely agglutinated and simulating true fusion, the corolla-tube about equaling the calyx or longer; flowers always polystichous. (Fig. 49.) ..... 13. **Guzmania**

1. Appendage of the seed apical, folded at maturity; sepals strongly asymmetric in most species; flowers polystichous. (Fig. 50.) ..... 14. **Catopsis**

Subfamily 3. BROMELIOIDEAE

1. Petals naked; flowers never in strobilate spikes.
   2. Filaments not forming a tube; petals free or connate by their margins.
      3. Inflorescence elongate or if short (some species of *Streptocalyx*) then the flowers distichous; petals free.
         4. The inflorescence simple, lax; flowers pedicellate. (Fig. 51.) 15. **Fernseea**
         4. The inflorescence compound; flowers pedicellate or sessile.
            5. Sepals not more than 3 mm. long; flowers minute, sessile or pedicellate; ovules few. (Fig. 52.) ..... 16. **Araeococcus**
            5. Sepals 8–23 mm. long; flowers larger, sessile; ovules numerous. (Figs. 53, 54.) ..... 17. **Streptocalyx**
      3. Inflorescence densely capitate or capitiform, often involucrate; flowers never distichous; petals free or connate by their margins.
         6. Flowers on slender pedicels; inflorescence involucrate, sunk in the center of the rosette; petal-blades spreading, acute. (Figs. 55–66.) 18. **Neoregelia**
         6. Flowers sessile or subsessile.
            7. Epigynous tube very short or lacking.
               8. Petals thin, widely spreading, obtuse, white or rarely yellow; bracts of the inflorescence foliaceous; usually some of the flowers unisexual. (Figs. 67–72.) ..... 19. **Cryptanthus**
               8. Petals fleshy, erect or rarely spreading and acute; bracts of the inflorescence not foliaceous; flowers all perfect. (Figs. 73–77.) 20. **Nidularium**
            7. Epigynous tube elongate; scape elongate, slender; inflorescence not involucrate. (Fig. 78.) ..... 21. **Andrea**
   2. Filaments forming a tube to which the fleshy petals are joined along their centers but with their margins free; inflorescence compound, many-flowered, sessile or scapose, globose or elongate. (Figs. 79–81.) 22. **Bromelia**

1. Petals appendaged or when rarely naked then the flowers strobilate.
   9. Ovaries always remaining distinct; inflorescence compound or simple; sepals often mucronate.
      10. Ovary in small part superior; scape naked; inflorescence simple, strobilate, pseudolateral. (Fig. 82.) ..... 23. **Acanthostachys**
      10. Ovary completely inferior.
         11. Scape-bracts foliaceous or the scape lacking; sepals always free; epigynous tube very short or none.
            12. Petal-scales well developed; sepals nearly or quite symmetric, 10–20 mm. long; inflorescence or its spikes few-flowered, small. (Figs. 83–85.) ..... 24. **Orthophytum**

12. Petal-scales vestigial; sepals definitely asymmetric, 25–35 mm. long; inflorescence or its spikes many-flowered, 6–15 cm. in diameter ..... 29. **Aechmea**

11. Scape-bracts distinct from the leaves, or if there is no evident scape (some species of *Aechmea*) then the sepals much connate; epigynous tube often large.

13. Inflorescence involucrate; sepals unarmed, nearly or quite free in most species.

14. Petals completely free. (Figs. 86, 87.)..... 25. **Canistrum**

14. Petals partially connate above the base but often free at the base and exposing the bases of the filaments of the first series. (Figs. 88–90.)..... 26. **Wittrockia**

13. Inflorescence not involucrate or if somewhat so then the sepals mucronate and much connate.

15. The inflorescence compound (simple in depauperate specimens of *Hohenbergia littoralis*); flowers in strobilate spikes, much compressed.

16. Epigynous tube very small or lacking; pollen-grains with 2 or 4 pores. (Figs. 91–93.)..... 27. **Hohenbergia**

16. Epigynous tube well developed; pollen-grains with more than 4 pores. (Fig. 94.)..... 28. **Gravisia**

15. The inflorescence simple or if compound then the flowers not in strobilate spikes.

17. Flowers sessile or if rarely pedicellate then the sepals free.

18. Sepals mucronate or pungent or if blunt then small and the ovules long-caudate. (Figs. 95–111.)..... 29. **Aechmea**

18. Sepals unarmed or soft-apiculate.

19. Ovules numerous.

20. Petals regular, erect or suberect; pollen-grains with pores; flowers sessile. (Figs. 112–114.) 30. **Quesnelia**

20. Petals either zygomorphic or recurved in a spiral; dry pollen-grains usually with a single longitudinal fold; flowers sessile or pedicellate. (Figs. 115–123.) 31. **Billbergia**

19. Ovules few; flowers pedicellate, regular. (Fig. 124.) 32. **Neoglaziovia**

17. Flowers pedicellate; sepals connate; pollen-grains with more than 4 pores. (Fig. 125.)..... 33. **Portea**

9. Ovaries fused with each other and with the fleshy bracts to form a syncarp; inflorescence with an apical coma, simple; sepals never mucronate.

21. Inflorescence with a small inconspicuous coma, never producing basal shoots; plant propagating by elongate rhizomes; petals bearing vertical folds. (Fig. 126.)..... 34. **Pseudananas**

21. Inflorescence with a large conspicuous coma, often with basal shoots; rhizomes lacking; petals usually bearing well developed scales (Figs. 127, 128.)..... 35. **Ananas**

1. *Puya* Molina

Puya Molina, Saggio Chile 160, 351. 1782.

Principally Andean with outlying species in Costa Rica, Guiana, and northwestern Argentina.

1. **Puya floccosa** (Linden) E. Morr. Belg. Hortic. 35:81. 1885. FIGURE 1.
Pourretia floccosa Linden, Catal. 1853 ex Bot. Zeitung 11:718. 1853.
Pitcairnia floccosa Regel, Act. Hort. Petrop. 3:124. 1875.
Pitcairnia guyanensis Baker, Handb. Bromel. 120. 1889.
RIO BRANCO: Serra de Mairori, Rio Branco, Surumú, *Ule* 8371 (K (GH neg. 2550), MG, US).
ALSO: VENEZUELA, COLOMBIA.

2. *Encholirium* Mart. ex Schult. f.

Encholirium Mart. ex Schult. f. in R. & S. Syst. 7, pt. 2: p. lxviii, 1233. 1830.

Endemic in northeastern Brazil.

1. Inflorescence usually compound with spreading more or less decurved branches, curving when simple; dorsal wing of the seed linear, elongate. 1. **E. horridum**
1. Inflorescence usually simple, erect and rigid, when compound the branches strict; dorsal wing of the seed subdeltoid, short.
2. Leaf-blades linear, 4 mm. wide, the spines longer than the width of the blade; plants less than 1 m. high. (Fig. 2.) ..... 2. **E. bradeanum**
2. Leaf-blades narrowly triangular, several times wider than 4 mm., the spines relatively short; plants mostly 2 m. high or more.
3. Floral bracts short and narrow, much exceeded by the sepals.
4. Pedicels slender, 8–14 mm. long, usually longer than the floral bracts. (Fig. 3.) ..... 3. **E. spectabile**
4. Pedicels stout, 5–7 mm. long, shorter than the floral bracts. 4. **E. hoehneanum**
3. Floral bracts conspicuous, nearly equaling to exceeding the sepals.
5. Floral bracts coarsely serrate..... 5. **E. glaziovii**
5. Floral bracts obscurely serrulate or entire.
6. Sepals narrowly elliptic, nearly equaling the petals. 6. **E. subsecundum**
6. Sepals elliptic or oblong, much shorter than the petals.
7. Axis of the inflorescence completely hidden by the flowers; sepals 10–12 mm. long..... 7. **E. densiflorum**
7. Axis of the inflorescence visible; sepals 6–7 mm. long. 8. **E. rupestre**

1. ***Encholirium horridum*** L. B. Smith, Contr. Gray Herb. 129:32, *pl. 3, figs. 1–3.* 1940.
ESPÍRITO SANTO: Vitória, *Foster* 193 (GH, type, US neg. 4209, 4210).

2. ***Encholirium bradeanum*** L. B. Smith, p. 26 and fig. 2.
MINAS GERAIS: Region of Diamantina, *Smith & Brade* 5652 (US, type).

3. ***Encholirium spectabile*** Mart. ex Schult. f. in R. & S. Syst. 7, pt. 2: 1233. 1830. FIGURE 3.

Dyckia spectabilis Baker, Handb. Bromel. 138. 1889.

PIAUÍ: Oeiras, *Gardner* 2329 (BM, K (GH neg. 2548), NY).

CEARÁ: Campo Grande, *Dahlgren* 896 (F). Cascavel, *Dahlgren* (GH). Humaïta, *Ducke* (MG).

PARAÍBA: Campina Grande, *Foster* 2418 (US).

PERNAMBUCO: Mun. Caruaru: Carapotos, Caruaru, *Pickel* 4240 (IPA).

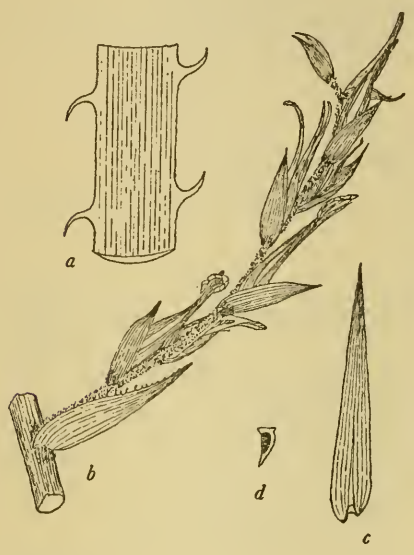

FIG. 1.

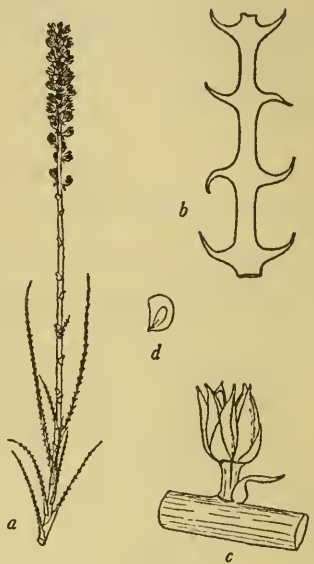

FIG. 2.

FIG. 1.—*Puya floccosa: a,* Section of leaf, × 1; *b,* branch of inflorescence, × ½; *c,* sepal, × 1; *d,* seed, × 2.

FIG. 2.—*Encholirium bradeanum: a,* Habit, × 1/10; *b,* section of leaf, × 1; *c,* flower and capsule, × 1; *d,* seed, × 2.

BAÍA: Itumirim, *Campos Porto* (RB). Joazeiro, *Martius* 2483 (M, type); *Rose & Russell* 19770 (NY, US). Paulo Afonso Falls, *Schery* 505 (GH).

4. ***Encholirium hoehneanum*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 109, *pl. 112.* 1943.

BAÍA: Jacobina, *Foster* 89 (GH, type; R).

5. ***Encholirium glaziovii*** Mez in Mart. Fl. Bras. 3, pt. 3: 505. 1894.

MINAS GERAIS: *Glaziou* 19918 (B, type, F neg. 11456).

6. ***Encholirium subsecundum*** (Baker) Mez in DC. Monogr. Phan. 9: 540. 1896.

Dyckia subsecunda Baker, Handb. Bromel. 135. 1889.

MINAS GERAIS: Milho Verde, *Saint-Hilaire* E-496 (P, type, GH neg. 2995). Serra do Cipó, *Foster* 640 (GH, US). Mun. Jaboticatubas: Serra do Cipó,

6 km. north of Palacio, *Smith & Mus. R* 6881 (R, US). Chapeu de Sol, Serra do Cipó, *Smith & Mus. R* 7036 (R, US).

7. ***Encholirium densiflorum*** Ule, Bot. Jahrb. 42: 198. 1908.

BAÍA: Tamburi *Ule* 7060 (B, type, F neg. 11455). Mun. Amargosa: Milagres, *Foster* 2474 (US).

8. ***Encholirium rupestre*** Ule, Bot. Jahrb. 42: 199. 1908.

BAÍA: Serra do São Ignacio, *Ule* 7223 (B, type, F neg. 11457).

FIG. 3.

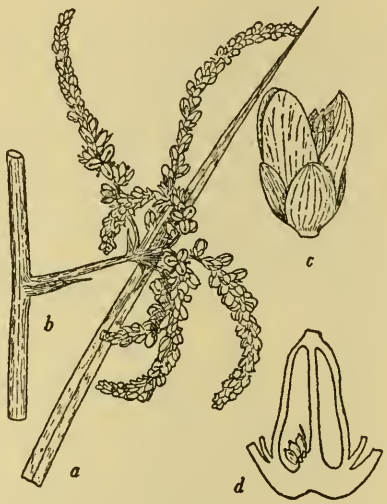

FIG. 4.

FIG. 3.—*Encholirium spectabile: a,* Habit (after M. B. Foster), × 1/40; *b,* section of leaf, × ½; *c,* flower (after Flora Brasiliensis), × 1; *d,* seed, × 1.

FIG. 4.—*Cottendorfia florida: a,* Apex of leaf, × ½; *b,* branch of inflorescence, × ½; *c,* flower, × 2.5; *d,* longitudinal section of ovary, × 5. (All after Flora Brasiliensis.)

3. *Cottendorfia* Schult. f.

Cottendorfia Schult. f. in R. & S. Syst. 7, pt. 2: p. lxiv, 1193. 1830.

A monotypic Brazilian endemic.

1. ***Cottendorfia florida*** Schult. f. in R. & S. Syst. 7, pt. 2: 1193. 1830. FIGURE 4.

PIAUÍ: Southern part of state, *Luetzelburg* (! Mez).

PARAÍBA: Piancó, *Luetzelburg* (! Mez).

BAÍA: Jeremoabo, *Luetzelburg* (! Mez). Serra do Sincorá, *Martius* 1938 (M, type, F neg. 8629); *Ule* 7081 (K).

4. *Lindmania* Mez

Lindmania Mez in DC. Monogr. Phan. 9: 535. 1896.

Southern México to Paraguay and northern Argentina. Chiefly Andean.

1. Inflorescence glabrous; flowers polystichous, spreading; leaf-blades broadest at the base..... 1. **L. guianensis**
1. Inflorescence arachnoid; flowers secund, pendent; leaf-blades broadest at the middle..... 2. **L. micrantha**

1. ***Lindmania guianensis*** (Beer) Mez in DC. Monogr. Phan. 9:537. 1896. FIGURE 5.

Anoplophytum guianense Beer, Bromel. 44. 1857.

BRAZIL: Probable, but not yet recorded.

BRITISH GUIANA: Kaieteur, *Maguire & Fanshawe* 23158 (GH, NY, US). Berbice, upper Corentyne River, *Rob. Schomburgk* 20 (K, isotype, GH neg. 1396).

VENEZUELA: Southwest slope, Mount Roraima, *Steyermark* 58616 (F, GH).

2. ***Lindmania micrantha*** (Lindl.) L. B. Smith, Contr. Gray Herb. 104:77. 1934.

Pitcairnia micrantha Lindl. Bot. Reg. 29, Misc.: 44. 1843.

Cottendorfia neogranatensis Baker, Handb. Bromel. 129. 1889.

Lindmania neogranatensis Mez in DC. Monogr. Phan. 9:538. 1896.

Lindmania flaccida Standley, Journ. Washington Acad. Sci. 13:364. 1923.

DISTRITO FEDERAL: Rio de Janeiro, *C. Smith* (CGE, type). The only record for Brazil and a very dubious one because based on cultivated material.

ALSO: SOUTHERN MÉXICO, CENTRAL AMERICA.

5. *Connellia* N. E. Brown

Connellia N. E. Brown, Trans. Linn. Soc. Bot. II. 6:66. 1901.

Southern Venezuela.

1. Inflorescence compound with several flowers in the axil of each major bract; leaf-blades glabrous on both sides..... 1. **C. augustae**
1. Inflorescence simple with a single flower in the axil of each bract; leaf-blades more or less lepidote on one side.
   2. Leaf-blades stout, rigid, densely tomentose-lepidote above, soon glabrous beneath. (Fig. 6.)..... 2. **C. quelchii**
   2. Leaf-blades flaccid, glabrous above, obscurely lepidote beneath, margins white, prominent..... 3. **C. caricifolia**

1. ***Connellia augustae*** (Rich. Schomburgk) N. E. Brown, Trans. Linn. Soc. Bot. II. 6:66, *pl. 13.* 1901.

Encholirium augustae Rich. Schomburgk, Verh. Preuss. Gartenb. Ver. 18: 130, *pl. 2.* 1847.

Dyckia augustae Baker, Handb. Bromel. 135. 1889.

Puya augustae Mez in DC. Monogr. Phan. 9:487. 1896.

BRAZIL: Probable, but not yet recorded.

VENEZUELA: Mount Roraima, *McConnell & Quelch* 670 (K); *Schomburgk* 687 (or 1021) (BM, K (GH neg. 1374)); *Steyermark* 58883 (F, GH).

2. ***Connellia quelchii*** N. E. Brown, Trans. Linn. Soc. Bot. II. 6:67, *pl. 14.* 1901. FIGURE 6.

Puya roraimae Mez, Repert. Sp. Nov. Fedde 12:417. 1913.

Puya quelchii L. B. Smith, Contr. Gray Herb. 89:7, 66. 1930.

BRAZIL: Probable, but not yet recorded.

VENEZUELA: Mount Roraima, *im Thurn* 315 (BM, BRG, K, US); *Luetzelburg* 21567 (R); *McConnell & Quelch* 107 (K, type, GH neg. 1377); *Steyermark* 58818 (F, GH); *Ule* 8557 (B, type of *Puya roraimae* Mez (F neg. 11417), MG).

3. ***Connellia caricifolia*** L. B. Smith in Steyermark, Bot. Explor. Venezuela–I, Fieldiana, Bot. 28: 139, *fig. 20 a–b.* 1951.

BRAZIL: Probable, but not yet recorded.

VENEZUELA: Mount Roraima, *Steyermark* 58846 (F, type).

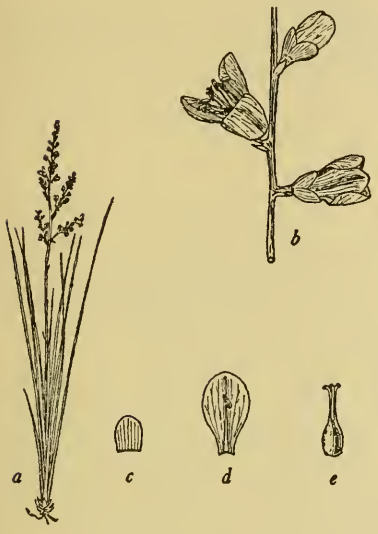

FIG. 5.

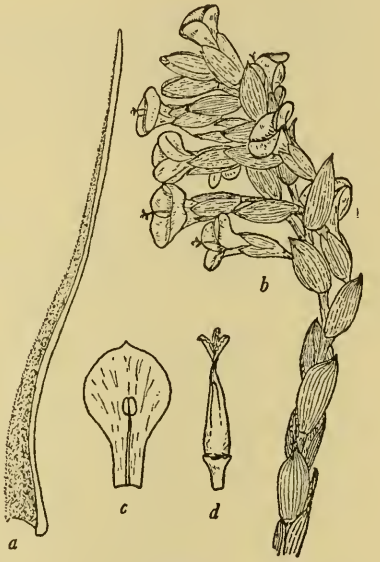

FIG. 6.

FIG. 5.—*Lindmania guianensis: a,* Habit, × 1/10; *b,* section of inflorescence, × 1; *c,* sepal, × 1; *d,* petal and stamen, × 1; *e,* pistil, × 1.

FIG. 6.—*Connellia quelchii: a,* Leaf, × ½; *b,* inflorescence, × ½; *c,* petal and stamen, × 1; *d,* pistil, × 1. (All after N. E. Brown.)

6. *Deuterocohnia* Mez

Deuterocohnia Mez in Mart. Fl. Bras. 3, pt. 3: 506. 1894.

Xerophytic shrubs. Slopes of the Andes in Perú, Bolivia, Argentina, and Chile, also in the basin of the Rio Paraguay in Brazil and Paraguay.

1. ***Deuterocohnia meziana*** O. Kuntze ex Mez in DC. Monogr. Phan. 9: 465. 1896. FIGURE 7.

Deuterocohnia paraguariensis Hassler, Ann. Conserv. & Jard. Bot. Genève 20: 298. 1919.

Deuterocohnia divaricata Mez, Repert. Sp. Nov. Fedde 16: 9. 1919.

Mato Grosso: Corumbá, *Kuntze* (NY, type); *Hoehne in Rondon* 3543 (R); *Foster* 1045 (GH, US); 1064 (GH).
Also: Paraguay.

7. *Pitcairnia* L'Hérit.

Pitcairnia L'Hérit. Sert. Angl. 7. 1788, nomen conservandum.
Hepetis Sw. Prodr. 4, 56. 1788.

México and the West Indies to northern Argentina. One species in Africa.

1. Flowers and pedicels stout; floral bracts large, ample; ovary almost wholly superior; leaves entire, petiolate, 6–8 cm. wide. ..... 1. **P. maidifolia**
1. Flowers slender and usually the pedicels also (pedicels almost lacking in *P. anomala*); floral bracts usually small or narrow.
2. Fruit dehiscent; ovary at least half superior; inflorescence simple or compound.
3. Petals naked.
4. Inflorescence amply paniculate; leaf-blades narrowly triangular, not narrowed at the base.
5. Flowers deflexed-secund; sepals 30–37 mm. long..... 2. **P. nuda**
5. Flowers stiffly spreading in all directions; sepals 15–20 mm. long. 3. **P. patentiflora**
4. Inflorescence simple; leaf-blades often narrowed at the base.
6. Blades of all the leaves persistent.
7. Leaves with a distinct slender petiole..... 4. **P. lancifolia**
7. Leaves not petiolate, though often somewhat narrowed at the base.
8. Pedicels 3–5 mm. long, stout, sulcate; petals only a little longer than the sepals; flowers spreading..... 5. **P. encholirioides**
8. Pedicels 8–30 mm. long, slender, even; petals two to three times as long as the sepals.
9. Petals zygomorphic at least by position, not spirally recurving at anthesis. (Fig. 8.)
10. Base of the rosette not thickened; leaves not more than 15 cm. long..... 6. **P. beycalema**
10. Base of the rosette bulbous-thickened; leaves usually much more than 15 cm. long.
11. Sepals distinctly carinate..... 7. **P. carinata**
11. Sepals ecarinate. (Fig. 8.)..... 8. **P. flammea**
9. Petals regular, spirally recurving at anthesis. (Fig. 9.)
12. Rhachis of the inflorescence glabrous; sepals 15–18 mm. long; petals white to yellow..... 9. **P. albiflos**
12. Rhachis of the inflorescence furfuraceous; sepals 19–22 mm. long; petals red..... 10. **P. staminea**
6. Blades of the larger leaves deciduous along a straight transverse line.
13. Leaves serrate on the reduced blades and on the persistent remainder of the large blades..... 11. **P. glaziovii**
13. Leaves all entire..... 12. **P. decidua**
3. Petals each bearing a single scale at base.
14. Leaf-blades narrow and elongate, never more than 22 mm. wide.
15. Inflorescence compound.

16. Inflorescence lax, its axes glabrous..... 13. **P. anthericoides**
16. Inflorescence dense, densely pale-flocculose. ..... 14. **P. ulei**
15. Inflorescence simple.
17. Sepals alate-carinate; leaves dimorphic, the larger ones with serrulate petioles..... 15. **P. ensifolia**
17. Sepals ecarinate.
18. Scape-bracts all exceeding the internodes; sepals acuminate; petals white..... 16. **P. suaveolens**
18. Scape-bracts shorter than the upper internodes; sepals broadly acute or obtuse.
19. Sepals not more than 15 mm. long; leaf-blades 5–8 mm. wide.
20. Leaves dimorphic, the blades of the larger ones deciduous; petals red..... 17. **P. torresiana**
20. Leaves all alike, all persistent; petals white. 18. **P. bradei**
19. Sepals to 30 mm. long; leaf-blades 11–22 mm. wide.
21. Sepals obtuse; seeds caudate; leaf-blades 16–22 mm. wide. 19. **P. subpetiolata**
21. Sepals acute; seeds alate; leaf-blades 11 mm. wide. 20. **P. platypetala**
14. Leaf-blades lanceolate to elliptic-oblong, 3.5–18 cm. wide; seeds narrowly winged; species of the Amazon Basin.
22. Leaf-blades entire, broadly rounded and apiculate, to 18 cm. wide; scape-bracts all much shorter than the internodes. 21. **P. undulata**
22. Leaf-blades serrulate toward the apex, acuminate, not over 9 cm. wide; scape-bracts exceeding at least the upper internodes. 22. **P. sprucei**
2. Fruit indehiscent, pseudocapsular; inflorescence simple; species of the Amazon Basin. (Figs. 10, 11.)
23. Larger part of the ovary superior. (Fig. 10.)
24. Scape elongate, slender; inflorescence lax; pedicels 20 mm. long. 23. **P. uaupensis**
24. Scape very short or none; inflorescence dense; pedicels not more than 2 mm. long..... 24. **P. aphelandriflora**
23. Larger part or all of the ovary inferior. (Fig. 11.)
25. Ovary in small part superior; pedicels evident, slender.
26. Leaf-blades distinctly petiolate, 25–30 mm. wide, reddish-lepidote beneath; inflorescence subdensely many-flowered; pedicels 15–40 mm. long; sepals 22–26 mm. long..... 25. **P. amazonica**
26. Leaf-blades only slightly narrowed at base, 6–13 mm. wide, pale-lepidote beneath; inflorescence laxly few-flowered; pedicels 5–10 mm. long; sepals 15 mm. long..... 26. **P. caricifolia**
25. Ovary wholly inferior; pedicels almost wholly lacking. 27. **P. anomala**

1. ***Pitcairnia maidifolia*** (C. Morr.) Dcne. ex Planch. Fl. des Serres 9: 151, *pl. 915.* 1854.
Puya maidifolia C. Morr. Ann. Soc. Agr. Bot. Gand 5: 453, *pl. 289.* 1849.
Puya funckiana Linden, Catal. 5: 2. 1850.
Pitcairnia funckiana A. Dietr. Allg. Gartenz. 19: 337. 1851.

Pitcairnia macrocalyx Hook. Bot. Mag. 79: *pl. 4705.* 1853.
Pitcairnia zeifolia C. Koch & Sellow ex C. Koch, Ind. Sem. Hort. Berol. 1854. App.: 11. 1855.
Pitcairnia oerstediana Mez in DC. Monogr. Phan. 9: 448. 1896.
BRAZIL: Probable, but not yet recorded.
BRITISH GUIANA: Kaieteur, *Maguire & Fanshawe* 23411 (GH, NY).
ALSO: CENTRAL AMERICA, COLOMBIA, VENEZUELA.

2. ***Pitcairnia nuda*** Baker, Journ. Bot. 19: 269. 1881.
BRAZIL: Probable, but not yet recorded.
BRITISH GUIANA: Rupununi River, *Appun* 1582 (K, type, GH neg. 1389). Kanuku Mountains, *A. C. Smith* 3644 (GH, NY, US).
SURINAM: Tafelberg, *Maguire* 24460 (GH, NY).

3. ***Pitcairnia*** **patentiflora** L. B. Smith, Contr. Gray Herb. 127: 18, *pl. 1, fig. 4.* 1939.
AMAZONAS: Rio Içana, Serra de Tunuí, *Black* 48-2815 (IAN, US).
ALSO: COLOMBIA, VENEZUELA.

4. ***Pitcairnia lancifolia*** Mez in Mart. Fl. Bras. 3, pt. 3: 447. 1894.
1. Sepals 35 mm. long..... Var. a. **lancifolia**
1. Sepals 24 mm. long..... Var. b. **minor**

4a. ***Pitcairnia lancifolia*** var. ***lancifolia.***
RIO DE JANEIRO: Serra dos Orgãos, *Glaziou* 3628 (BR, type).

4b. ***Pitcairnia lancifolia*** var. ***minor*** L. B. Smith, Bol. Mus. Nac. Rio de Janeiro nov. ser. No. 15: 4. 1952.
RIO DE JANEIRO: Teresópolis, *Sampaio* 2444 (R, US neg. 3397).
DISTRITO FEDERAL: Serra da Tijuca, *Brade* (R, 46830, type, US neg. 3395).

5. ***Pitcairnia encholirioides*** L. B. Smith, Arquiv. Jard. Bot. Rio de Janeiro 10: 146, *pl. 2, fig. 6.* 1950.
RIO DE JANEIRO: Mun. Santa Maria Madalena: Pedra das Flores, *Santos Lima & Brade* 13249 (RB, type, US neg. 4203).

6. ***Pitcairnia beycalema*** Beer, Bromel. 63. 1857.
Pitcairnia muscosa sensu Hook. Bot. Mag. 80: *pl. 4770.* 1854. Not Mart.
BRAZIL: Described from cultivated material of unknown origin, *Hb. Kunth* (B, F neg. 11350).
RIO DE JANEIRO: Macaé, *Riedel* 865 in part (! Mez). Old road up the Serra to Petrópolis, *Smith & Mus. R* 6493 (R, US).

7. ***Pitcairnia carinata*** Mez in Mart. Fl. Bras. 3, pt. 3: 448. 1894.
RIO DE JANEIRO: Nova Friburgo, *Glaziou* 13256 (B, type, F neg. 11352). Mun. Santa Maria Madalena: Serra da Furquilha, *Santos Lima & Brade* 14180 (RB).

8. ***Pitcairnia flammea*** Lindl. Bot. Reg. 13: *pl. 1092.* 1827.
1. Leaves covered beneath with spreading scales, mostly 20–36 mm. wide.
2. Axis of the inflorescence glabrous, usually turning black on drying. Var. a. **flammea**
2. Axis of the inflorescence lepidote, usually remaining pale. Var. b. **roezlii**

1. Leaves glabrous or, if lepidote, always less than 20 mm. wide; inflorescence remaining pale.
   3. Axis of the inflorescence glabrous; leaves glabrous.
      4. Inflorescence lax, few-flowered..... Var. c. **corcovadensis**
      4. Inflorescence dense, at least toward the apex, many-flowered.
         5. Petals red. ..... Var. d. **glabrior**
         5. Petals yellowish white..... Var. e. **pallida**
   3. Axis of the inflorescence lepidote..... Var. f. **floccosa**

8a. *Pitcairnia flammea* var. ***flammea.*** FIGURE 8.

? *Tillandsia laevis* Vell. Fl. Fluminensis 133. 1825; Icon. 3: *pl. 126.* 1835. Not *Pitcairnia laevis* Willd. 1830.

? *Pitcairnia fulgens* Poit. Rev. Hortic. 3:157. Jan. 1836; Mez in DC. Monogr. Phan. 9:430. 1896.

Pitcairnia morelii Lem. Hort. Univ. 7:231, *pl.* 1846.

Pitcairnia laevis Beer, Bromel. 60. 1857. Not Willd. 1830.

Pitcairnia roezlii sensu Baker, Bot. Mag. 117: *pl. 7175.* 1891. Not E. Morr.

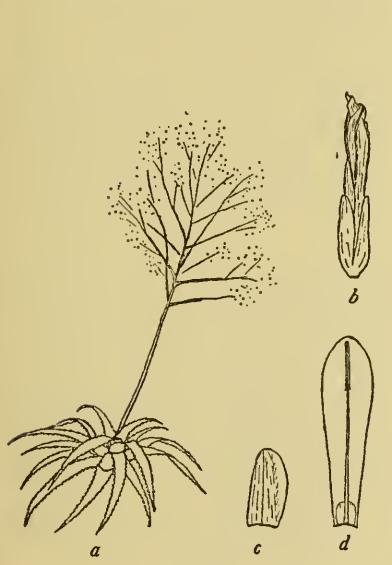

FIG. 7.

FIG. 8.

FIG. 7.—*Deuterocohnia meziana: a,* Habit (after M. B. Foster), × 1/40; *b,* flower, ×1; *c,* sepal, × 1; *d,* petal and stamen, × 1.

FIG. 8.—*Pitcairnia flammea* var. *flammea: a,* Habit, × 1/10; *b,* flower (after Botanical Register), × ½; *c,* sepal, × 1; *d,* petal, × 1.

BRAZIL: Cultivated (K, basis of *"Pitcairnia roezlii"* in Bot. Mag. *pl. 7175*). Cultivated, "Rivage" (G, basis of citation of *Pitcairnia fulgens* Poit. in DC. Monogr. Phan. 9:430).

ESPÍRITO SANTO: Cuibiça, *Foster* 894 (GH). Domingos Martins, *Foster* 233 (GH).

Rio de Janeiro: Itatiaia, *Brade* 17171 (RB); *Luiz* 20 (RB); *Foster* 127 (GH); *L. B. Smith* 2311 (GH). Japuiba, *Hoehne & Gehrt* (SP). (Juturnaiba) *Passarelli* 105 (R); 112 (R). Nova Friburgo, *Lutz* 1339 (R). Serra dos Orgãos, *Gardner* 5896 (BM); *Miers* 2856 (BM); 4078 (BM). Petrópolis, *Goés & Constantino* 23 (RB); *Pabst* 10080 (Pabst). Teresópolis, *Bailey* 1292 (BH, GH); 1301 (BH).

Distrito Federal: Cultivated in England, *Harrison* (CGE, type). Recreio dos Bandeirantes, *Lutz* 902 in part (R). Monte do Cochrane, *L. B. Smith* 1410 (GH). Pedra Dois Irmãos, *Rose & Russell* 20242 (NY, US). Chacara do Fonseca, *Occhioni* (RB). Pedra da Gavea, *Frazão* (RB); *Reitz* 4030 (HBR); *Smith & Mus. R* 6427 (R, US). Praia do Leblon, *Hoehne* (SP). Paineiras, Serra da Carioca, *Pabst* 10085 (Pabst). Avenida Niemeier, *Freire & Vidal* (R). Tijuca, *L. B. Smith* 2130 (GH); *Ule* 4692 in part (R). Restinga da Tijuca, *Machado* (RB).

São Paulo: Santos, *Mosén* 3246 (S). Ubatuba, Santos, *Edwall* (SP).

8b. ***Pitcairnia flammea*** var. ***roezlii*** (E. Morr.) L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 111. 1943.

Pitcairnia roezlii E. Morr. Belg. Hortic. 35: 285, *pls. 18, 19.* 1885.

Pitcairnia hypoleuca Mez in Mart. Fl. Bras. 3, pt. 3: 458. 1894.

Brazil: *Freyreis* (S). Cultivated in Liége, Belgium (LG, type).

Rio de Janeiro: Alto da Serra to Meio da Serra, *L. B. Smith* 2112 (GH). Meio da Serra, *Smith & Brade* 2292 (GH). Petrópolis, *Glaziou* 16474 (P, cotype of *Pitcairnia hypoleuca* Mez, GH neg. 2965). Old road below Petrópolis, *Smith & Mus. R.* 6493a (R, US). Mun. Nova Friburgo: Teodoro de Oliveira to Nova Friburgo, *Smith & Mus. R* 6680a (R, US).

Distrito Federal: Cachoeira, *Siqueira* (R). Rio de Janeiro, *Widgren* (S). Tijuca, *Horta & Brade* 14494 (RB).

8c. ***Pitcairnia flammea*** var. ***corcovadensis*** (Wawra) L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 112. 1943.

Pitcairnia corcovadensis Wawra, Oesterr. Bot. Zeitschr. 12: 384. 1862.

Rio de Janeiro: Teresópolis, *Brade* 16295 (RB); *Frazão* (RB). Mun. Santa Maria Madalena: Furquilha, *Santos Lima* 154 (RB, US neg. 3255).

Distrito Federal: Serra da Carioca, *Brade* 14380 (RB). Corcovado, *Ule* 4166 (R); *Wawra* I–501 (W, type). Pedra da Gavea, *Glaziou* 12237 (K, GH neg. 2543); *Smith & Mus. R* 6429 (R, US). Estrada do Redentor, *Occhioni* 40 (RB). Rio de Janeiro, *Widgren* 76 (S).

8d. ***Pitcairnia flammea*** var. ***glabrior*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 112. 1943.

? *Pitcairnia cinnabarina* A. Dietr. Allg. Gartenz. 18: 202. 1850.

Brazil: Cultivated in Berlin (P, GH neg. 2967).

Minas Gerais: Serra da Caparao, *Brade* 17127 (RB).

Rio de Janeiro: Teresópolis, *Brade* 9756 (R).

Distrito Federal: Tijuca, *Glaziou* 8021 (B (F neg. 11353), P).

São Paulo: Alto da Serra, *Hoehne* (SP, type; GH). Alto dos Marins, *Loefgren* (SP). Itapeva to Campos do Jordão, *Eugenio* 3444 (GH).

Paraná: Cadeado, *Dusén* 8834 (S, US); 11590 (S). São João, Serra do Mar, *Dusén* 7245 (S); 17299 (S, US).

8e. ***Pitcairnia flammea*** var. ***pallida*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 112, *pl. 115.* 1943.

RIO DE JANEIRO: Teresópolis, *Brade* 9533 (R); *Foster* 1015 (GH, type); *Sampaio* 2903 (R).

8f. ***Pitcairnia flammea*** var. ***floccosa*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1:112. 1943.

Pitcairnia muscosa Mart. in R. & S. Syst. 7, pt. 2:1240. 1830.

Pitcairnia selloana Baker, Handb. Bromel. 100. 1889.

Pitcairnia dietrichiana Wittm. Bot. Jahrb. 13, Beibl. 29:15. 1891.

Pitcairnia pruinosa Mez in Mart. Fl. Bras. 3, pt. 3:454. 1894. Not H. B. K. 1816.

Pitcairnia claussenii Mez in Mart. Fl. Bras. 3, pt. 3:454. 1894.

Pitcairnia weddelliana Mez in DC. Monogr. Phan. 9:434. 1896. Not Baker 1889.

Pitcairnia minarum Mez in Engl. Pflanzenreich IV. 32:636. 1935.

BRAZIL: *Sellow* 1317 (B, type of *Pitcairnia selloana* Baker, F neg. 11381). Cultivated, *Hort. Petrograd* (G).

CEARÁ: Serra do Araripe, *Luetzelburg* (! Mez). Quixadá, *Luetzelburg* (! Mez).

PARAÍBA: Cajazeiras, *Luetzelburg* (! Mez). Pianco, *Luetzelburg* (! Mez).

BAÍA: Central and northeastern parts of the state, *Luetzelburg* (! Mez).

ESPÍRITO SANTO: Mun. Castelo: Forno Grande, *Brade* 19992 (RB, US).

MINAS GERAIS: *Claussen* (K, isotype of *Pitcairnia claussenii* Mez, GH neg. 2573); 286 (BM). *Regnell* I–439 (S). *Weddell* 1556 (P, type of *Pitcairnia weddelliana* Mez, GH neg. 2979). Serra da Cachoeira do Campo, *Glaziou* 20524 (B, F neg. 11370). Caeté, Serra da Piedade, *Martius* 1236 (M, type of *Pitcairnia muscosa* Mart.). Serra de Caracol, *Mosén* 4434 (S).

RIO DE JANEIRO: (Fazenda da Rocinha, Pedra do Rio) *Freire & Xavier* 652 (R).

SÃO PAULO: Atibaia, *Foster* 480 (GH, US); *Ostemayer* (SP, type). Pedra do Baú, São Bento do Sapucai, *Eugenio* 3905 (GH). Bragança Paulista, *Pires* (SP, US). Retiro de Laien, Cajurú, *Regnell* III–1252 (S, US). Itú, Santos, *Hemmendorff* 490 (S). Sorocaba, Santos, *Mosén* 2980 (S).

PARANÁ: Mun. Morretes: Pico Olimpo, *Hatschbach* 1758 (US).

SANTA CATARINA: Morro do Baú, Itajaí, *Reitz* C-2074 (HBR, US); 4596 (HBR); 5174 (! Reitz).

9. ***Pitcairnia albiflos*** Herb. Bot. Mag. 53: *pl. 2642.* 1826.

RIO DE JANEIRO: Niteroi, *Glaziou* 8023 (P); *Foster* 105 (GH).

DISTRITO FEDERAL: *Regnell* (S). Pedra Bonita, *Brade* 11912 (R). Lagoa Rodrigo de Freitas, *Schwacke* (R, US neg. 3394). Corcovado, *Apparicio & Paulo* 213 (RB); *Widgren* 215 (S). Morro da Viuva, *Glaziou* 3629 (P). Copacabana, *Glaziou* 17281 (P). Morro Flamengo, *Miers* (BM). Gavea, *Guerra* (RB); *Smith & Mus. R* 6428 (R, US). Morro do Grajau, *Mello Filho* 545 (R, US).

10. ***Pitcairnia staminea*** Lodd. Bot. Cab. 8: *pl. 722.* 1823. FIGURE 9.

Pitcairnia canaliculata Baker, Handb. Bromel. 99. 1889.

Pitcairnia longicauda Hornem. ex Mez in Mart. Fl. Bras. 3, pt. 3:445. 1894.

Pitcairnia albiflos sensu Mez in Mart. Fl. Bras. 3, pt. 3: *pl. 84.* 1894.

Pitcairnia staminea var. *longicauda* Mez in DC. Monogr. Phan. 9:439. 1896.

Baía: Salvador to Vitória, *Sellow* bromel 41 (P, GH neg. 2968); *Sellow* 942 (BM). (Baía records unverified, probably from Espírito Santo.)
Epírito Santo: Vitória, *Foster* 232 (GH, R).
Rio de Janeiro: Jurujuba, *Glaziou* 8022 (B, F neg. 11373).
Distrito Federal: *Lay & Collie* (BM); *Weddell* 515 (P). Morro da Babilonia, *Hoehne* 28 (SP, GH neg. 7162). Morro do Flamengo, *Gardner* 846 (BM); *Miers* (BM). Gavea, *Frazão* (RB).

11. ***Pitcairnia glaziovii*** Baker, Handb. Bromel. 92. 1889.
Rio de Janeiro: Serra dos Orgãos, *Glaziou* 17282 (K, type (GH neg. 2604), B (F neg. 11359)).

12. ***Pitcairnia decidua*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 110, *pl. 114.* 1943.
Espírito Santo: Cultivated, *Reitz* 5676 (HBR). Cuibiça, *Foster* 893 (GH, type). Itabapoana, *Mazzini in Hoehne* (SP, US).
Minas Gerais: Araponga, *Bailey* 1036 (GH).

13. ***Pitcairnia anthericoides*** Mez in Mart. Fl. Bras. 3, pt. 3: 441. 1894.
Distrito Federal: São Cristovão, *Glaziou* 8024 (B, type, F neg. 11347); *Hoehne* 140 (SP); *Ule* (R).

14. ***Pitcairnia ulei*** L. B. Smith, Bol. Mus. Nac. Rio de Janeiro nov. ser. No. 15: 5, *pl. 1, figs. h-j.* 1952.
Goiás: Corumbá, *Ule* 788 (R, type, US neg. 3389).

15. ***Pitcairnia ensifolia*** Mez in Mart. Fl. Bras. 3, pt. 3: 436, *pl. 82.* 1894.
Goiás: Serra Dourada, *Schott* 2037 (W, type); *Ule* 511 (R, US neg. 3393); *Ule* 599-A (R, US neg. 3396).

16. ***Pitcairnia suaveolens*** Lindl. Bot. Reg. 13: *pl. 1069.* 1827.
Minas Gerais: *Saint-Hilaire* B[1] 2026 (P).
Rio de Janeiro: *R. Harrison* (CGE, type). Serra dos Orgãos, *Gardner* 5895 (BM, K).

17. ***Pitcairnia torresiana*** L. B. Smith, Bol. Mus. Nac. Rio de Janeiro nov. ser. No. 15: 4, *pl. 1, figs. f, g.* 1952.
Mato Grosso: *H. Smith* (R, type, US neg. 3398). Chapada, *Hoehne in Rondon* 3552, 3553 (R, US neg. 3392); *Malme* 1474-b (S).

18. ***Pitcairnia bradei*** Markgraf, Notizblatt 15: 215. 1940.
Minas Gerais: Montes Claros, *Markgraf, Brade & Mello Barreto* 3918 (B, type; photo RB).

19. ***Pitcairnia subpetiolata*** Baker, Journ. Bot. 19: 267. 1881.
Pitcairnia caldasiana Baker, Handb. Bromel. 100. 1889.
Pitcairnia burchellii Mez in Mart. Fl. Bras. 3, pt. 3: 436. 1894.
Pitcairnia sessiliflora Rusby, Bull. N. Y. Bot. Gard. 4: 457. 1907.
Amazonas: *Xavier* 245 (US).
Minas Gerais: Sabará, *Hoehne in Rondon* 6914 (R). Belo Horizonte, *Sampaio* 7153 (R). Caldas, *Regnell* III–1253 (S, US). Lagoa Santa, *Warming* 2174 (C, F neg. 22330). Mun. Ituiutaba: Carmo, *Macedo* 3215 (US).
Goiás: Cavalcante to Conceição, *Burchell* 8116 (K, type of *Pitcairnia burchellii* Mez, GH neg. 2569).

MATO GROSSO: Ponte de Pedra, *Hoehne in Rondon* 2138 (R). Camizão, *Foster* 1077 (GH). Campo Grande, *Foster* 1096 (GH).
ALSO: PERÚ, BOLIVIA.

20. ***Pitcairnia platypetala*** Mez in Mart. Fl. Bras. 3, pt. 3: 438. 1894.
BRAZIL: *Peters* (LE, type).

21. ***Pitcairnia undulata*** Scheidw. Allg. Gartenz. 10:275. 1842.
AMAZONAS (?): Cultivated, *E. Morren* (LG); *Barry* (GH).

22. ***Pitcairnia sprucei*** Baker, Journ. Bot. 19:303. 1881.
AMAZONAS: Manaus, *Spruce* 1653 (K, type (GH neg. 2568), BR); *Black* 47-1150a (IAN, US); *Ducke* (MG); *Krukoff* 9123 (NY); *Schwacke* 4009 (! Mez); *Ule* (! Mez). São Paulo de Olivença, *Krukoff* 9026 (NY).
ALSO: PERÚ.

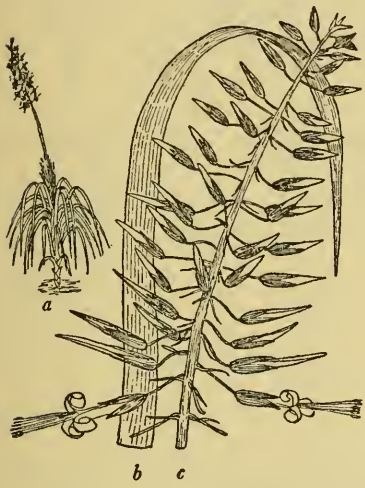

FIG. 9.

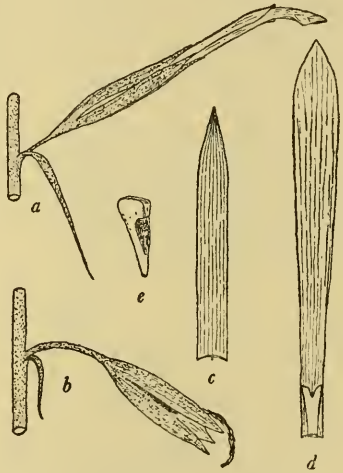

FIG. 10.

FIG. 9.—*Pitcairnia staminea: a,* Habit (after Botanical Cabinet), × 1/40; *b,* apex of leaf, × ¼; *c,* inflorescence, × ¼. (*b* and *c,* after Botanical Magazine.)

FIG. 10.—*Pitcairnia uaupensis: a,* Flower, × ½; *b,* flower with fruit, × ½; *c,* sepal, × 1; *d,* petal, × 1; *e,* seed, × 5.

23. ***Pitcairnia uaupensis*** Baker, Handb. Bromel. 93. 1889. FIGURE 10.
AMAZONAS: *Foster* 1134 (GH). Rio Uaupés, *Spruce* 2667 (K, type, GH neg. 2567). Camanaus, Rio Negro, *Luetzelburg in Rondon* 22654 (M). Rio Içana, *Leutzelburg in Rondon* 22512 (M); 22751 (R); 22782 (M, R). Rio Aiari, Cururu, *Luetzelburg in Rondon* 22533 (R). São Gabriel, Rio Negro, *Pires* 787 (IAN); *Schultes & López* 8788 (US). Rio Curicuriari, *Schultes & López* 8861 (US); 8932 (US). São Felipe, Rio Negro, *Schultes & López* 9594 (US). Manaus, *Corner* 24 (IAN).
ALSO: COLOMBIA.

24. ***Pitcairnia aphelandriflora*** Lem. Ill. Hortic. 16: Misc. 90. 1869.
Pepinia aphelandriflora André, Ill. Hortic. 17: 32, *pl. 5.* 1870.
BRAZIL: Probable, but not yet recorded.
PERÚ: Loreto: Rio Pumayacu (Balsapuerto), *Sandeman* 136 (K).

25. ***Pitcairnia amazonica*** Baker, Handb. Bromel. 117. 1889.
AMAZONAS: Serra Dimití, basin of the upper Rio Negro, *Schultes & López* 10009 (US).
ALSO: VENEZUELA.

26. ***Pitcairnia caricifolia*** Mart. in R. & S. Syst. 7, pt. 2: 1242. 1830. FIGURE 11.
Pitcairnia kegeliana Schlecht. Linnaea 24: 664. 1851.
Pitcairnia pauciflora Baker, Journ. Bot. 19: 230. 1881.
Pitcairnia subjuncta Baker, Handb. Bromel. 116. 1889.
AMAZONAS: Rio Amazonas, *Martius* (M, type, F neg. 18759). (Cachoeira Caranguejo) Rio Cauaburi, *Holt & Blake* 425 (GH, NY, US).
PARÁ: Rio Jaramacarú, *Ducke* (RB).
ALSO: COLOMBIA, VENEZUELA, GUIANA.

27. ***Pitcairnia anomala*** Hoehne in Comm. Linh. Telegr. Estrat. Matto-Grosso [Publ. 47], Annexo 5, Bot. pt. 9: 9, *pl. 161.* 1919.
PARÁ: Capipi Mission, Rio Cururu, *Hoehne in Rondon* 5151 (R, type).
MATO GROSSO: Rio Juruena above Salto Augusto, *Hoehne in Rondon* 5081 (R, US neg. 3390, 3391).

8. *Brocchinia* Schult. f.

Brocchinia Schult. f. in R. & S. Syst. 7, pt. 2: p. lxx, 1250. 1830.

Colombia and Venezuela.

1. Petals without a claw; filaments free or nearly so; ovary wholly inferior.
2. Axes of the inflorescence straight; leaf-blades only nerved, not reticulate; primary bracts subfoliaceous, to 18 cm. long..... 1. **B. tatei**
2. Axes of the inflorescence geniculate; leaf-blades reticulate; primary bracts broadly ovate, small; scape-bracts small, remote.
3. Scape about 3 mm. in diameter; leaves few, erect. (Fig. 12.) 2. **B. reducta**
3. Scape stouter; leaves many, spreading..... 3. **B. hechtioides**
1. Petals with a distinct claw; filaments of the second series much connate with the petals; ovary to one-fourth superior.
4. Inflorescence (including the ovaries) glabrous..... 4. **B. micrantha**
4. Inflorescence (including the ovaries) lepidote..... 5. **B. paniculata**

1. ***Brocchinia tatei*** L. B. Smith, Contr. Gray Herb. 161: 29, *pl. 4, fig. 1.* 1946.
Brocchinia cordylinoides sensu im Thurn ex N. E. Brown, Trans. Linn. Soc. Bot. II. 2: 256, 269. 1887.
BRAZIL: Probable, but not yet recorded.
VENEZUELA: Mount Roraima, *Tate* 514 (NY, type).

2. ***Brocchinia reducta*** Baker, Journ. Bot. 20:331. 1882. FIGURE 12.
BRAZIL: Probable, but not yet recorded.
BRITISH GUIANA: Kaieteur, *Jenman* 873 (K, type, GH neg. 1395); *Maguire & Fanshawe* 23198 (GH, NY).

3. ***Brocchinia hechtioides*** Mez, Repert. Sp. Nov. Fedde 12:414. 1913.
RIO BRANCO: Campo below Roraima, *Ule* 8561 (B, type, F neg. 11329).
ALSO: VENEZUELA, COLOMBIA.

FIG. 11.

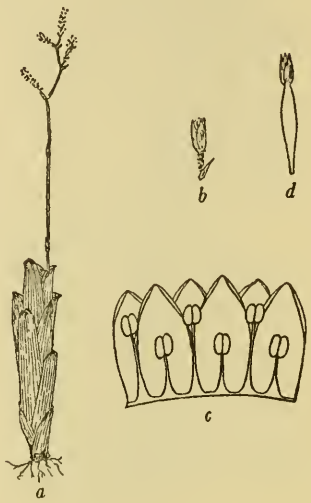

FIG. 12.

FIG. 11.—*Pitcairnia caricifolia: a,* Apex of leaf, × ½; *b,* inflorescence, × ½; *c,* sepal, × 1; *d,* petal, × 1; *e,* seed, × 5.
FIG. 12.—*Brocchinia reducta: a,* Habit, × 1/20; *b,* flower, × 1; *c,* perianth and stamens, × 5; *d,* fruit, × 1.

4. ***Brocchinia micrantha*** (Baker) Mez in Mart. Fl. Bras. 3, pt. 3:464. 1894.
Cordyline micrantha Baker, Gard. Chron. n. ser. 14, pt. 2:243, *fig.* 47. 1880.
Brocchinia cordylinoides Baker, Journ. Bot. 20:330. 1882.
BRAZIL: Probable, but not yet recorded.
BRITISH GUIANA: Kaieteur, *im Thurn* (K, type, GH neg. 1399); *Maguire & Fanshawe* 23300 (NY, US).

5. ***Brocchinia paniculata*** Schult. f. in R. & S. Syst. 7, pt. 2:1250. 1830.
BRAZIL: Probable, but not yet recorded.
COLOMBIA: Serra de Araracoara, *Martius* (M, type; F neg. 8632).

9. *Dyckia* Schult. f.

Dyckia Schult. f. in R. & S. Syst. 7, pt. 2: p. lxv, 1194. 1830.

Chiefly native of the dry open campos of Brazil with outlying species in Bolivia, Paraguay, Uruguay, and northern Argentina.

1. Pedicels 20 mm. long or more, much exceeding the floral bracts; leaves over 1 m. long, repand-serrate with teeth 4 mm. long..... 1. **D. pedicellata** [1]
1. Pedicels much less than 20 mm. long.
2. Inflorescence densely ferruginous-lepidote, amply tripinnate; leaves lepidote on both sides; floral bracts not more than 3 mm. long, much exceeded by the sepals..... 2. **D. tomentosa** [1]
2. Inflorescence not densely ferruginous-lepidote or else either less than tripinnate or the leaves glabrous above or the floral bracts more than 3 mm. long.
3. Filaments free above the common tube formed by the petals and stamens together. (Fig. 15.) To p. 59.
4. Floral bracts not more than 3 mm. long, exceeding the pedicels; inflorescence ample, 2–3-pinnate; sepals 5 mm. long or less.
5. Leaves densely lepidote; inflorescence completely glabrous; flowers dimorphic; sepals apiculate..... 3. **D. selloa**
5. Leaves nearly glabrous on both sides; inflorescence densely tomentose-lepidote; flowers all perfect; sepals acute.... 4. **D. maritima**
4. Floral bracts much more than 3 mm. long, or shorter than the pedicels (*Dyckia orobanchoides*); inflorescence simple or bipinnate.
6. Stamens distinctly exceeding the petals; floral bracts exceeding the pedicels.
7. Floral bracts broadly ovate or suborbicular, apiculate.
8. Racemes dense; sepals 3–4 mm. long; style nearly the same length as the ovary..... 5. **D. microcalyx**
8. Racemes lax; sepals 6–10 mm. long; style much shorter than the ovary. (Fig. 14.)..... 6. **D. leptostachya**
7. Floral bracts ovate, acuminate; inflorescence simple, few-flowered; sepals 6–7 mm. long..... 7. **D. tenuis**
6. Stamens equaling the petals or shorter, or the floral bracts shorter than the pedicels.
9. Sepals acute, subacute, or apiculate. To p. 58.
10. Inflorescence densely ferruginous-tomentose or ferruginous-lanate, simple to much branched; scape-bracts serrulate.
11. Margins of the sepals obscured by the dense lanate indument; petals barely exceeding the 15-mm.-long sepals; floral bracts entire; leaf-blades glabrous, the spines 3 mm. long. 8. **D. ursina**
11. Margins of the sepals clearly visible; petals greatly exceeding the 8 mm. long sepals; floral bracts serrulate; leaf-blades lepidote beneath, the spines 3–5 mm. long. (Fig. 15.) 9. **D. encholirioides**
10. Inflorescence pale-lepidote or pale-villous or glabrous; usually simple.

[1] *Dyckia pedicellata* and *D. tomentosa* are known from fruiting material only, thus necessitating the artificial treatment given above. It is not even wholly certain that they belong to the genus *Dyckia*.

12. Scape-bracts all with linear blades; leaves entire or subentire, over 40 cm. long; flowers few, 9 mm. long, half as long as the internodes..... 10. **D. burchellii**

12. Scape-bracts diverse, the upper ones bladeless; leaves serrulate, 7–30 cm. long; flowers usually numerous, much more than half as long as the internodes.

13. Floral bracts apiculate or abruptly acute; flowers 11–24 mm. long.

14. Inflorescence compound; pedicels 3 mm. long, exceeding the floral bracts; sepals 7 mm. long, fimbriate, tomentulose..... 11. **D. orobanchoides**

14. Inflorescence simple; pedicels either shorter than the floral bracts or over 3 mm. long.

15. Pedicels about 8 mm. long; inflorescence 2–3-flowered; sepals narrow, 8 mm. long; petals erect, ecarinate, not undulate..... 12. **D. biflora**

15. Pedicels much less than 8 mm. long; inflorescence more than 3-flowered; sepals broad, 8–12 mm. long; petals more or less spreading and carinate.

16. Upper scape-bracts shorter than the internodes. 13. **D. remotiflora**

16. Upper scape-bracts equaling or exceeding the internodes.

17. Axis of the inflorescence lepidote; inflorescence many-flowered..... 14. **D. vaginosa**

17. Axis of the inflorescence white-villous; inflorescence few-flowered..... 15. **D. choristaminea**

13. Floral bracts acuminate; flowers never more than 12 mm. long.

18. Upper scape-bracts equaling or exceeding the internodes; lower floral bracts usually exceeding the flowers; leaf-blades 25–35 mm. wide, short and thick; sepals to 8 mm. long..... 16. **D. brevifolia**

18. Upper scape-bracts shorter than the internodes; lower floral bracts shorter than the flowers; leaf-blades 10–20 mm. wide.

19. Upper scape-bracts entire; leaves to 12 cm. long.

20. Pedicels not more than 3 mm. long; leaf-blades serrulate, 1 cm. wide; sepals 6 mm. long. 17. **D. hilaireana**

20. Pedicels to 14 mm. long; leaf-blades entire, 2 cm. wide; sepals 9 mm. long. (Fig. 16.) 18. **D. heloisae**

19. Upper scape-bracts serrulate; leaves 15–40 cm. long.

21. Style almost as long as the ovary; leaf-blades covered on both sides with a membrane of coarse silvery scales; sepals 6 mm. long. 19. **D. argentea**

21. Style very short; leaf-blades glabrous above; sepals 5–7 (rarely to 9) mm. long. (Fig. 17.) 20. **D. tuberosa**

9. Sepals obtuse.
22. Petals ferruginous-tomentulose outside; petal-filament tube only 0.5 mm. long; styles elongate; plant 1 m. or more high; leaves repand-serrate with teeth 10 mm. long; inflorescence simple, dense; sepals 7–8.5 mm. long; petals suberect, ecarinate. ..... 21. **D. ferruginea**
22. Petals completely glabrous; petal-filament tube longer; styles usually short.
23. Upper scape-bracts equaling or exceeding the internodes.
24. Leaves short and thick, only 6–20 cm. long, but 8–35 mm. wide; inflorescence simple.
25. Floral bracts entire, narrowly lance-triangular; inflorescence soon glabrous; leaf-blades 25–35 mm. wide, glabrous above; sepals to 8 mm. long. 16. **D. brevifolia**
25. Floral bracts serrulate, broadly ovate; inflorescence densely lepidote; leaf-blades 8–10 mm. wide, cinereous-lepidote on both sides; sepals 9–10 mm. long. 22. **D. simulans**
24. Leaves long and narrow, 30–50 cm. long; inflorescence often compound.
26. Floral bracts to 25 mm. long, the lower ones equaling or exceeding the flowers; spines of the leaves 1–1.5 mm. long.
27. Inflorescence compound or with buds in the axils of the lower bracts; pedicels short and stout; petal-blades suborbicular, ecarinate; sepals 7–12 mm. long. 23. **D. trichostachya**
27. Inflorescence simple; pedicels 5 mm. long; petal-blades trapeziform, carinate; sepals 9 mm. long. 24. **D. eminens**
26. Floral bracts not more than 15 mm. long, the lower ones usually equaling the sepals; spines of the leaves to 4 mm. long.
28. Inflorescence brown-furfuraceous; leaf-blades to 45 mm. wide; sepals to 10 mm. long.... 25. **D. frigida**
28. Inflorescence soon glabrous; leaf-blades 17 mm. wide; sepals 7 mm. long..... 26. **D. elata**
23. Upper scape-bracts shorter than the internodes.
29. Inflorescence covered with a dark ferruginous tomentum, its axis strongly flexuous; flowers to 18 mm. long; sepals 8–11 mm. long; petals ecarinate; stigmas subsessile; leaves 5 dm. long, the blades subglabrous on both sides..... 27. **D. sordida**
29. Inflorescence sparsely pale-furfuraceous or glabrous.
30. Upper scape-bracts and floral bracts serrulate.
31. Pedicels short, much exceeded by the floral bracts; leaves 15–40 cm. long; sepals 5–7 (rarely to 9) mm. long. (Fig. 17.)..... 20. **D. tuberosa**

31. Pedicels 5 mm. long, about equaling the floral bracts; leaves 6–8 cm. long; sepals 5 mm. long. (Fig. 18.) 28. **D. macedoi**

30. Upper scape-bracts and floral bracts entire.

32. Pedicels about 7 mm. long; sepals 8 mm. long.

33. Leaves over 40 cm. long; inflorescence many-flowered. ..... 29. **D. linearifolia**

33. Leaves 4 cm. long; inflorescence 2–3-flowered. 12. **D. biflora**

32. Pedicels short and stout.

34. Floral bracts triangular-ovate, acuminate; sepals 6–8 mm. long.

35. Styles very short; leaves to 40 cm. long, the blades 15 mm. wide, the spines stout, to 6 mm. long. ..... 30. **D. elongata**

35. Styles elongate; leaves 14–20 cm. long, the blades 20–35 mm. wide, the spines small and inconspicuous. ..... 31. **D. distachya**

34. Floral bracts broadly ovate to subreniform, apiculate.

36. Sepals 3–4 mm. long; flowers 6–13 mm. long; racemes dense..... 5. **D. microcalyx**

36. Sepals 6–10 mm. long; flowers 13–23 mm. long; racemes lax. (Fig. 14.)... 6. **D. leptostachya**

3. Filaments connate and forming a definite ring above their junction with the petals. (Fig. 20.)

37. Petals without a distinct claw and blade, narrowly elliptic; leaf-blades erect, 13–32 cm. long, the spines nearly straight, 2 mm. long; scape-bracts remote; inflorescence simple, lax; sepals 6–8 mm. long; filaments wholly connate; stigmas subsessile. 32. **D. horridula**

37. Petals with a sharp distinction between the narrow claw and broad blade.

38. Sepals acute or apiculate.

39. Scape-bracts (or the great majority of them) equaling or exceeding the internodes.

40. Pedicels 15 mm. long, stout; inflorescence much branched; leaf-blades 3 cm. wide; scape-bracts serrulate; floral bracts exceeding the sepals; sepals 9–10 mm. long. 33. **D. princeps**

40. Pedicels much less than 15 mm. long.

41. Leaves equally lepidote on both sides.

42. Sepals 11 mm. long; inflorescence branched or with buds in the axils of the lower bracts; leaves nearly 50 cm. long, the blades 30 mm. wide, laxly serrate. 34. **D. cinerea**

42. Sepals 6 mm. long; inflorescence simple; leaves 9–17 cm. long, the blades 8–10 mm. wide, repand-serrate. 35. **D. fosteriana**

41. Leaves much more lepidote on the under side than on the upper; inflorescence simple.

43. The leaves only 5–6 cm. long, the spines 3 mm. long; sepals 7–8 mm. long.
44. Filament-tube continued only 2 mm. above the junction with the petals; scape-bracts ovate with linear blades, obscurely serrulate..... 36. **D. schwackeana**
44. Filaments highly connate above the junction with the petals; scape-bracts acuminate, densely serrulate. 37. **D. densiflora**

43. The leaves 17–50 cm. long.
45. Sepals 16 mm. long; inflorescence soon glabrous. 38. **D. dusenii**
45. Sepals 6–9 mm. long; inflorescence persistently furfuraceous.
46. Filaments not connate for more than 2 mm. above the petal-stamen tube; pedicels to 4 mm. long; sepals 7–9 mm. long; petal-blades suborbicular. (Fig. 19.) 39. **D. minarum**
46. Filaments high-connate above the petal-stamen tube.
47. Sepals 8–9 mm. long, cucullate; petals 16 mm. long, their blades rhombic..... 40. **D. reitzii**
47. Sepals 6 mm. long, mucronulate; petals 12 mm. long, their blades broadly obovate. 41. **D. lagoensis**

39. Scape-bracts shorter than the internodes.
48. Flowers subsessile; sepals 4–6 mm. long; filaments high-connate above the petal-stamen tube.
49. Inflorescence subdense, 4–5 times shorter than the scape; wing of the ovule narrowly falciform... 42. **D. consimilis**
49. Inflorescence lax, nearly as long as the scape; wing of the ovule broadly rounded..... 43. **D. rariflora**
48. Flowers distinctly pedicellate.
50. Floral bracts and scape-bracts serrulate.
51. Inflorescence subglabrous; lower floral bracts about equaling the 9 mm. long sepals..... 44. **D. pseudococcinea**
51. Inflorescence furfuraceous; lower floral bracts exceeding the sepals.
52. Leaves laxly serrate, much more lepidote on the under side; sepals 7–9 mm. long..... 39. **D. minarum**
52. Leaves repand-serrate, equally lepidote on both sides; sepals 6 mm. long..... 35. **D. fosteriana**
50. Floral bracts and scape-bracts entire; sepals 6–8 mm. long.
53. Filaments short-connate above the petal-stamen tube. 45. **D. dissitiflora**
53. Filaments almost completely connate... 46. **D. warmingii**

38. Sepals obtuse.
54. Scape-bracts all exceeding the internodes; filaments connate for 2 mm. above the petal-stamen tube.
55. Sepals 12 mm. long; leaves 50 cm. long; inflorescence branched or with buds in the axils of the lower bracts. 47. **D. bracteata**

55. Sepals not more than 7 mm. long; leaves 6 cm. long; inflorescence simple..... 36. **D. schwackeana**
54. Scape-bracts, or at least the upper ones, shorter than the internodes.
56. Stamens exserted; inflorescence glabrous or subglabrous; filaments high-connate above the petal-stamen tube.
57. Pedicels stout, angled, 2–4 mm. long, 2 to 3 times shorter than the floral bracts; sepals 5–7 mm. long. 48. **D. niederleinii**
57. Pedicels slender, 4–5 mm. long, almost as long as the floral bracts; sepals 8–9 mm. long..... 49. **D. lutziana**
56. Stamens shorter than the petals; inflorescence usually lepidote.
58. Filaments short-connate above the petal-stamen tube; leaves 15–20 cm. long.
59. Floral bracts acuminate, much exceeding the pedicels; inflorescence simple; sepals 8 mm. long. 50. **D. saxatilis**
59. Floral bracts apiculate, barely exceeding the pedicels; inflorescence usually compound; sepals 6 mm. long. 51. **D. maracasensis**
58. Filaments high-connate above the petal-stamen tube.
60. Flowers subsessile; stigmas subsessile.
61. Floral bracts to 10 mm. long; leaves 50 cm. long; scape-bracts entire..... 52. **D. uleana**
61. Floral bracts not over 5 mm. long; leaves only 5 cm. long; scape-bracts obscurely serrulate. 42. **D. consimilis**
60. Flowers distinctly pedicellate; sepals 6–6.5 mm. long; leaves 25–40 cm. long.
62. Upper scape-bracts serrulate; pedicels short and stout but distinct; inflorescence lax..... 53. **D. sellowiana**
62. Upper scape-bracts entire; style half as long as the ovary.
63. Floral bracts 9 mm. long, much exceeding the short pedicels; inflorescence simple or compound. (Fig. 20.) ..... 54. **D. weddelliana**
63. Floral bracts 3 mm. long, about half as long as the pedicels; inflorescence simple.... 55. **D. racemosa**

1. ***Dyckia pedicellata*** Mez in DC. Monogr. Phan. 9: 515. 1896.
MINAS GERAIS: Serra dos Cristais, Diamantina, *Glaziou* 19198a (! Mez); *Schwacke* 8413 (B, type, F neg. 11444).
Identity with the genus *Dyckia* is uncertain because of the lack of petals and stamens.

2. ***Dyckia tomentosa*** Mez in DC. Monogr. Phan. 9: 515. 1896.
RIO GRANDE DO SUL: *Sellow* Bromel. No. 73 (P, type, GH neg. 3003).

3. ***Dyckia selloa*** (C. Koch) Baker, Handb. Bromel. 136. 1889.
Prionophyllum selloum C. Koch, Ind. Sem. Hort. Berol. for 1873, App. 4: 7. 1874.
Dyckia grandifolia Baker, Handb. Bromel. 136. 1889.

Dyckia macracantha Baker, Handb. Bromel. 137. 1889.
Dyckia myriostachya Baker, Handb. Bromel. 137. 1889.

Rio Grande do Sul: *Gaudichaud* 276 (P, GH neg. 3008). Rio Pardo to Caçapava, *Sellow* 1615 (! Mez).

Also: Uruguay.

4. ***Dyckia maritima*** Baker, Handb. Bromel. 136. 1889. Figure 13.
Prionophyllum maritimum Mez in DC. Monogr. Phan. 9:542. 1896.

Santa Catarina: Mun. Araranguá: Peroba, *Reitz* C-755 (GH, HBR); C-909 (GH, HBR, US); 1369 (R). Mun. Itajaí: Cabeçudas lighthouse, *Reitz* (! Reitz).

Rio Grande do Sul: *Tweedie* (K, type). Estação Capela, *Eugenio* 2640 (GH). Salvador, *Eugenio* 2640-b (GH). Tôrres, *Reitz* 4427 (HBR); 5000 (! Reitz); *Smith & Reitz* 5824 (R, RB, US). Mun. São Leopoldo: Morro Sapucaia, *Eugenio* 220 (SP); 2640-a (GH).

5. ***Dyckia microcalyx*** Baker, Handb. Bromel. 133. 1889.
Dyckia microcalyx var. *inermis* Hassler, Ann. Conserv. & Jard. Bot. Genève 20:307. 1919.
Dyckia microcalyx var. *micrantha* Hassler, Ann. Conserv. & Jard. Bot. Genève 20:308. 1919.

Paraná: Iguaçu, *J. G. Kuhlmann* (RB).

Mato Grosso: Campo Grande, *Foster* 1094 (GH).

Also: Paraguay.

6. ***Dyckia leptostachya*** Baker, Gard. Chron. 1884, pt. 2:198. 1884. Figure 14.
Dyckia conspicua Mez in DC. Monogr. Phan. 9:513. 1896.
Dyckia hassleri Mez, Bull. Herb. Boiss. II. 3:134. 1903.
Dyckia rojasii Mez, Repert. Sp. Nov. Fedde 16:67. 1919.
Dyckia apensis Mez, Repert. Sp. Nov. Fedde 16:69. 1919.
Dyckia longifolia Mez, Repert. Sp. Nov. Fedde 16:69. 1919.
Dyckia remotiflora var. *montevidensis* sensu falso, L. B. Smith, Anais Bot. Herb. Barbosa Rodrigues 2:45. 1950.

Minas Gerais: Mun. Ituiutaba: *Macedo* 11 (US). Campos de São Vicente, *Macedo* 1286 in part (RB). Ituiutaba, *Macedo* 1242 (US).

Mato Grosso: Amolar, Rio Paraguai, *Hoehne in Rondon* 2282 (R). Corumbá, *Hoehne in Rondon* 3548 (R); 5796 (R, US neg. 3606). Rio Pardo, *Romboust* (SP). Mun. Aquidauana: Camizão, *Foster* 1080 (GH).

Paraná: Cultivated, *Kew* (K, type, GH neg. 2546).

Santa Catarina: Mun. Araranguá: Sombrio, *Reitz* 3815 (HBR); 3835 (HBR); 4282 (HBR).

Rio Grande do Sul: Pôrto Alegre, *Eugenio* 2258 (GH). Mun. Tôrres: Campo Bonito, *Reitz* 4411 (HBR); *Smith & Reitz* 5846 (R, RB, US).

Also: Paraguay, Argentina.

7. ***Dyckia tenuis*** Mez in Mart. Fl. Bras. 3, pt. 3:484. 1894.
Dyckia morreniana Mez in Mart. Fl. Bras. 3, pt. 3:496. 1894.
Dyckia kuntzeana Mez in DC. Monogr. Phan. 9:523. 1896.

Brazil: Cultivated, *Jard. Bot. Liége* (LG, type of *Dyckia morreniana* Mez).

Goiás: Cavalcante to Conceição, *Burchell* 7996 (K). Mission de Douro, *Gardner* 3479 (K, isotype, K neg.).

Mato Grosso: *Kuntze* (NY, type of *Dyckia kuntzeana* Mez). São Luiz de Cáceres, Jacobina, *Hoehne in Rondon* 575 (R, US neg. 3602).

8. ***Dyckia ursina*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 109, *pl. 111.* 1943.

MINAS GERAIS: Mun. Jaboticatubas: Serra do Cipó, *Foster* 636 (GH, type, US neg. 4053). Serra do Cipó, 5 km. north of Chapeu de Sol, *Smith & Mus. R* 6697 (R, US).

9. ***Dyckia encholirioides*** (Gaud.) Mez in DC. Monogr. Phan. 9: 507. 1896.

1. Axes of the inflorescence and the sepals yellow..... Var. a. **encholirioides**
1. Axes of the inflorescence and the sepals red..... Var. b. **rubra**

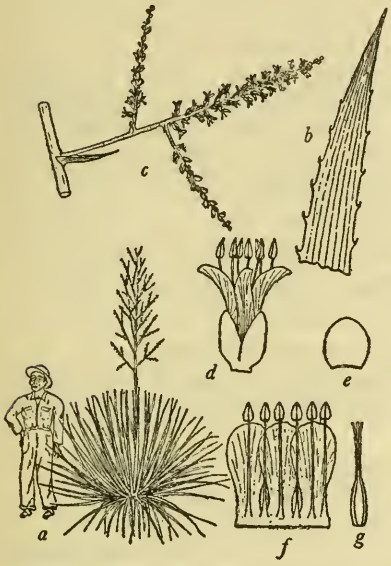

FIG. 13.

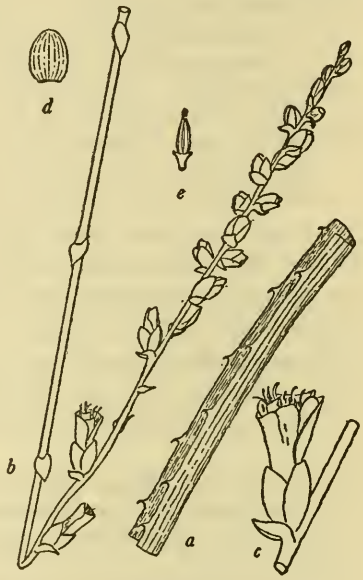

FIG. 14.

FIG. 13.—*Dyckia maritima: a,* Habit; *b,* apex of leaf, × ¼; *c,* branch of inflorescence, × ¼; *d,* flower, × 2; *e,* sepal, × 2; *f,* petals and stamens, × 2; *g,* pistil, × 2.

FIG. 14.—*Dyckia leptostachya: a,* Section of leaf, × ½; *b,* scape and inflorescence, × ½; *c,* flower, × 1; *d,* sepal × 1; *e,* pistil × 1.

9a. ***Dyckia encholirioides*** var. ***encholirioides.*** FIGURE 15.

Garrelia encholirioides Gaud. Atl. Voy. Bonite *pl. 115.* 1851.

Dyckia catharinensis C. Koch, Ind. Sem. Hort. Berol. for 1873, App. 4: 4. 1874.

? *Dyckia catharinensis* var. *dentata* Wittm. Bot. Jahrb. 13, Beibl. 29: 17. 1891.

BRAZIL: Coast, *Tweedie* 795 (K); 796 (K).

SÃO PAULO: Ilha Comprida, Iguapé, *Löfgren & Edwall* (SP).

PARANÁ: Mun. Guaratuba: Morro de Brajatúba, *Frenzel* (Inst. Biol. Pesq. Tec.). Guaratuba, *Reitz* 4247 (HBR); *Stellfeld* (Paran.). Mun. Paranaguá: Caiobá, *Foster* 435 (GH); *M. Kuhlmann* (SP); *Tessmann* (Paran., US). Matinhos, *Hatschbach* 2725 (US).

SANTA CATARINA: Mun. Araquari: Itajuba, *Reitz* 3682 (! Reitz); 3896 (! Reitz). Mun. Florianópolis: Ilha de Santa Catarina: *Gaudichaud* 130 (P, type, GH neg. 2993). Armação do Sul, *Rohr* 654 (LIL). Canavieiras, *Reitz* 4264 (HBR). Mun. Itajaí: Cabeçudas, *Reitz* (HBR); 3682-a (HBR, US). Mun. São Francisco do Sul: Itapema, *Hoehne* (GH, SP). Praia Grande, *Reitz* 3837 (! Reitz). Mun. São José: Mainland opposite Desterro [Florianópolis], *Schenk* 456 (! Mez, type of *Dyckia catharinensis* var. *dentata* Wittm.).

RIO GRANDE DO SUL: *Sellow* (R).

9b. ***Dyckia encholirioides*** var. ***rubra*** (Wittm.) Reitz, Anais Bot. Herb. Barbosa Rodrigues 3: 108. 1951.

Dyckia rubra Wittm. Bot. Jahrb. 13, Beibl. 29: 16. 1891.

SANTA CATARINA: Laguna, *Reitz* 4027 (HBR); *Reitz & Klein* 47 (HBR); *Smith & Reitz* 5970 (US). Mun. Florianopolis: Desterro [Florianopolis], Ilha de Santa Catarina, *Schenk* 619 (? herb., type). Mun. Imarui: Vila Nova to Mirim, *Reitz* 3700 (HBR). Mun. Palhoça: Campo de Massiambu, *Reitz & Klein* 974 (! Reitz). Paulo Lopes, *Reitz & Klein* 38 (HBR).

10. ***Dyckia burchellii*** Baker, Handb. Bromel. 131. 1889.

GOIÁS: Between Conceição and Natividade, *Burchell* 8178 (K, type; BR).

11. ***Dyckia orobanchoides*** Mez in Mart. Fl. Bras. 3, pt. 3: 475. 1894.

BRAZIL: *Tamberlik* (W, type).

12. ***Dyckia biflora*** Mez in Mart. Fl. Bras. 3, pt. 3: 486. 1894.

MINAS GERAIS: Serra do Cipó, *Glaziou* 19919 (B, type, F. neg. 11428); *Schwacke* 8410 (! Mez). Mun. Diamantina: Guinda, *Mello Barreto* 9519 (R).

13. ***Dyckia remotiflora*** Otto & Dietr. Allg. Gartenz. 1: 129. 1833.

1. Floral bracts and upper scape-bracts with broad apiculate summits.
   2. Sepals cucullate, 8–10 mm. long; petals 17–23 mm. long. Var. a. **remotiflora**
   2. Sepals nearly or quite straight, 6–8 mm. long; petals 11–17 mm. long. Var. b. **montevidensis**
1. Floral bracts and upper scape-bracts acuminate..... Var. c. **angustior**

13a. ***Dyckia remotiflora*** var. ***remotiflora.***

Dyckia rariflora sensu Lindl. Bot. Reg. 21: *pl. 1782.* 1836. Not Schult. f. 1830.

Dyckia rariflora var. *"D. remotiflora"* Baker, Handb. Bromel. 132. 1889.

Dyckia rariflora var. *cunninghami* Baker, Handb. Bromel. 132. 1889.

MINAS GERAIS: Mun. Ituiutaba: São Vicente, *Macedo* 1286 in part (SP).

SÃO PAULO: Araraquara, *Loefgren* (SP). Piraçununga, *Rachi-d* (SP, inflorescence with one lateral branch).

PARANÁ: *Miers* 2518 (BM).

ALSO: URUGUAY, ARGENTINA.

13b. ***Dyckia remotiflora*** var. ***montevidensis*** (C. Koch) L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 108. 1943.

Dyckia montevidensis C. Koch, Ind. Sem. Hort. Berol. for 1873, App.: 4. 1874.

Dyckia rariflora var. *"D. montevidensis"* Baker, Handb. Bromel. 132. 1889.

Dyckia rariflora var. *montevidensis* Baker ex Hauman & Vanderveken, An. Mus. Nac. Hist. Nat. Buenos Aires 29: 239. 1917.

BRAZIL: *Sellow* Bromel. 43 (P); 46 (US); 48 (P); 53 (P); 57 (P).

RIO GRANDE DO SUL: *Gaudichaud* 278 (P). Rio Irapuá, east of Caçapava, *Sellow* 3247 (B, F neg. 11442). Serra dos Tapes, Cascata, *Lindman* A-935 (S). Pôrto Alegre, *Eugenio* 130 (R); 218 (SP); 2490 (GH); *Jürgens* 356 (US); *Palacios & Cuezzo* 656 (LIL).

ALSO: URUGUAY, PARAGUAY, ARGENTINA.

13c. ***Dyckia remotiflora*** var. ***angustior*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 108. 1943.

BRAZIL: Cultivated at Berlin, *Hennings* (B, F neg. 11425).

RIO GRANDE DO SUL: Salto Alegre, *Bornmueller* 351 (GH, type).

14. ***Dyckia vaginosa*** Mez in Mart. Fl. Bras. 3, pt. 3: 490. 1894.

Dyckia rariflora sensu Graham, Bot. Mag. 62: *pl. 3449.* 1835. Not Schult. f. 1830.

SÃO PAULO: Serra do Picu, *Glaziou* 15497 (B, type, F neg. 11453).

RIO GRANDE DO SUL: *Sellow* Bromel. 305 (R).

ALSO: URUGUAY.

Possibly not more than a variety of *Dyckia remotiflora* Otto & Dietr.

15. ***Dyckia choristaminea*** Mez, Repert. Sp. Nov. Fedde 16: 71. 1919.

RIO GRANDE DO SUL: Cultivated in Berlin, *Malme* (B, type). Pôrto Alegre, *Lindman* A-439 (S); *Eugenio* 2249 (GH); *Rambo* (Anchieta, US).

16. ***Dyckia brevifolia*** Baker in Saund. Ref. Bot. 4: *pl. 236.* 1871.

Dyckia sulphurea C. Koch, Ind. Sem. Hort. Berol. for 1873, App. 4: 3. 1874.

Dyckia princeps Hort. ex Mez in Mart. Fl. Bras. 3, pt. 3: 493. 1894. In part, not Lem. 1853.

Dyckia gemellaria E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3: 494. 1894.

BRAZIL: Cultivated, *Atkinson* 29 (GH); 30 (GH); *Bailey* (BH); *Hennings* (B, F neg. 11450); *E. Morren* (LG, type of *Dyckia gemellaria* E. Morr., GH neg. 2830).

MINAS GERAIS: *Saint-Hilaire* (! Mez).

DISTRITO FEDERAL: Rio de Janeiro, cultivated ?, *Glaziou* 331 (! Mez).

SÃO PAULO: São Paulo, *Glaziou* 15496 (K, GH neg. 2544).

SANTA CATARINA: Blumenau, *F. Mueller* (! Mez). Salto, Blumenau, *Reitz* 3707 (HBR, US). Rio Itajaí Açu, Encano to Indaial, *Reitz* 3988 (HBR, US).

17. ***Dyckia hilaireana*** Mez in DC. Monogr. Phan. 9: 530. 1896.

MINAS GERAIS: *Saint-Hilaire* 924 (P, type, GH neg. 3011). Serra do Cipó, *A. P. Duarte* 2135 (RB, US neg. 3348).

18. ***Dyckia heloisae*** L. B. Smith, p. 26, fig. 16.

MINAS GERAIS: Mun. Jaboticatubas: Serra do Cipó, 5 km. north of Chapeu de Sol, *L. B. Smith & Mus. R* 6698 (US, type, R).

19. ***Dyckia argentea*** Mez in Mart. Fl. Bras. 3, pt. 3: 492. 1894.

MINAS GERAIS: São João del Rei, *Glaziou* 17279 in part (C ! Mez); 17280a (B, type, F neg. 11427).

20. ***Dyckia tuberosa*** (Vell.) Beer, Bromel. 157. 1857.

1. Floral bracts shorter than the flowers and usually shorter than the sepals, lance-triangular. ..... Var. a. **tuberosa**

1. Floral bracts exceeding the lowest flowers, narrowly triangular. Var. b. **deltoidea**

20a. ***Dyckia tuberosa*** var. ***tuberosa.*** FIGURE 17.

Tillandsia tuberosa Vell. Fl. Fluminensis 135. 1825; Icon. 3: *pl. 136.* 1835.

Dyckia coccinea Mez in Mart. Fl. Bras. 3, pt. 3: 491. 1894.

MINAS GERAIS: Carmo do Rio Claro, *Mello Filho* 628 (R). Mun. Ouro Preto: Casa Branca, *Williams* 8121 (GH).

FIG. 15.

FIG. 16.

FIG. 15.—*Dyckia encholirioides* var. *encholirioides: a,* Leaf-blade, × 1/10; *b,* inflorescence, × 1/10; *c,* flower, × 1; *d,* sepal, × 1; *e,* petals and stamens, × 1.

FIG. 16.—*Dyckia heloisae: a,* Habit, × 1/10; *b,* flower and capsule, × 1; *c,* seed, × 2.

SÃO PAULO: Atibaia, *Foster* 348 (GH). Campinas, *Viegas* (GH, IAC); *Viegas & Lima* (IAC). Campo Grande, *Edwall* (SP). Itirapina, *Toledo & Gehrt* (GH, SP). Santo Amaro, *Krieger* 182 (SP). São José dos Campos, *Loefgren* (S). Serra da Cunha, *Kuhlmann & Gehrt* (GH, SP). Mun. São Paulo: Bosque da Saude, *Brade* 5926 (S). Ipiranga, *Luederwaldt* (SP, GH neg. 7166); *Hoehne* (GH, SP). Jabaquára, *Brade* (SP). São Paulo, *Sellow* E-23 (B, type of *Dyckia coccinea* Mez, F neg. 11430); *Pickel* 5479 (US); *Tamandaré* 196 (RB). Vila Ema, *Brade* (GH, SP). Vila Mariana, *Usteri* (SP).

PARANÁ: Morungava, *Dusén* 16522 (S). Turma 23, *Jönsson in Dusén* 1323a (S). Mun. Palmeira: Rio do Salto, *Hatschbach* 2620 (US).

SANTA CATARINA: Curitibanos, *Reitz* 4673 (HBR).

At first glance it seems inconsistent to associate a Vellozo name with a

species that has not been recorded from the state of Rio de Janeiro. However, Vellozo collected around Pharmacópolis (now Parati) so that the collection of Kuhlmann and Gehrt from the Serra da Cunha in São Paulo could be a topotype.

20b. ***Dyckia tuberosa*** var. ***deltoidea*** (L. B. Smith) L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 2: 119. 1950.

Dyckia coccinea var. *deltoidea* L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 107. 1943.

PARANÁ: Jaguariaíva, *Dusén* 10373 (BM, K, NY, S); 17357 (GH, type; S).

21. ***Dyckia ferruginea*** Mez in DC. Monogr. Phan. 9: 533. 1896.

MATO GROSSO: Jacobina, *Kuntze* (NY, type). Mun. Aquidauana: Camizão, *Foster* 1082 (GH, US).

22. ***Dyckia simulans*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 108, *pl. 110.* 1943.

MINAS GERAIS: Pico da Piedade, Belo Horizonte, *Foster* 570 (GH, type, US neg. 4055).

23. ***Dyckia trichostachya*** Baker, Handb. Bromel. 133. 1889.

Dyckia micracantha Baker, Handb. Bromel. 135. 1889.

MINAS GERAIS: *Sellow* Bromel. 59 (P, type, GH neg. 3002); *Sellow* 1097 (B, type of *Dyckia micracantha* Baker, F neg. 11452). Itacolomi, *Lauro* (R).

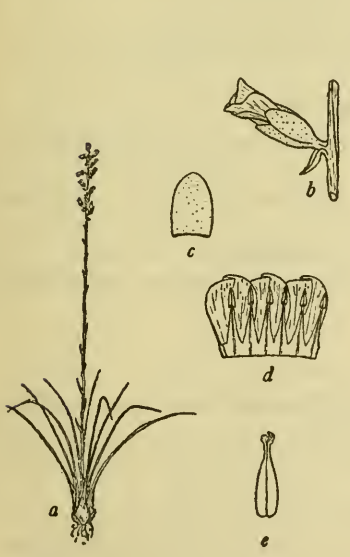

FIG. 17.

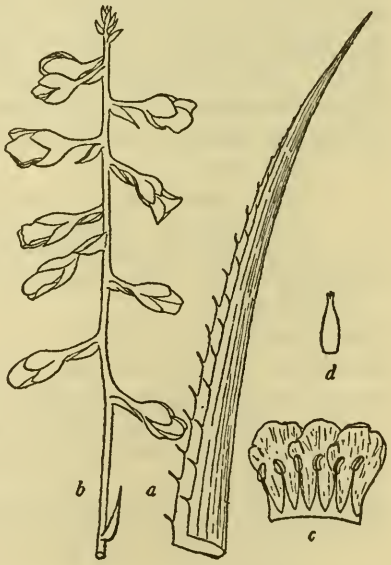

FIG. 18.

FIG. 17.—*Dyckia tuberosa* var. *tuberosa: a,* Habit, × 1/10; *b,* flower, × 1; *c,* sepal, × 1; *d,* petals and stamens, × 1; *e,* pistil, × 1.

FIG. 18.—*Dyckia macedoi: a,* Leaf-blade, × 1; *b,* inflorescence, × 1; *c,* petals and stamens, × 2; *d,* pistil, × 2.

24. ***Dyckia eminens*** Mez, Bot. Jahrb. 30, Beibl. 67: 5. 1901.
GOIÁS: *Glaziou* 22192a (B, type).
Not verified. Characters dubious because the original description is self-contradictory. According to the measurements the lower floral bracts exceed the flowers.

25. ***Dyckia frigida*** (Linden) Hook. f. Bot. Mag. 103: *pl. 6294.* 1877.
Pourretia frigida Linden, Catal. No. 8: 31. 1853.
BRAZIL: Cultivated, *E. Morren* (LG type collection?).
PARANÁ: Ponta Grossa, *Dusén* (S). Vila Velha, *Dusén* 2801 (R); 4059 (R); 14936 (S); 15829 (S); *Foster* 417 (GH); *M. Kuhlmann* (SP, US).

26. ***Dyckia elata*** Mez in DC. Monogr. Phan. 9: 508. 1896.
MINAS GERAIS: Serra de Antonio Pereira, *Schwacke* 8739 (B, type, F neg. 11432).

27. ***Dyckia sordida*** Baker, Handb. Bromel. 132. 1889.
MINAS GERAIS: Itambé, *Saint-Hilaire* 402 (P, type, GH neg. 3004). Serra do Cipó, *Duarte* 2106 (RB, US neg. 3350); *Foster* 623 (G, US).

28. ***Dyckia macedoi*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 2: 195. 1952. FIGURE 18.
MINAS GERAIS: Lagoa Santa, *Pires & Black* 2887 (IAN). Mun. Conceição do Mato Dentro: Serra do Cipó, *Macedo* 2974 (US, type, US neg. 3651).

29. ***Dyckia linearifolia*** Baker, Handb. Bromel. 131. 1889.
MINAS GERAIS: *Saint-Hilaire* 1010 (P, type, GH neg. 3010).

30. ***Dyckia elongata*** Mez in DC. Monogr. Phan. 9: 529. 1896.
BRAZIL: *Sellow* 58 (P, GH neg. 2989).
BAÍA: Milagres to Maracás, *Foster* 2439 (US).

31. ***Dyckia distachya*** Hassler, Ann. Conserv. & Jard. Bot. Genève 20: 308. Feb. 1919.
Dyckia distachya forma *induta* Hassler, Ann. Conserv. & Jard. Bot. Genève 20: 309. Feb. 1919.
Dyckia interrupta Mez, Repert. Sp. Nov. Fedde 16: 70. Nov. 1919.
SANTA CATARINA: Mun. Concordia: Estreito do Uruguai, *Reitz* 3818-a (HBR, US).
ALSO: PARAGUAY, ARGENTINA.

32. ***Dyckia horridula*** Mez, Bot. Jahrb. 30, Beibl. 67: 5. 1901.
GOIÁS: Near Goiás, *Burchell* 6791 (K). Rio Descoberto, near Capelinha, *Glaziou* 22194 (B, type (F neg. 11435), K).
MATO GROSSO: São Jeronimo, *Lindman* 2707b (S). Serra das Araras, *Lindman* 2707c (S).

33. ***Dyckia princeps*** Lem. Jard. Fleur. 3: *pls. 224, 225.* 1853.
Dyckia altissima sensu Baker, Handb. Bromel. 134. 1889. In part, not Lindl.
MINAS GERAIS: Described from material cultivated in Brussels. Apparently no specimens preserved.

34. ***Dyckia cinerea*** Mez in Mart. Fl. Bras. 3, pt. 3: 469. 1894.
BRAZIL: *Glaziou* 18570 (B, type (F neg. 11429), K).

35. ***Dyckia fosteriana*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 107, *pl. 106.* 1943.

PARANÁ: Mun. Campo Largo: Serra São Luiz de Puruna, *Foster* 1154 (GH, type, US neg. 4098); 2526 (US); *Hatschbach* 1567 (US).

By error the type locality was given originally as "Santa Catarina."

36. ***Dyckia schwackeana*** Mez in Mart. Fl. Bras. 3, pt. 3: 478. 1894.

MINAS GERAIS: Pico de Itabira do Campo, *Glaziou* 18572 (B, F neg. 11448); *Schwacke* (R); *Schwacke* 5857 (B, type).

37. ***Dyckia densiflora*** Schult. f. in R. & S. Syst. 7, pt. 2: 1194. 1830.

MINAS GERAIS: Morro da Vila Rica (near Ouro Preto), *Martius* (M, type).

Not verified but see Mez in Mart. Fl. Bras. 3, pt. 3: *pl. 90, fig. 2.*

38. ***Dyckia dusenii*** L. B. Smith, Contr. Gray Herb. 98: 6, *pl. 2.* 1932.

PARANÁ: Pôrto Amazonas, *Dusén* 18081 (S, type). Serrinha, *Dusén* 8686, 8996 (S). Tamandaré, *Jönsson ex Dusén* 1029a (GH, S).

39. ***Dyckia minarum*** Mez in Mart. Fl. Bras. 3, pt. 3: 483, *pl. 91.* 1894. FIGURE 19.

BRAZIL: *Sellow* Bromel. 46 (P); 55 (P); 56 (P); *Weir* (K); *Widgren* (S).

ESPÍRITO SANTO: Serra da Caparao, *Mexia* 4082-a (UC).

MINAS GERAIS: *Claussen* 148 (P); *Mosén* 4443 (S). Barbacena, *Glaziou* 18571 (K). Belo Horizonte, *Hoehne* (SP). Serra do Curral, Belo Horizonte, *Foster* 675 (GH). Serra de Rola Moça, Belo Horizonte, *Foster* 530 (GH). Nova Lima to Belo Horizonte, *Mello Barreto* 4909 (R). Caldas, *Regnell* II-283 (S, US); III-529 (S). Serra de Caparao, *Brade* 16983 (RB, US). Serra São José [João] del Rei, *Glaziou* 17279 (K). São João del Rei, Lindman A-55 (S); A-57 (S); A-59 (S); A-59½ (S); A-61 (S); A-61½ (S). Serra de Lenheiro, *Glaziou* 17280 (K). Serra da Piedade, *Hoehne* 6428 (R). Mun. Baipendi: São Tome das Letras, *Brade & Apparicio* 20479 (RB).

GOIÁS (?): *Glaziou* 22192-a (K).

SÃO PAULO: Pedra Grande, Atibaia, *Gehrt* (SP).

SANTA CATARINA: Campo Alegre, *Reitz* 3765 (HBR); 3912 (HBR).

40. ***Dyckia reitzii*** L. B. Smith, Anais. Bot. Herb. Barbosa Rodrigues 2: 14, *pls. 1–3.* 1950.

SANTA CATARINA: Campo dos Padres, *Reitz* 2690 (US, type (US neg. 3516), HBR).

41. ***Dyckia lagoensis*** Mez in Mart. Fl. Bras. 3, pt. 3: 483. 1894.

MINAS GERAIS: Lagoa Santa, *Warming* 2171 (C, type, F neg. 22328).

42. ***Dyckia consimilis*** Mez in Mart. Fl. Bras. 3, pt. 3: 479, *pl. 90.* 1894.

MINAS GERAIS: *Weddell* 1407 (P, type, GH neg. 2991). Pico de Itabira do Campo, *Glaziou & Schwacke* 17822 (P); *Palacios, Balegno & Cuezzo* 3891 (LIL, US neg. 3310).

43. ***Dyckia rariflora*** Schult. f. in R. & S. Syst. 7, pt. 2: 1195. 1830.

MINAS GERAIS: *Handro* (SP). Ouro Preto to Sorocaba (São Paulo), *Martius* (M, type, F neg. 8631). Serra de Ouro Preto, *Ule* (R, US neg. 3603); 2434 (! Mez). Mun. Jaboticatubas: Serra do Cipó, Chapeu de Sol, *Smith & Mus. R* 7065 (US).

44. ***Dyckia pseudococcinea*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 108, *pl. 109, fig. 1.* 1943.

Rio de Janeiro: *Foster* 1144 (GH, type, US neg. 4054).

São Paulo: Atibaia, *Foster* 348 in part (R).

45. ***Dyckia dissitiflora*** Schult. f. in R. & S. Syst. 7, pt. 2: 1194. 1830.

Piauí: Serra do Brejo, *Luetzelburg* (! Mez).

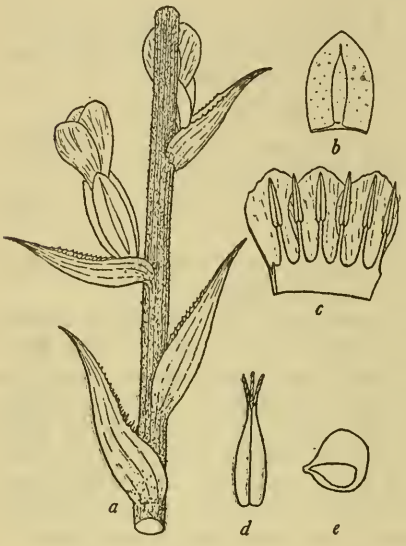

Fig. 19.

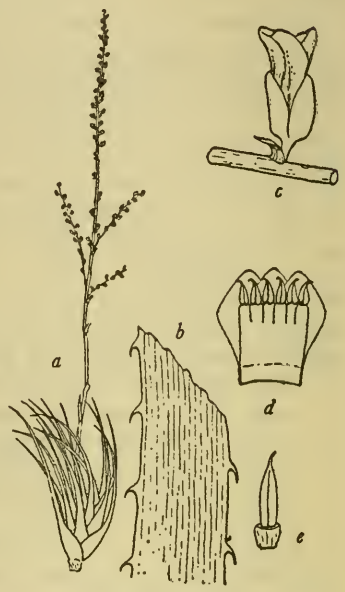

Fig. 20.

Fig. 19.—*Dyckia minarum: a,* Section of inflorescence (After Flora Brasiliensis), × 1; *b,* sepal, × 1; *c,* petals and stamens, × 1; *d,* pistil, × 1; *e,* seed, × 5.

Fig. 20.—*Dyckia weddelliana: a,* Habit, × 1/20; *b,* section of leaf, × 1; *c,* flower, × 1; *d,* petals and stamens, × 1; *e,* pistil, × 2.

Baía: Joazeiro, Rio São Francisco, *Luetzelburg* (! Mez). Serra da Lapa, Rio São Francisco, *Luetzelburg* (! Mez). Sincorá, *Martius* (M, type, F neg. 8630).

Minas Gerais: Lagoa Santa, *Warming* 2171[2] (! Mez).

46. ***Dyckia warmingii*** Mez in Mart. Fl. Bras. 3, pt. 3: 481. 1894.

Minas Gerais: Lagoa Santa, *Hoehne* ex *Rondon* 6363 (R, old specimen, determination uncertain); *Warming* (C, type, F neg. 22329).

Macbride's photograph indicates that some large bracts from some genus other than *Dyckia* are mixed with the type.

47. ***Dyckia bracteata*** (Wittm.) Mez in Mart. Fl. Bras. 3, pt. 3: 470. 1894.
Dyckia dissitiflora var. *bracteata* Wittm. Bot. Jahrb. 13, Beibl. 29: 16. 1891.

Minas Gerais: Serra do Ouro Branco, *Schenck* 3510 (LZ, type).

48. ***Dyckia niederleinii*** Mez in Mart. Fl. Bras. 3, pt. 3: 474. 1894.
Dyckia missionum Mez in Mart. Fl. Bras. 3, pt. 3: 477. 1894.
Dyckia missionum var. *breviflora* Hassler, Ann. Conserv. & Jard. Bot. Genève 20: 316. 1919.
BRAZIL: Probable, but not yet recorded.
ARGENTINA: Sierra de Santa Ana, Territorio de Misiones, *Niederlein* 229 in part (B, type, F neg. 11443); *Niederlein* 229 in part (B, type of *Dyckia missionum* Mez, F neg. 11441).

49. ***Dyckia lutziana*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 107, *pl. 107*. 1943.
BRAZIL: *Foster* 1144b (GH, type, US neg. 4099).

50. ***Dyckia saxatilis*** Mez in DC. Monogr. Phan. 9: 518. 1896.
MINAS GERAIS: Belo Horizonte, *Mello Barreto* 4085 (R). Serra da Cachoeira do Campo, *Schwacke* 8948 (B, type, F neg. 11447).
MATO GROSSO: Chapada, *Hochne in Rondon* 4545–4550 (R). Aricá, Cabeça de Boi (near Cuiabá), *Hoehne in Rondon* 3545–3547 (R, US neg. 3601).

51. ***Dyckia maracasensis*** Ule, Bot. Jahrb. 42: 197. 1908.
BAÍA: Maracás, *Foster* 2459 (US); *Ule* 7019 (B, type, F neg. 11439).

52. ***Dyckia uleana*** Mez in DC. Monogr. Phan. 9: 517. 1896.
GOIÁS: Mossamedes, *Ule* 510 (R, US neg. 3604); *Ule* 3134 (Type. In hb. Taubert according to Mez, in Manaus according to Ule).

53. ***Dyckia sellowiana*** Mez in DC. Monogr. Phan. 9: 520. 1896.
RIO GRANDE DO SUL (?): *Sellow* Bromel. 52 (P, type, GH neg. 3005).

54. ***Dyckia weddelliana*** Baker, Handb. Bromel. 132. 1889. FIGURE 20.
BRAZIL: *Weddell* 2584 (P, type, GH neg. 3001).
MINAS GERIAS: Mun. Ituiutaba: Santa Terezinha, *Macedo* 1673 (US); 2200 (US).

55. ***Dyckia racemosa*** Baker, Handb. Bromel. 132. 1889.
GOIÁS: Arraias, *Gardner* 4015 (K, type, K neg.).

10. *Navia* Mart. ex Schult. f.

Navia Mart. ex Schult. f. in R. & S. Syst. 7, pt. 2: p. lxv, 1195. 1830. The name proposed for conservation, cf. Arquiv. Bot. Estado São Paulo n. ser. 2: 197. 1952.

Mountains and hills along the northern rim of the Amazon Basin in Colombia, Venezuela, British Guiana, and Surinam.

1. Inflorescence elongate, interrupted..... 1. **N. caulescens**
1. Inflorescence densely capitate or glomerate.
2. Scape present, slender, covered by the subentire leaves; sepals 10 mm. long; petals yellow..... 2. **N. myriantha**
2. Scape lacking; inflorescence sessile in the center of the terminal leaves.
3. Sepals 50 mm. long; leaves entire with blades 23 mm. wide; petals rose-purple. (Fig. 21.)..... 3. **N. lopezii**
3. Sepals 4–19 mm. long; leaves serrulate with blades 6–15 mm. wide.
4. Inflorescence subglobose; leaf-blades flat, uniform.

5. Leaf-blades 6 mm. wide; sepals 4 mm. long..... 4. **N. acaulis**
5. Leaf-blades 15 mm. wide; sepals 19 mm. long... 5. **N. angustifolia**
4. Inflorescence subdigitate from numerous short spikes; leaf-blades with crisped margins and strongly marked median channel; sepals 8 mm. long..... 6. **N. crispa**

1. ***N. caulescens*** Mart. ex Schult. f. in R. & S. Syst. 7, pt. 2: 1195. 1830.
BRAZIL: Probable, but not yet recorded.
COLOMBIA: Serra de Araracoara, *Martius* (M, type). Cerro de Cupati, middle Rio Japura, *Ducke* (MG, US); *Schultes* 5859 (US).

2. ***Navia myriantha*** L. B. Smith ex R. E. Schultes, Bot. Mus. Leafl. Harvard 15: 41. 1951.
AMAZONAS: Serra Dimití, upper Rio Negro, *R. E. Schultes & F. López* 9955 (US, type).

3. ***Navia lopezii*** L. B. Smith ex R. E. Schultes, Bot. Mus. Leafl. Harvard 15: 40. 1951. FIGURE 21.
AMAZONAS: Serra Dimití, upper Rio Negro, *R. E. Schultes & F. López* 9956 (US, type).
ALSO: VENEZUELA.

4. ***Navia acaulis*** Mart. ex Schult. f. in R. & S. Syst. 7, pt. 2: 1196. 1830.
BRAZIL: Probable, but not yet recorded.
COLOMBIA: Serra de Araracoara, upper Rio Japura, *Martius* (M, type).

5. ***Navia angustifolia*** (Baker) Mez in DC. Monogr. Phan. 9: 553. 1896.
Cryptanthus angustifolius Baker, Handb. Bromel. 15. 1889.
BRAZIL: Probable, but not yet recorded.
BRITISH GUIANA: Marima (Maringma), *Appun* 1055 (K, type, GH neg. 1373).

6. ***Navia crispa*** L. B. Smith, Phytologia 4: 378, *pl. 1, figs. 1–3.* 1953.
AMAZONAS: Rocky ground at foot of serra, Tunui, Rio Içana, *Pires* 725 (IAN, US).
ALSO: VENEZUELA.

11. *Tillandsia* L.

Tillandsia L. Sp. Pl. 286. 1753.

Southeastern United States to northern Argentina and Chile.

1. Stamens equaling the petals or shorter.
2. Sepals symmetric, or if slightly asymmetric then ovate or lanceolate and broadest below the middle.
3. Stamens appearing in the throat of the corolla; style slender, much longer than the ovary.
4. Filaments straight; flowers distichous in all Brazilian species. (Fig. 23.)
5. Stamens only a little shorter than the narrow suberect entire petal-blades. ..... Subgenus **Allardtia**
6. Inflorescence 3 dm. long or more, laxly paniculate; species of northern and northwestern Brazil.
7. Leaf-blades ligulate, broadly acute; spikes not over 9 cm. long; floral bracts imbricate, carinate, 2 cm. long..... 1. **T. duidae**

7. Leaf-blades narrowly triangular, acuminate; spikes elongate.
8. Floral bracts imbricate, 2 cm. long; spikes to 15 cm. long in the Brazilian variety of the species..... 2. **T. elongata**
8. Floral bracts not imbricate, much less than twice the length of the internodes, 5 cm. long; lateral spikes to 55 cm. long. (Fig. 22.)..... 3. **T. adpressiflora**

6. Inflorescence less than 3 dm. long, densely to laxly paniculate or simple; floral bracts imbricate.
9. Inflorescences numerous in the leaf-axils, always simple; leaf-blades ligulate, broadly acute or subobtuse; floral bracts imbricate, exceeding the 10–15 mm. long sepals. 4. **T. complanata**
9. Inflorescence single, terminal, simple or compound; leaf-blades narrowly triangular, acuminate.
10. Primary bracts conspicuous, the lower ones nearly or quite equaling the axillary spikes; inflorescence very dense; leaf-blades 30–40 mm. wide; floral bracts carinate; sepals 18–20 m. long, much connate posteriorly... 5. **T. turneri**
10. Primary bracts much shorter than the axillary spikes or else the inflorescence simple; leaf-blades 5–20 mm. wide.
11. Leaves covered with conspicuous spreading scales especially along the margins; floral bracts 20–25 mm. long, nearly or quite glabrous, ecarinate..... 6. **T. lorentziana**
11. Leaves covered with appressed or subappressed scales; floral bracts 11–20 mm. long, usually densely lepidote.
12. Plant stemless; inflorescence compound, fan-shaped with all the spikes in one plane; leaf-blades 6–20 mm. wide; floral bracts ecarinate. (Fig. 23.) 7. **T. didisticha**
12. Plant with a stem up to 14 cm. long; inflorescence simple; leaf-blades 5 mm. wide..... 8. **T. dura**

5. Stamens barely exceeding the claws of the petals; petal-blades spreading, broad, crenate-serrate; inflorescence simple; sepals to 42 mm. long in the Brazilian species..... **Subgenus Aërobia** 9. **T. xiphioides**

4. Filaments more or less transversely plicate or widened toward their apices; inflorescence dense, often simple with the flowers in more than 2 ranks; leaf-blades narrowly triangular or sometimes linear. (Figs. 24, 25.)..... **Subgenus Anoplophytum**
13. Inflorescence compound; flowers in 2 ranks on the spikes.
14. Floral bracts densely imbricate and concealing the rhachis, exceeding the 10–14 mm. long sepals; leaf-blades narrowly triangular, 15–20 mm. wide, coarsely cinereous-lepidote. 10. **T. gardneri**
14. Floral bracts separate and disclosing almost the whole rhachis.
15. Leaf-scales coarse, spreading; leaves 9 cm. long, 10–15 mm. wide, without a distinct sheath; sepals 16 mm. long, the posterior ones connate for 10 mm..... 11. **T. brachyphylla**
15. Leaf-scales appressed; leaves about 10–20 cm. long; sepals 12–15 mm. long, the posterior ones short-connate.

16. Leaf-sheaths not distinct from the narrowly triangular blades; floral bracts shorter than the sepals. (Fig. 24.) 12. **T. geminiflora**

16. Leaf-sheaths distinct from the linear blades; floral bracts about equaling the sepals..... 13. **T. globosa**

13. Inflorescence simple; flowers usually in more than 2 ranks (only 2 in varieties of *T. pulchella* and *T. stricta*).

17. Sepals free or equally short-connate; plants generally stemless or short-caulescent (sometimes long-caulescent in *T. pohliana*).

18. Sepals glabrous, lanceolate or lance-ovate.

19. Leaves covered with coarse spreading scales, 3–4 cm. long. 14. **T. sprengeliana**

19. Leaves covered with appressed scales, 6–18 cm. long.

20. Scape very short, hidden by the leaves; leaves rigid, curved and often secund, acuminate but subpungent. 15. **T. rosea**

20. Scape evident; leaves flexible, not much curved, filiform-acuminate. (Fig. 25.)..... 16. **T. stricta**

18. Sepals lepidote.

21. The sepals coriaceous, thick, suborbicular... 17. **T. pohliana**

21. The sepals membranaceous; lance-ovate. 18. **T. meridionalis**

17. Sepals much more highly connate posteriorly than anteriorly; plants in general strongly caulescent.

22. Leaf-blades slender (about 20 times as long as wide), or if robust then strongly secund, rather flexible; inflorescence few-flowered; petals white to pale blue.

23. Scape exceeding the short stout strongly secund leaves; petals to 30 mm. long..... 19. **T. araujei**

23. Scape usually shorter than the slender leaves; petals not over 20 mm. long..... 20. **T. pulchella**

22. Leaf-blades stouter (about 10 times as long as wide), scarcely if at all secund, 5–13 mm. wide, rigid; inflorescence 5–20-flowered; petals usually dark blue, 17–27 mm. long. 21. **T. aëranthos**

3. Stamens deeply included; style short and stout; leaf-blades narrowly triangular or linear in the Brazilian species. (Figs. 27, 28.)

24. Petal-blades broad, conspicuous; sepals 10–30 mm. long in the Brazilian species. (Fig. 27.)..... **Subgenus Phytarrhiza**

25. Scape completely covered by its bracts; leaves in more than 2 ranks.

26. Floral bracts 20–40 mm. long; inflorescence simple; plant stemless.

27. Flowers imbricate at and after anthesis.

28. Floral bracts coriaceous, glabrous, to 4 cm. long; inflorescence elliptic, 55 mm. wide; leaf-sheaths red-striate; leaf-blades 7–12 mm. wide. (Fig. 26.)..... 22. **T. anceps**

28. Floral bracts membranaceous, lepidote, about 2 cm. long; inflorescence narrowly lanceolate, 6–10 mm. wide; leaf-sheaths concolorous; leaf-blades 1–2 mm. wide. 23. **T. linearis**

27. Flowers spreading, not imbricate at anthesis; floral bracts coriaceous or subcoriaceous, 17 mm. long; rhachis alate-angled. ..... 24. **T. monadelpha**

26. Floral bracts not more than 12 mm. long; inflorescence usually compound; plant usually caulescent.

29. Leaf-scales subappressed; leaf-blades stout, spirally twisted; inflorescence much branched..... 25. **T. decomposita**

29. Leaf-scales spreading; leaf-blades slender, usually twisted only near their apices; inflorescence few-branched or even simple. (Fig. 27.)..... 26. **T. streptocarpa**

25. Scape naked or with 1 or 2 bracts which cover only a small part of it; leaves in 2 ranks.

30. Petals bright yellow; floral bracts to 20 mm. long, about equaling the sepals; leaf-blades 2–5 mm. in diameter, covered with narrow retrorse scales..... 27. **T. crocata**

30. Petals blue or purple; floral bracts 9 mm. long, much shorter than the sepals; leaf-blades 1–1.5 mm. in diameter, covered with broad subappressed scales; sepals 12.5 mm. long (distinction from *T. recurvata* in fruit)..... 28. **T. mallemontii**

24. Petal-blades narrow and inconspicuous; sepals 6–9 mm. long in the Brazilian species; inflorescence almost always simple; small plants with the appearance of coarse mosses. (Fig. 28.)

Subgenus Diaphoranthema

31. Leaves in many ranks; scape evident, covered with bracts.

32. Spike lax with a geniculate axis, to 4 cm. long and 16-flowered; leaves 2–4 cm. long..... 29. **T. loliacea**

32. Spike dense with a straight axis, not more than 17 mm. long, 1–5-flowered; leaves 1 cm. long or rarely to 2 cm. 30. **T. tricholepis**

31. Leaves in 2 ranks; scape largely naked or else absent.

33. Stem usually shorter than the leaves and always covered by them; scape terminal, always evident; sepals not more than 9 mm. long (distinction from *T. mallemontii* in fruit). 31. **T. recurvata**

33. Stem to 8 m. long, exposed between the leaves; scape almost none; flowers solitary on short pseudo-axillary branches. (Fig. 28.) ..... 32. **T. usneoides**

2. Sepals asymmetric, nearly or quite free, broadest near the apex, not over 9 mm. long in the Brazilian species; inflorescence laxly bipinnate in the Brazilian species..... **Subgenus Pseudo-Catopsis**

34. Leaf-blades ligulate, rounded at the apex, usually with dark irregular cross-bands; floral bracts equaling the sepals; spikes dense. 33. **T. triticea**

34. Leaf-blades narrowly triangular, acuminate, concolorous; floral bracts usually shorter than the sepals; spikes lax.

35. Flowers erect or ascending; spikes erect; scape decurved; leaf-blades 8 mm. wide. (Fig. 29.)..... 34. **T. aëris-incola**

35. Flowers spreading; spikes spreading to reflexed; species of northern Brazil.

36. Scape-bracts much shorter than the internodes; primary bracts very short; leaf-blades 6 mm. wide..... 35. **T. jenmanii**
36. Scape-bracts about equaling the internodes; primary bracts about half as long as the spikes; leaf-blades to 20 mm. wide. 36. **T. caribaea**

1. Stamens longer than the petals, exserted; leaf-blades narrowly triangular or linear in the Brazilian species.....**Subgenus Tillandsia**
37. Leaf-sheaths nearly flat, their apices widely separated from the scape; floral bracts coriaceous or subcoriaceous.
38. Leaf-blades narrowly triangular, 10–30 mm. wide at the base; leaf-sheaths broad; floral bracts nearly or quite glabrous.
39. Spikes not more than 12 mm. wide; leaf-sheaths the same color as the blades except for their extreme bases which are pale-ferruginous; inflorescence usually compound..... 37. **T. polystachia**
39. Spikes to 4 cm. wide; leaf-sheaths dark castaneous at least toward the base.
40. Floral bracts pale, coriaceous, even or slightly nerved; sepals lanceolate, acute, connate posteriorly; inflorescence often compound. ..... 38. **T. fasciculata**
40. Floral bracts blackening when dry, probably fleshy in life; sepals elliptic, obtuse, free; inflorescence simple. .... 39. **T. kegeliana**
38. Leaf-blades linear-subulate, very narrow; leaf-sheaths narrow; floral bracts densely lepidote at least when young; sepals connate posteriorly.
41. Inflorescence usually shorter than the leaves, when simple its flowers in 2 ranks, when compound lax at least toward the base. 40. **T. tenuifolia**
41. Inflorescence usually equaling or exceeding the leaves, when simple its flowers in more than 2 ranks, when compound very dense with its bracts massed below it..... 41. **T. juncea**
37. Leaf-sheaths inflated and forming a pseudo-bulb, their apices enclosing the scape or the base of the inflorescence; floral bracts subcoriaceous to subchartaceous.
42. Upper scape-bracts merely apiculate; leaf-blades only curved; sepals free, ecarinate; petals red. (Fig. 30.)..... 42. **T. paraënsis**
42. Upper scape-bracts, or lacking an evident scape the lowest primary bracts, with long foliaceous blades; leaf-blades contorted; sepals more or less connate posteriorly; petals blue or purple.
43. Leaves covered with minute appressed scales; scape short but evident; inflorescence simple or digitate; spikes lanceolate; floral bracts 10–15 mm. long..... 43. **T. bulbosa**
43. Leaves covered with coarse spreading scales; scape not evident; inflorescence usually simple; spikes broad; floral bracts 20–26 mm. long. ..... 44. **T. pruinosa**

Subgenus *Allardtia* (A. Dietr.) Baker

1. ***Tillandsia duidae*** L. B. Smith, Bull. Torrey Bot. Club 58:340, *pl. 26, fig. 3* (*1–4*). 1931.

BRAZIL: Probable, but not yet recorded.

VENEZUELA: Mount Roraima, *Steyermark* 58998 (F, GH).

2. ***Tillandsia elongata*** H. B. K. Nov. Gen. & Sp. 1:293. 1816.

1. Spikes to 40-flowered, very long and slender..... Var. a. **elongata**
1. Spikes to 20-flowered, 15 cm. long, 12 mm. wide..... Var. b. **subimbricata**

2a. ***Tillandsia elongata*** var. ***elongata.***

Not recorded in or near Brazil.

FIG. 21.

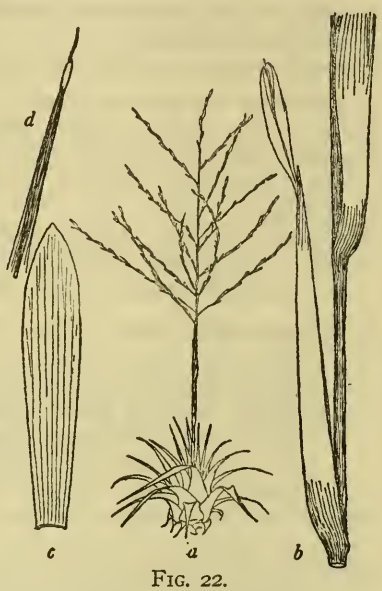

FIG. 22.

FIG. 21.—*Navia lopezii: a,* Habit, × 1/10; *b,* sepals, × 1; *c,* diagram of imbrication of sepals.

FIG. 22.—*Tillandsia adpressiflora: a,* Habit, × 1/40; *b,* section of spike, × 1; *c,* sepal, × 1; *d,* seed × 1.

2b. ***Tillandsia elongata*** var. ***subimbricata*** (Baker) L. B. Smith, Journ. Washington Acad. Sci. 43:68. 1953.

Tillandsia subimbricata Baker, Journ. Bot. 25:304. 1887.

Tillandsia orthorhachis Mez & C. F. Baker, Bull. Torrey Bot. Club 30: 435. 1903.

RIO BRANCO: Isla do Ajarani, *J. G. Kuhlmann* 391 (RB).

ALSO: MÉXICO (Yucatan), NICARAGUA, PANAMÁ, CUBA, JAMAICA, TRINIDAD, COLOMBIA.

3. ***Tillandsia adpressiflora*** Mez in DC. Monogr. Phan. 9:661. 1896. FIGURE 22.

AMAZONAS: Rio Juruá-Mirim, *Ule* 5618 (B (F neg. 11473), GH).

ALSO: SURINAM, VENEZUELA, PERÚ.

4. ***Tillandsia complanata*** Benth. Bot. Voy. Sulphur 173. 1846.

RIO BRANCO: Mount Roraima, *Ule* 8560 (MG, K).

ALSO: COSTA RICA and the WEST INDIES to BOLIVIA and BRITISH GUIANA.

5. ***Tillandsia turneri*** Baker, Journ. Bot. 26: 144. May 1888.
Tillandsia rhodocincta Baker, Journ. Bot. 26: 143. May 1888.
Tillandsia cornuaulti André, Énum. Bromél. 8. Dec. 1888.
Guzmania cornuaulti André ex Mez in DC. Monogr. Phan. 9: 925. 1896.
Tillandsia multifolia Mez, Repert. Sp. Nov. Fedde 12: 420. 1913.
Thecophyllum cornuaulti Mez in Engl. Pflanzenreich IV. 32: 423. 1935.
Rio Branco: Mount Roraima, *Ule* 8558 (B, type of *Tillandsia multifolia* Mez (F neg. 11515), K).
Also: British Guiana, Venezuela, Colombia.

6. ***Tillandsia lorentziana*** Griseb. Pl. Lorentz. in Goett. Abh. 19: 271. 1874.
Mato Grosso: Urucum, near Corumbá, *Foster* 1159 (GH).
Paraná: Mun. Ponta Grossa: Vila Velha, *Dusén* 2756 (R); 2810 (S); 7624 (S); 9528 (S); *Foster* 412 (GH, R); *M. Kuhlmann* (SP); *Paech* 5680 (HBR).
Rio Grande do Sul: Quarí, Jarau, *Rambo* (LIL). São Leopoldo, *Eugenio* 2211 (GH); *Rambo* (LIL).
Also: Paraguay, Bolivia, Argentina.

7. ***Tillandsia didisticha*** (E. Morr.) Baker, Journ. Bot. 26: 16. 1888. Figure 23.
Anoplophytum didistichum E. Morr. Belg. Hortic. 31: 164. 1881.
Tillandsia oranensis Baker, Handb. Bromel. 173. 1889.
Tillandsia crassifolia Baker, Handb. Bromel. 174. 1889.
Tillandsia goyazensis Mez, Bot. Jahrb. 30, Beibl. 67: 11. 1901.
Guzmania complanata Wittm. Mededell. Rijks Herb. 29: 92. 1916.
Goiás: Serra da Arruda, near Pireneos, *Glaziou* 22196 (K, isotype of *Tillandsia goyazensis* Mez, GH neg. 2726).
Mato Grosso: *Hoehne* (SP). Corumbá, *Foster* 1056 (GH). São Luiz de Cáceres, *Hoehne in Rondon* 556 (R).

8. ***Tillandsia dura*** Baker, Handb. Bromel. 168. 1889.
Distrito Federal: Morro do Archer, *Brade & Duarte* 18576 (RB). Serra da Carioca, *L. B. Smith* 1280 (BM, F, GH, K, US). Tijuca, *Glaziou* 11689 (P); 16460 (K, type (GH neg. 2633), US); *L. B. Smith* 2126 (B, GH, S).
São Paulo: Alto da Serra, *Smith & King* 1933 (GH). Ribeirão Pires, *Edwall* (GH, SP). São Paulo, *Krieger* 176 (SP). São Vicente, Santos, *Mosén* 3716 (S).
Santa Catarina: Pilões, Palhoça, *Reitz* 4259 (HBR, US); *L. B. Smith* 6207 (R, US); 6215a (R, RB, US).

Subgenus *Aërobia* Mez

9. ***Tillandsia xiphioides*** Ker, Bot. Reg. 2: *pl. 105.* 1816.
Rio Grande do Sul–Santa Catarina: Boundary near Colonia São Pedro, *A. R. Schultz* 767 (US).
Also: Uruguay, Paraguay, Argentina, Bolivia.

Subgenus *Anoplophytum* (Beer) Baker

10. ***Tillandsia gardneri*** Lindl. Bot. Reg. 28: sub *pl. 63.* 1842.
Tillandsia fluminensis Mez in Mart. Fl. Bras. 3, pt. 3: 591. 1894.
Tillandsia regnellii Mez in Mart. Fl. Bras. 3, pt. 3: 592, *pl. 110.* 1894.

Tillandsia cambuquirensis A. Silveira, Floralia Montium 2:27, *pl. 11, fig. 2.* 1931.

Tillandsia venusta A. Silveira, Floralia Montium 2:29, *pl. 12.* 1931.

PIAUÍ: Southern part of state, *Luetzelburg* (! Mez).

CEARÁ: *Alemão e Cysneiros* 1526 in part (R). Serra do Araripe, *Luetzelburg* (! Mez). Barra da Santa Rosa, *Luetzelburg* (! Mez).

PARAÍBA: Campina Grande to Caruaru (in Pernambuco), *Foster* 2423 (US).

BAÍA: Agua Preta, *Foster* 66 (GH). Bom Jesus do Rio de Contas, *Luetzelburg* (! Mez). Jacobina, *Foster* 101 (GH, R). Paramirim, *Luetzelburg* (! Mez).

ESPÍRITO SANTO: (Bananal) *Viana Freire* 49 (R).

MINAS GERAIS: Belo Horizonte, *Foster* 531 (GH). Caldas, *Mosén* 3989 (S); *Regnell* III-1798 (S, US isotypes of *Tillandsia regnellii* Mez). Passo Quatro, Rio Retiro, *Brade & Silva Araujo* 19071 (RB). Mun. Nova Lima: Lagoa Grande, *Williams & Assis* 5790 (GH). Fazenda de Mutuda, *Melo Barreto* 4910 (R). Mun. Santa Barbara: Caraça, *Foster* 687 (GH).

RIO DE JANEIRO: Campos, *Sampaio* 2913 (R); 8502 in part (R). Soberbo to Guapi, *L. B. Smith* 1534 (GH).

DISTRITO FEDERAL: Gavea, *Reitz* 4777 (! Reitz). Praia de Grumari, near Guaratiba, *Smith & Mus. R* 6535 (US, sterile). Jacarepaguá, *Ule* 4050 (R). Recreio de Bandeirantes, *Lutz* 615 (GH). Rio de Janeiro, *Andersson* (S); *Gardner* 134 (K, type, GH neg. 2725); *Widgren* (S). Tijuca, *Lindman* A-45 (S). Restinga da Tijuca, *Machado* (RB).

SÃO PAULO: Caraguatatuba, *Hoehne & Gehrt* (SP). Itirapina, *Gehrt* (GH, SP). Santos, *Mosén* 3717 (S). São Vicente, *L. B. Smith* 2095 (B, GH, S).

PARANÁ: Jacareí, *Dusén* 15405 (S).

SANTA CATARINA: Blumenau, *Reitz* 4059 (HBR). Canto Grande, Porto Belo, *Reitz* 3627 (HBR); 3657 (HBR). Itajaí, *Reitz* 4050 (HBR). Corupá, Jaraguá do Sul, *Reitz* 4038 (HBR). Sombrio, Araranguá, *Reitz* C-465 (GH, US).

RIO GRANDE DO SUL: Mun. Torres: Campo Bonito, *Reitz* 4424 (HBR).

ALSO: TRINIDAD, VENEZUELA, COLOMBIA.

11. ***Tillandsia brachyphylla*** Baker, Journ. Bot. 26:16. 1888.

Anoplophytum binotii E. Morr. ex Baker, Handb. Bromel. 200. 1889, nomen in synonymy.

BRAZIL: *Binot* (K, Morren Icones, type of *Anoplophytum binotii* E. Morr.).

RIO DE JANEIRO: Serra dos Orgãos, *Moura* (R, US neg. 4200).

DISTRITO FEDERAL: Gavea, *Frazão Armando* (RB, US); *Glaziou* 8018 (K, type, US neg. 3978); *Smith & Mus. R* 6431 (R, US).

12. ***Tillandsia geminiflora*** Brongn. in Duperrey Voy. Coquille 186. 1829.

1. Scales of the leaves closely appressed..... Var. a. **geminiflora**

1. Scales of the leaves spreading..... Var. b. **incana**

12a. ***Tillandsia geminiflora*** Brongn. var. ***geminiflora.*** FIGURE 24.

ESPÍRITO SANTO: (Bananal), *Viana Freire* 46 (R).

MINAS GERAIS: Caldas, *Mosén* 1945 (S); 4438 (S); *Regnell* I-282-a (S, US); I-282-b (S, US). São Miguel, *Mexia* 5239-a (GH, US). Mun. Conceição do Mato Dentro: Serra do Cipó, *Foster* 616 (GH). Mun. Santa Bárbara: Caraça, *Foster* 717 (GH).

Mato Grosso: Rio Jaurú, *Hoehne in Rondon* 889 (R); 928 (R); 929 (R); 930 (R). Palmeiras, *Lindman* A-2605 (S).

Rio de Janeiro: Nova Friburgo, *Lutz* 1015 (R). Petrópolis, *Foster* 38 (GH). Petrópolis to Raiz da Serra, *L. B. Smith* 1328 (GH). Teresópolis, *Duarte & Pereira* (RB).

Distrito Federal: Morro do Archer, *Brade & Duarte* 18577 (RB). Represa de Camorim, *Peckolt, Freire & Sampaio* (R). Corcovado, *Lindman* A-41 (S); *L. B. Smith* 1262 (B, BA, BM, F, GH, K, S, US). Jacarepaguá, *Hoehne* (SP). Pico do Papagaio, *Mello Filho & Dansereau* 375 (R). Tijuca, *Lindman* A-47 (S); A-51 (S). Vista Chineza, *Saldanha et al.* (R).

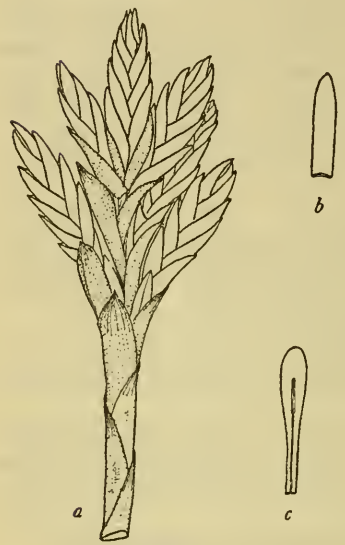

Fig. 23.

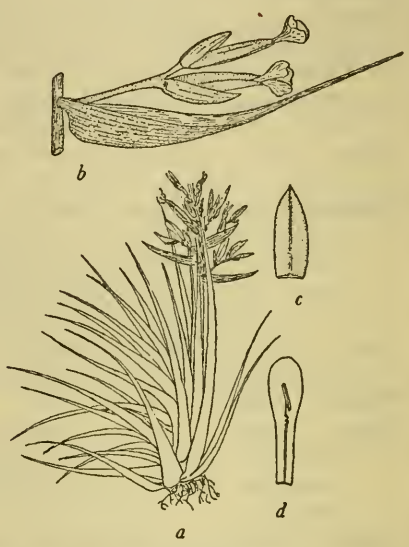

Fig. 24.

Fig. 23.—*Tillandsia didisticha: a,* Inflorescence, × ½; *b,* sepal, × 1; *c,* petal and stamen, × 1.

Fig. 24.—*Tillandsia geminiflora* var. *geminiflora: a,* Habit, × ¼; *b,* primary bract and spike, × 1; *c,* sepal, × 1; *d,* petal and stamen, × 1.

São Paulo: Alto da Serra, *Gehrt* (SP). Atibaia, *Duarte* (SP). Campinas, *Campos Novaes* 1203 (US); *Viegas* (SP). Campos do Jordão, *Hoehne* (SP). Serra de Caracol, *Mosén* 1732 (S). Itú, *Russel* (SP). Santo Amaro, *Krieger* 175 (SP). (Socorro), *Viegas & Zagato* (IAC). Sorocaba, Santos, *Mosén* 2984 (S); 3804 (S). Mun. São Paulo: *Handro* (SP). Butantan, *Hoehne* (GH, SP). Cidade Jardim, *Krug* (SP); *Smith & Kuhlmann* 1813 (GH). Ipiranga, *Luederwaldt* (SP). Jardim Botânico, *Handro* 364 (SP). Pirajussara, *Gehrt* (GH, SP).

Paraná: Curitiba, *Foster* 437-F (GH). Guaratuba, *Reitz* 4240 (HBR). Jaguariaíva, *Dusén* 10787 (S); 13243 (S); 15528 (GH, S, US). Pôrto de Cima, *Dusén* 8447 (S). Saquarema, *Stellfeld* 4261 (US). Mun. Ponta Grossa: Vila Velha, *Foster* 424 (GH); *M. Kuhlmann* (SP).

Santa Catarina: *D'Urville* (P, type, GH neg. 3033). Serra do Mirador, Taio, *Reitz* 3965 (HBR). Mun. Araranguá: Meleiro, *Reitz* C-57 (HBR); C-59 (GH, HBR). Sombrio, *Reitz* C-750 (GH, HBR, US); C-760 (HBR, US); 1509 (R). Mun. Brusque: Azambuja, *Reitz* 3028 (HBR, US); 3653 (HBR); 3683 (HBR); 3684 (HBR). Brusque, *Smith & Reitz* 5765 (US). Mun. Chapecó: Dionísio Cerqueira, *Reitz* 4285 (HBR). Mun. Itajaí: Praia Braba, *Reitz* 2306 (HBR). Mun. Jaraguá do Sul: Corupá, *Seidel* 35 (HBR). Mun. Palhoça: Campo de Massiambú, *Reitz* 1034 (! Reitz); 4939 (! Reitz).

Rio Grande do Sul: Pareci Novo, *Sehnem* 1448 (LIL). Pôrto Alegre, *Lindman* A-593 (S); *Rambo* (LIL). São Leopoldo, *Eugenio* 119 (R); 1895 (GH). Mun. Tôrres: Campo Bonito, *Reitz* 4415 (HBR).

Also: Paraguay, Uruguay, Argentina.

12b. ***Tillandsia geminiflora*** var. ***incana*** (Wawra) Mez in Mart. Fl. Bras. 3, pt. 3: 595. 1894.

Tillandsia incana Wawra, Oesterr. Bot. Zeitschr. 30: 223. 1880.

Rio de Janeiro: Itatiaia, *Wawra* II-508 (W, type).

Also: Uruguay (! Mez).

13. ***Tillandsia globosa*** Wawra, Oesterr. Bot. Zeitschr. 30: 222. 1880.

1. Inflorescence not more than bipinnate; spikes 2–3-flowered. Var. a. **globosa**

1. Inflorescence tripinnate; some of the spikes 4-flowered..... Var. b. **major**

13a. ***Tillandsia globosa*** var. ***globosa***.

Paraíba: Ipanargna, *Foster* 2415 (US).

Baía: *Blanchet* 1466 (S).

Espírito Santo: *Saint-Hilaire* B²-II-284 (P). Mun. Cachoeira do Itapemirim: *Foster* 162 (GH). Vargem Alta, *Foster* 906 (GH).

Rio de Janeiro: Entre Rios, *Wawra* 142-b (W, type); 142-c (W). Mauá, *Ule* 4067 (R).

Distrito Federal: Rio de Janeiro, *Gaudichaud* 360 (P); *Wilkes Expedition* . (GH, US). Tijuca, *Lindman* A-259 (S).

São Paulo: Bragança Paulista, *Pires* (SP, US). Cubatão, *L. B. Smith* 2036 (GH). São Sebastião, *Handro* 365 (SP, US). Sorocaba, Santos, *Mosén* 2983 (S).

Also: Venezuela.

13b. ***Tillandsia globosa*** var. ***major*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 114. 1943.

São Paulo: Rio Quilombo, near Santos, *Doering* (SP, type).

14. ***Tillandsia sprengeliana*** Kl. ex Mez in Mart. Fl. Bras. 3, pt. 3: 596. 1894.

Tillandsia brachyphylla Baker, Handb. Bromel. 200. 1889. In part, not as to type.

Brazil: *Freyreis* (S).

Espírito Santo: Vitória, *Foster* 503 (GH).

Rio de Janeiro: *Saint-Hilaire* B² 106 (B, type).

15. ***Tillandsia rosea*** Lindl. Bot. Reg. 16: *pl. 1357*. 1830.

Anoplophytum roseum (Lindl.) Beer, Bromel. 40. 1857.

Tillandsia recurvifolia Hook. Bot. Mag. 87: *pl. 5246*. 1861.

Tillandsia langsdorffii Mez in Mart. Fl. Bras. 3, pt. 3: 598. 1894.
Tillandsia pulchella var. *rosea* (Lindl.) Mez in Mart. Fl. Bras. 3, pt. 3: 603. 1894.

Brazil: Cultivated in England (type, not preserved).

Rio de Janeiro: *Langsdorff* (LE, type of *Tillandsia langsdorffii* Mez). Teresópolis, *Brade & Pereira* 20062 (RB, US).

16. ***Tillandsia stricta*** Soland. Bot. Mag. 37: *pl. 1529.* 1813.

1. Flowers polystichous..... Var. a. **stricta**
1. Flowers distichous..... Var. b. **disticha**

16a. ***Tillandsia stricta*** var. ***stricta.*** Figure 25.

Anoplophytum strictum var. *krameri* André, Rev. Hort. 60: 350. 1888.
Tillandsia krameri Baker, Handb. Bromel. 197. 1889.
Tillandsia meridionalis Baker, Handb. Bromel. 197. 1889. In part, not as to type.
Tillandsia stricta var. *krameri* Mez in Mart. Fl. Bras. 3, pt. 3: 600. 1894.

Brazil: *Arduino* 10 (LINN, GH neg. 2642); *Widgren* 1079 (S); cultivated (LG, type of *Tillandsia krameri* Baker; K, Morren Icon.).

Baía: Agua Preta, *Bondar* (SP); *Foster* 78 (GH, R). Salvador, *Torrend* (FFBahia).

Espírito Santo: Leopoldina, *Luetzelburg* (! Mez). Linhares, *Foster* 785 (GH). Santa Teresa, *Foster* 307 (GH). Vitória, *Foster* 202 (GH).

Minas Gerais: *Mosén* 1733 (S). Caldas, *Regnell* I-282-c in part (F, S); I-282-d in part (S). Caldas to Serra de Caracol, *Mosén* 4439 (S). Passa Quatro, *Sampaio* 6192 (R); 6193 (R). Sitio, *Sampaio* 248 (R). Vaccaria to Palacios, Serra do Cipó, *Foster* 633 (GH); 634 (GH). Mun. Caete: Serra Piedade, *Foster* 672 (GH). Mun. Jaboticatubas: Chapeu de Sol, Serra do Cipó, *Smith & Mus. R* 7064 (US). Mun. Nova Lima: Serra da Mutuca, *Williams & Assis* 6201 (GH, US). Mun. Sêrro: Bôca da Mata, *Williams & Assis* 7939 (GH).

Rio de Janeiro: Angra dos Reis, *M. Kuhlmann* 2651 (SP); *Luetzelburg* (! Mez). Atafona, *Sampaio* (R); 8046 (R); 8061 (R). Campos, *Sampaio* (R); 7803 (R); 7957 (R); 7958 (R); 8501 (R). Carmo, bank of Rio Paquequer, *Neves Armond* 126 (R). Iguaba Grande, *Rose & Russell* 20714 (US). Itatiaia, *Dusén* 2161 (S); *Foster* 145 (GH). Ilha de Marambaia, *Mello Filho & Santos* (R). (María), *Mus. R* 12 (NY). Marica, *Vidal* (R). Mauá, *Dusén* 232 (S); *Ule* (R). Restinga de Mauá, *Hemmendorff* 462 (S). Monte Alegre, *Vidal* 138 (R). Niteroi, *Foster* 108 (GH). Rio Paquequer, Serra dos Orgãos, *Brade* 16693 (RB). Soberbo to Guapi, *L. B. Smith* 1535 (F, GH). Suruí, *Foster* 329 (GH, R). Teresópolis, *Vasconcelos & Sampaio* 2523 (R); *Wille* (RB). Mun. Cabo Frio: Cabo Frio, *Neto, Glaziou & Schwacke* (R). Ponta do Gabriel, *Smith & Mus. R* 6651 (R, US). Praia do Pontal, *Smith & Mus. R* 6597 (R, US).

Distrito Federal: Campo Grande, *Parker* 1 (R). Serra da Carioca, *Smith & Vieira* 1294 (GH). Corcovado, *Lindman* A-43 (S). Ilha das Flores, *Parodi* (SP). Gavea, *Luetzelburg* (! Mez). Praia de Grumari, near Guaratiba, *Smith & Mus. R* 6537 (R, US); 6538 (R, US). Restinga de Jacarepaguá, *Ule* 4051 (R). Jardim Botânico, *Bailey* 36 (BH); 36-a (BH); 496 (BH); *Lindman* A-233 (S). Quinta da Boa Vista, *Lutz* 1290 (R); *Rente & Eunice* 49 (R); *Sampaio* (R). Ilha do Raimundo, *Vidal*

(R). Riachuelo, *Neves Armond* 291 (R). Rio de Janeiro, *Andersson* (S); *Lutz* (R); *Regnell* 213 (S); *Riedel* 45 (R); *Widgren* (S); *Wilkes Expedition* (GH, US). Praia de Sernambetiba, *Smith & Mus. R* 6824 (US). Tijuca, *Frazão* 52 (RB); *Smith & Brade* 2239 (GH). Tijuca to Jacarepaguá, *Cochran* (R, US). Restinga da Tijuca, *Machado* (RB). Estrada da Vista Chineza, *Occhioni* 42 (RB).

São Paulo: Boracéa, *Lima & da Silva* (SP). Boracéa to Salesópolis, *M. Kuhlmann* 1695 (SP); 2021 (SP). Bragança Paulista, *Duarte* 116 (GH, SP). Campinas, *Campos Novaes* 1203 (GH, SP); *Dedecca* (IAN). Campo Grande, *Loefgren* (GH, SP). Cubatão, *L. B. Smith* 2049 (B, BA, BM, F, GH, K, P, S, US). Santos, *Carvalho* (IAC); *Mosén* 3252 (R); *Regnell* 38 1/64 (S). São Vicente, *L. B. Smith* 2098 (GH). Mun. Amparo: Monte Alegre, *M. Kuhlmann* 262 (SP). Mun. São Paulo: *Handro* (SP). Bosque da Saude, *Hoehne* (SP). Butantã, *Hoehne* (SP). Serra da Cantareira, *Koscinski* 329 (SP). Ipiranga, *Luederwaldt* (SP). Source of Rio Ipiranga, *Hoehne* (SP). Pirajussára, *Gehrt in L. B. Smith* 1823 (GH, S); *Gehrt* (GH, SP). Santo Amaro, *Krieger* 173 (SP). Vila Ema, *Brade* 7202 (SP). Vila Friburgo, *Hauff* 34 (SP).

Paraná: Casino Aú, *Mattos* 4268 (US). Curitiba, *Dusén* 2411 (R); *Foster* g (GH); *Stellfeld* 1544 (US). Rio Marumbi, *Dusén* 14308 (S). Paranaguá, *Tessmann* (US). Serrinha, *Dusén* 7191 (S, US). Tibagi, *Reiss* 6 (GH, US); 55 (GH, US). Mun. Piraquara: Florestal, *Hatschbach* 1161 (US); *Tessmann* (US). Mun. Ponta Grossa: Vila Velha, *Dusén* 2764 (R); *Foster* 411 (GH, R); *M. Kuhlmann* (SP, US).

Santa Catarina: Florianópolis, *Reitz* 3908 (HBR). Itajaí, *Reitz* 3425-a (HBR). Laguna, *Reitz & Klein* 85 (HBR). São Francisco do Sul, *Reitz* 3902 (HBR). (Nova Teutonia), *Plaumann* 593 (RB). Mun. Araranguá: Serra do Pilão, *Reitz* 3425 (HBR). Sombrio, *Reitz* C-464 (GH); 3693 (HBR). Turvo, *Reitz* C-203 (GH, HBR); C-204 (GH, HBR); 828 (R). Mun. Bom Retiro: Figueiredo, *Reitz* 2869 (HBR, US). Mun. Brusque: Azambuja, *Reitz* 3656 (HBR). Brusque, *L. B. Smith* 5792 (US). Mun. Chapecó: Itapiranga, *Reitz* 4798 (! Reitz). Mun. Jaraguá do Sul: Corupá, *Seidel* 33 (! Reitz). Mun. Pôrto Belo: Canto Grande, *Reitz* 3602 (HBR, US); 3602-a (HBR); 3623 in part (HBR); 3628 in part (HBR); 3654 (HBR); 3655 (HBR). Mun São Joaquim: Urubici, *Reitz* 2908 (HBR, US); 2909 (HBR, US).

Rio Grande do Sul: Belem Nova, *Beetle* 1608 (US). Belem Nova, Rio Guaíba, *Palacios & Cuezza* 411 (LIL). Canoas, *Teodoro* 73 (US). Colonia Santo Angelo, *Lindman* A-1033 (S); A-1057 (S). Hamburger Berg, *Lindman* A-575 (S). Nova Wurtemburg, *Bornmueller* 393 (GH). Palmares, near Lagoa dos Patos, *Rambo* (US). Pareci Novo, *Sehnem* 1656 (LIL). Passo Fundo, *Mattos & Laboriou* (RB). Pôrto Alegre, *Lindman* A-341 (S); *Palacios & Cuezza* 659 (LIL); *Rambo* (LIL). São Leopoldo, *Eugenio* 123 (R); 1653 (GH); 1655 (GH). São Salvador, *Eugenio* 3275 (GH). Tôrres, *Vidal* (R). Mun. Rio Pardo, *Jurgens* 267 (US). Mun. Vacaria: Passo do Socorro, *Rambo* (US).

Also: Trinidad, Venezuela, Guiana, Paraguay, Argentina.

16b. ***Tillandsia stricta*** var. ***disticha*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 115. 1943.

Paraná: Mun. Ponta Grossa: Vila Velha, *Foster* 411a (GH, type).

17. ***Tillandsia pohliana*** Mez in Mart. Fl. Bras. 3, pt. 3: 597, *pl. 111.* 1894.

Tillandsia meridionalis sensu Mez in DC. Monogr. Phan. 9: 818. 1896. In part, not Baker.

Tillandsia windhausenii Hassler ex Rojas, Rev. Jard. Bot. & Mus. Hist. Nat. Paraguay 2: 183. 1930. Nomen.

Tillandsia latisepala L. B. Smith, Proc. Amer. Acad. 68: 148, *pl. 1, figs. 6, 7.* 1933.

Ceará: Araripe, *Miranda* 1 (IAN).

Minas Gerais: Barbacena, *Glaziou* 13242 (P). São Miguel, *Pohl* 3658 (W, type). Mun. Ituiutaba: *Macedo* 511 (US). Santa Terezinha, *Macedo* 1204 (US).

Mato Grosso: Campo Grande, *Foster* 1095 (GH). Corumbá, *Foster* 1162 (GH).

São Paulo: Campinas, *Trevisan* 2861 (SP); *Trevisan & Viegas* 2862 (SP); 2863 (SP). Mun. Amparo: Monte Alegre, *M. Kuhlmann* 247 (SP).

Also: Paraguay, Argentina, Peru.

18. ***Tillandsia meridionalis*** Baker, Journ. Bot. 26: 15. 1888.

Rio Grande do Sul: Caxias, *Teodoro* 231 (R, US).

Also: Paraguay, Argentina.

19. ***Tillandsia araujei*** Mez in Mart. Fl. Bras. 3, pt. 3: 600, *pl. 112, fig. 2.* 1894.

Rio de Janeiro (?): *Glaziou* 8019 (P, GH neg. 3020); 15463 (US); 15464 (GH).

Distrito Federal: Morro dos Cabritos, *Duarte* 959 (RB). Copacabana, *collector?* (R). Corcovado to Tijuca, *Lutz* 866 (R). Pedra Dois Irmãos, *Rose & Russell* 20241 (US). Gavea, *Hoehne* (SP); *Reitz* 5682 (HBR); *Smith & Mus. R* 6425 (R, US). Praia de Grumari, near Guaratiba, *Smith & Mus. R* 6532 (US, lax shade form, sterile). Jacarepaguá, *Cochran* (R); *Pereira* 622 (RB). Jardim Leblon, *Harshberger* 851 (US). Praia Leblon, *Hoehne* 30 (SP). Avenida Niemeier, *Brade in L. B. Smith* 2169 (GH); *Parker* (R). Pedra Quilombo, *Brade* 10876 (R).

São Paulo: Ilha dos Alcatrazes, Santos, *Loefgren* (SP); *Luederwaldt & Fonseca* (SP).

20. ***Tillandsia pulchella*** Hook. Exot. Fl. 2: *pl. 154.* 1825.

1. Leaf-blades flat near the base, merging gradually into the sheaths, usually equaling or exceeding the simple or few-branched stem.
   2. Plant not distinctly dorsi-ventral; leaves not completely secund, diverging from one another.
      3. Inflorescence shorter than the slender leaves; leaves scarcely or not at all secund.
         4. Flowers polystichous..... Var. a. **pulchella**
         4. Flowers distichous..... Var. b. **disticha**
      3. Inflorescence exceeding the stout usually secund leaves. Var. c. **surinamensis**
   2. Plant distinctly dorsi-ventral; leaves very densely ascending-secund with the blades closely approximate..... Var. d. **saxicola**
1. Leaf-blades involute throughout and thus contrasting sharply with the sheaths, very slender, much shorter than the long branching stem, often spreading. ..... Var. e. **vaginata**

20a. ***Tillandsia pulchella*** var. ***pulchella.***

Tillandsia pulchra Hook. Exot. Fl. 2: sub *pl. 154.* 1825. With the text.
Tillandsia subulata Vell. Fl. Fluminensis 133. 1825; Icon. 3: *pl. 127.* 1835.
? *Tillandsia autumnalis* F. Mueller, Gartenflora 42:737. 1893.
Tillandsia astragaloides Mez in Mart. Fl. Bras. 3, pt. 3:601. 1894.
Tillandsia pulchella var. *rosca* Mez in Mart. Fl. Bras. 3, pt. 3:603. 1894, in part, not as to basonym.
Tillandsia pscudo-stricta Chodat & Vischer, Bull. Soc. Bot. Genève II. 8:263, *figs. 122, 123.* 1916.

BRAZIL: *Sellow* bromel. 87 (P); 91 (P).
PARÁ: Belém, *Archer* 7833 (IAN).
CEARÁ: *Allemão e Cysneiros* 1526 in part (R).
PERNAMBUCO: São Bento, Tapera, *Pickel* 137 (SP).
BAÍA: Maracás, *Foster* 2464 (US).
ESPÍRITO SANTO: (Bananal), *Viana Freire* 50 (R). (Goitacazes), Rio Doce, *J. G. Kuhlmann* 138 (RB).
MINAS GERAIS: *Regnell* I-282-c in part (US).
MATO GROSSO: Cascata do Angelim, Serra do Itapirapuã, *Lindman* A-3523 (S). Guaira, *Cullen* (RB).
RIO DE JANEIRO: Bôa Vista, Rio Paraiba, *Neto, Glaziou & Schwacke* (R). Serra dos Orgãos, *Schreiner* (R). Petrópolis, *Glaziou* 8025 (P). Teresópolis, *Frazão* (RB); *Sampaio* 2538 (R).
DISTRITO FEDERAL: Copacabana, *Glaziou* 2730 (P); Serra da Carioca, Estrada da Sumaré, *Pabst* 10081 (Pabst).
SÃO PAULO: Campinas, *Campos Novaes* 1201 (SP). Campos do Jordão, *Hochne* (GH, SP). Monte Alegre do Sul, *M. Kuhlmann* 1885 (SP). Santos, *Mosén* 3252 in part (S). Serra Negra, *Hoehne* (SP). Mun. Amparo: Monte Alegre, *Kuhlmann & Kühn* 358 (SP). Mun. São Paulo: *Edwall* (SP). Butantã, *Gehrt* (SP). Vila Ema, *Brade* 7582 (R).
PARANÁ: Linha Esperança to Prudentópolis, *Frenzel* 650 (HBR, Inst. Biol. Pesq. Tec.). Tibagi, *Reiss* 83 (GH, US). Mun. Paranaguá: Vossoroca, *Hatschbach* 2483 (US). Mun. Ponta Grossa: Vila Velha, *Dusén* 7235 (S); 15525 (S); *Hoehne* (SP); *M. Kuhlmann* (SP).
SANTA CATARINA: Mun. Araranguá: Sombrio, *Reitz* C-644 (GH). Mun. Biguaçu: Fachinal, *Reitz* 4101 in part (HBR). Mun. Chapecó: Dionísio Cerqueira, *Reitz* 4595 (HBR). Itapiranga, *Reitz* 4606 (HBR). Rio Peperi-Guaçú, Itapiranga, *Reitz* 4284 (HBR).
RIO GRANDE DO SUL: Santo Angelo, *Lindman* A-1037 (S). São Leopoldo, *Eugenio* 120 (R); 212 (SP); 2611 (GH); 2614 (GH, HBR). "Theewald," *Bornmueller* 709 (GH).
ALSO: WEST INDIES, VENEZUELA, GUIANA, BOLIVIA, PARAGUAY, ARGENTINA.

20b. ***Tillandsia pulchella*** var. ***disticha*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1:114, *pl. 117.* 1943.

DISTRITO FEDERAL: Rio de Janeiro, *Wilkes Expedition* (GH, type, US neg. 4100).

20c. ***Tillandsia pulchella*** var. ***surinamensis*** Mez in Mart. Fl. Bras. 3, pt. 3: 603. 1894.

Tillandsia surinamensis Miq. ex Mez in Mart. Fl. Bras. 3, pt. 3:603. 1894. Nomen, in synon.

Tillandsia firmula Mez in Mart. Fl. Bras. 3, pt. 3:603. 1894.
Tillandsia pulchella forma *surinamensis* Mez in Luetzelburg, Estudo Bot. Nordéste 3:104. 1923.

Brazil: *Sellow* bromel. 89 (P).

Piauí: Southern part of state, *Luetzelburg* (! Mez).

Ceará: Aratuba (Coite or Santos Dumont), *Cutler* 8177 (US).

Paraíba: Serra da Aba, *Luetzelburg* (! Mez). Serra d'Olho d'Agua, *Luetzelburg* (! Mez). Serra dos Prazeres, *Luetzelburg* (! Mez).

Baía: Agua Preta, *Foster* 109 (GH, R). Serra das Almas, *Luetzelburg* (! Mez).

Espírito Santo: Santa Teresa, *Foster* 306 (GH).

Minas Gerais: Pedra Branca, Caldas, *Mosén* 3990 (S).

Distrito Federal: Serra da Carioca, *L. B. Smith* 2150 (GH). Corcovado, *Glaziou* 3127 (P, isotype of *Tillandsia firmula* Mez, GH neg. 3012).

São Paulo: *Burchell* 4222 (K); *Sellow* 5877 (B, F neg 11496). Alto da Serra, *Gehrt* (SP). Iguape, Santos, *Hoehne* (SP). Jaraguá, *Brade* 7203 (SP). Ubatuba, *Viegas, Franco & Lima* (IAC). Mun. São Paulo: Cidade Jardim, *Smith & Kuhlmann* 1812 (GH). Santo Amaro, *Krieger* 174 (SP).

Paraná: Alto da Serra, *Foster* 403 (GH, R). Ponta Grossa, *Reitz* 5733 (! Reitz).

Santa Catarina: São Francisco do Sul, *Reitz* 4012 (HBR). Mun. Araranguá: Espigão de Barro, *Reitz* C-606 (GH). Peroba, *Reitz* C-472 (GH). Peroba, Sombrio, *Reitz* 3705-b (HBR). Sombrio, *Reitz* 3763 (HBR, US). Mun. Blumenau: Garcia, *Reitz* 4642 (! Reitz). Mun. Imaruí: Vargem do Cedro, *Reitz* 4530 (HBR). Mun. Jaraguá do Sul: Corupa, *Seidel* 15 (HBR). Mun. Palhoça: Campo de Massiambú, *Reitz & Klein* 335 (! Reitz). Pilões, *L. B. Smith* 6218 (R, US).

Rio Grande do Sul: Morro Sapucaia, *Palacios & Cuezzo* 429 (LIL). Palmares, near Lagoa dos Patos, *Rambo* (US). São Jeronimo, *Schwacke* (R). São Leopoldo, *Eugenio* 126 in part (NY); 213 (SP); 2609 (GH); 2610 (GH). Estação São Salvador, *Sehnem* 2094 (LIL). Mun. Pôrto Alegre: Canoas, *Lindman* A-353 (S). Mun. Tôrres: Campo Bonito, *Reitz* 4416 (HBR).

Also: Guiana, Paraguay, Argentina.

20d. ***Tillandsia pulchella*** var. ***saxicola*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1:115, *pl. 118.* 1943.

Distrito Federal: Morro do Archer, *Brade* 10410 (R).

São Paulo: Atibaia, *Foster* 481 (GH); *Ostermeyer* (SP). Pedra Grande, Atibaia, *Gehrt* (GH, type (US neg. 4101), SP). Serra de Itapetinga, *Duarte* (GH, SP).

20e. ***Tillandsia pulchella*** var. ***vaginata*** (Wawra) Castellanos, An. Mus. Nac. Hist. Nat. Buenos Aires 37:505. 1933.
Tillandsia triflora Vell. Fl. Fluminensis 134. 1825; Icon. 3: *pl. 134.* 1835.
Tillandsia pityphylla Mart. ex Schult. in R. & S. Syst. 7, pt. 2:1208. 1830.
Tillandsia pulchra var. *vaginata* Wawra, Oesterr. Bot. Zeitschr. 30:224. 1880.
Anoplophytum amoenum E. Morr. Belg. Hortic. 33:265, *pl. 17.* 1883.
Anoplophytum brachypodium E. Morr. ex Baker, Handb. Bromel. 196. 1889. Nomen.

Tillandsia pulchella var. *pityphylla* Mez in Mart. Fl. Bras. 3, pt. 3: 603. 1894.

Tillandsia amoena Mez in Engl. Pflanzenreich IV. 32: 451. 1935. Not Lodd. 1818.

Tillandsia cyanescens Mez in Engl. Pflanzenreich IV. 32: 563. 1935.

Tillandsia brachypodia Mez in Engl. Pflanzenreich IV. 32: 564. 1935.

BRAZIL: *Sellow* (S); bromel. 83 (P).

PIAUÍ: Southern part of state, *Luetzelburg* (! Mez).

RIO GRANDE DO NORTE: Serra do Martins, *Luetzelburg* (! Mez).

PARAÍBA: Serra Branca, *Luetzelburg* (! Mez).

BAÍA: Serra das Almas, *Luetzelburg* (! Mez). Serra dos Veados, *Luetzelburg* (! Mez, erroneously listed as "Goiás").

ESPÍRITO SANTO: Mun. Cachoeira de Itapemirim: Vargem Alta, *Foster* 924 (GH).

MINAS GERAIS: Sitio, near Barbacena, *Sampaio* 342 (R). Caldas, *Hoehne* (GH, SP). Pedra Branca, Caldas, *Regnell* I-282-d in part (S). Serra de Caldas, *Mosén* 1734 (S). Rio Verde, Caldas, *Mosén* 4440 (S); *Regnell* III-1250 (S, US). Serra de Caracol, *Mosén* 1735 (S). Coronel Pacheco, *Heringer* 1007 (SP). Juiz de Fora, *Wawra* II-212 (W, type). Sete Lagoas, *Occhioni* (RB). Mun. Betim: Contagem, *Assis & Morreira in Williams* 8222 (GH, US).

RIO DE JANEIRO: Bôa Vista, Rio Paraiba do Sul, *Glaziou* (P). Restinga de Mauá, *Hemmendorff* 464 (S). Nova Friburgo, *Glaziou* 13257 (GH, P, US). Teresópolis, *Bessa & Sampaio* 2521 (R); *Sampaio* 2521-a (R); 2652 (R).

DISTRITO FEDERAL: Ilha do Ribeiro, Km. 21, Jacarepaguá, *Pereira* 101 (RB). São Cristovão, *Glaziou* 13239 (P). Tijuca, Excelsior, *Lutz* 1442 (R).

SÃO PAULO: Atibaia, *Duarte* (GH, SP). Campinas, *Campos Novaes* (SP, US). Campos do Jordão, *Eugenio* 3851 (GH). Iperó, *W. Hoehne & Gehrt* (SP). Itú, *Russel* (SP). (Ribeirão da Lagoa), *Edwall* (SP). Serra do Mar, *Edwall* (GH, SP). Rio Tijuca, *Foster* 471 (GH). Una, *Foster* 387 (GH, R). Mun. Iguape: Morro das Pedras, *Brade* 7905 (R). Mun. São Paulo: Bosque da Saude, *Hoehne* (SP). Butantã *Hoehne* (GH, SP). Ipiranga, *Luederwaldt* (GH, SP). Pirajussára, *Gehrt* (GH, SP).

PARANÁ: Itaperuçú, *Dusén* 7112 (S). Jaguariaíva, *Dusén* (S). Palmeiras, *M. Kuhlmann* (GH, SP). Roça Nova, *Dusén* 10274 (S).

ALSO: WEST INDIES, VENEZUELA, PARAGUAY, ARGENTINA.

21. ***Tillandsia aëranthos*** (Loisel.) L. B. Smith, Lilloa 9: 200. 1943.

Pourretia aëranthos Loisel. in Mordant de Launay, Herb. Gen. Amat. 5: *pl. 304.* 1821.

Tillandsia dianthoidea Rossi, Cat. Modoet. 79, *pl. 1.* 1825.

Tillandsia bicolor Brongn. in Duperrey, Voy. Coquille Bot. 185, *pl. 36.* 1829.

Tillandsia microxiphion Baker, Bot. Mag. 119: *pl. 7320.* 1893.

SANTA CATARINA: *D'Urville* (P, type of *Tillandsia bicolor* Brongn., GH neg. 3019). Laguna, *Dusén* 8412 (US). Mun. Araranguá: Sombrio, *Reitz* C-104 (HBR).

RIO GRANDE DO SUL: *Araujo* 48 (R). Osorio, *Rambo* (HBR, US). Pelotas, *Lindman* A-679 1/2 (S). Pôrto Alegre, *Lindman* A-253 (S); *Rambo* (LIL). Santa Maria, *Harshberger* 980 (US). São Leopoldo, *Eugenio*

122 (R); 1611 (GH); 1656 (GH); 1658 (GH); 1659 (GH); 1661 (GH); 2789 (HBR); *Fridericks in Eugenio* 3172 (GH); *Heinz* (LIL); *Reitz* (HBR). Viera, near Rio Grande, *Archer* 4304 (SP, US).

ALSO: URUGUAY, ARGENTINA, PARAGUAY.

Subgenus *Phytarrhiza* (De Vis.) Baker

22. ***Tillandsia anceps*** Lodd. Bot. Cab. 8: *pl. 771.* 1823. FIGURE 26.

PARÁ: Rio Guamá, *Pires & Black* 1553 (IAN); *Smith, Pires & Black* 7122

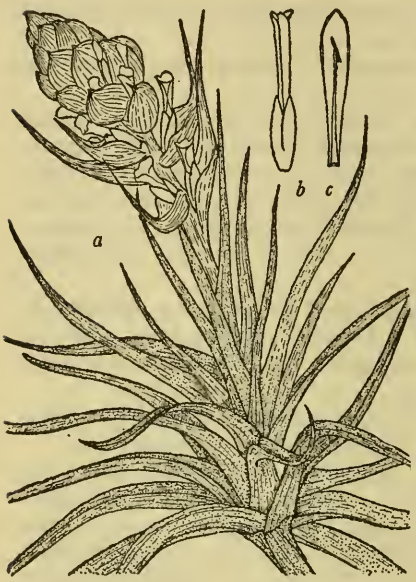

FIG. 25.

FIG. 26.

FIG. 25.—*Tillandsia stricta* var. *stricta: a,* Habit (after Botanical Magazine), × ½; *b,* flower, × 1; *c,* petal and stamen, × 1.

FIG. 26.—*Tillandsia anceps: a,* Habit (after Botanical Cabinet), × ½; *b,* sepals and capsule, × 1.

(US). Belém, *Archer* 7832 (IAN, US); *Museu Goeldi* (MG); *Pires* 1937 (IAN).

ALSO: CENTRAL AMERICA, TRINIDAD, NORTHERN SOUTH AMERICA.

23. ***Tillandsia linearis*** Vell. Fl. Fluminensis 133. 1825; Icon. 3: *pl. 128.* 1835.
Tillandsia selloa C. Koch, Ind. Sem. Hort. Berol. 1873, App.: 7. 1874.
Tillandsia setacea sensu Baker, Handb. Bromel. 175. 1889. In part, not Sw.

GOIÁS: Serra dos Veadeiros, *Glaziou* 22197 (P).

RIO DE JANEIRO: Serra de Nova Friburgo, *Saldanha in Schwacke* 4586 (! Mez).

SÃO PAULO: Cotia, *M. Kuhlmann* (SP). Paiol do Meio, *Gehrt* (SP). São Bernardo, *Brade* 6744 (SP). Una, *Foster* 384 (GH, R). Mun. São Paulo: Santo Amaro, *Edwall* (SP). Butantã, *Gehrt* (SP); *Hoehne* 823 (SP).

PARANÁ: Curitiba, *Galvão in Saldanha* 8839 (R); *Sellow* 4684 (GH). Curitiba to Paranaguá, km. 29, *Tessmann* (Paran., US), Itaperuçu, *Dusén* 7397 (BM, S, US). Jacareí, *Dusén* 6816 (S); 15555 (GH, S). Pinhaes, *Dusén* 11592 (S); 15852 (GH, S, US). Mun. Piraquara: Campininha, *Hatschbach* 2720 (US). Mun. Ponta Grossa: Itaiacóca, *Dusén* 4240 (R, S).

24. ***Tillandsia monadelpha*** (E. Morr.) Baker, Journ. Bot. 25:281. 1887.
Phytarrhiza monadelpha E. Morr. Belg. Hort. 32:168, *pl. 7.* 1882.

AMAPÁ: Rio Oiapoque, *Fróes* 25711 (IAN).

PARÁ: Belém, Estrada de Ferro Bragança, Santa Isabel, *Goeldi staff* (MG).

ALSO: CENTRAL AMERICA, TRINIDAD, NORTHERN SOUTH AMERICA.

25. ***Tillandsia decomposita*** Baker, Handb. Bromel. 168. 1889.
Tillandsia weddellii Baker, Handb. Bromel. 181. 1889.
Tillandsia tomentosa N. E. Brown, Trans. Proc. Bot. Soc. Edinburgh 20: 73. 1894.

MATO GROSSO: Camizão, *Foster* 1088 (GH). Corumbá, *Hoehne in Rondon* 3560 (R).

ALSO: BOLIVIA, PARAGUAY, ARGENTINA.

26. ***Tillandsia streptocarpa*** Baker, Journ. Bot. 25:241. 1887. FIGURE 27.
Tillandsia tricholepis Baker, Journ. Bot. 25:234. 1887. Not Baker 1878.
Tillandsia bakeriana Britten, Journ. Bot. 26:170. 1888.
? *Tillandsia retrorsa* A. Silveira, Floralia Montium 2:25, *pl. 10.* 1931.
? *Tillandsia grao-mogolensis* A. Silveira, Floralia Montium 2:26, *pl. 1, pl. 11, fig. 1.* 1931.

PIAUÍ: Paranaguá *Luetzelburg* (! Mez).

PARAÍBA: Campina Grande to Caruarú (in Pernambuco), *Foster* 2422 (US). Ipanargna, Campina Grande, *Foster* 2409 (US).

PERNAMBUCO: Caruarú, *Pickel* 4243 (IPA).

BAÍA: *Luetzelburg* 12412 (NY). Bom Jesus de Lapa, *Campos Porto* 2482 (RB); *Zehntner* 569 (RB). Catuni, Rio São Francisco, *Campos Porto* 2342 (RB). Itumirim, *Campos Porto* (RB). Jacobina, *Foster* 96 (GH, R). Joazeiro, *Rose & Russell* 19774 (US). Queimada, *Pires* 3451 (IAN).

MINAS GERAIS: *Saint-Hilaire* B1-1847 (P). Beribéri, *Glaziou* 19917 (P). Serra de Caracol, *Mosén* 4442 (S). Mun. Ituiutaba: São Vicente, *Macedo* 2714 (US).

GOIÁS: Alto da Serra dos Pireneos, *Glaziou* 22195 (P). Vargem Grande, upper Rio Tocantins, *Ule* 224 (R).

MATO GROSSO: Corumbá, *Foster* 1058 (GH); 1065 (GH, US).

RIO DE JANEIRO: Serra dos Orgãos, *Luetzelburg* (! Mez).

SÃO PAULO: Cultivated, *Hoehne* (GH, SP). Atibaia, *Foster* 478 (GH, R); *Gehrt* (SP). Cachoeira do Maribondo, *Gehrt* (SP). Campinas, *Viegas & Trevisan* (IAC). Morro Pelado, Itirapina, *Derby* (SP). Mun. Tanabi: Ilha Cachoeira dos Indios, *Gehrt* (SP).

PARANÁ: Mun. Ponta Grossa: Vila Velha, *Dusén* 2755 (R, S); 2811 (GH, R, S); 7643 (S, US); 9527 (S); 16123 (GH, S, US); *Foster* 416 (GH, R); *Tessmann* (US).

RIO GRANDE DO SUL: *Lindman* (S).

ALSO: PARAGUAY, ARGENTINA, BOLIVIA, PERÚ.

27. ***Tillandsia crocata*** (E. Morr.) Baker, Journ. Bot. 25:214. 1887.
Phytarrhiza crocata E. Morr. Belg. Hortic. 30:87. 1880.
Tillandsia mandonii E. Morr. ex Mez in DC. Monogr. Phan. 9:871. 1896.

Brazil: *Lietze* (K, type, as Morren Icon.).

Rio de Janeiro: Itatiaia, *Moreira* 5 (R).

Paraná: Mun. Ponta Grossa: Vila Velha, *Dusén* 4284 (R, S); 7628 (NY, S); 7642 (S); 9238 (GH, S, US); *Foster* 414 (GH, R); *Gonçalves* (SP, US); *Tessmann* (Paran., US).

Rio Grande do Sul: Mouth of Rio Jacuí, *Tweedie* 427 (K, US neg. 3971). Pôrto Alegre, *Lindman* (S). São Leopoldo, *Rambo* (LIL).

28. ***Tillandsia mallemontii*** Glaziou ex Mez in Mart. Fl. Bras. 3, pt. 3:608, *pl. 114, fig. 1.* 1894.
Tillandsia linearis sensu Baker, Journ. Bot. 25:234. 1887. Not Vell. 1825.

Piauí: Serra do Brejo, *Luetzelburg* (! Mez).

Rio Grande do Norte: Jardim do Seridó, *Luetzelburg* (! Mez). Serra do Martins, *Luetzelburg* (! Mez).

Baía: Serra de Chuquê, northeastern Baía, *Luetzelburg* (! Mez).

Rio de Janeiro: Alto de Macaé, near Nova Friburgo, *Glaziou* 18563 (K (US neg. 3973), US).

Distrito Federal: Cultivated, São Cristovão, *Lindman* A-35 (S); *Ule* 1313 in part (R). Restinga de Grumari, *Freire* 609 (R); *Smith & Mus. R* 6534 (R, US). Tijuca, *Glaziou* 14345 (B, type, K).

São Paulo: *Saint-Hilaire* C²-1451 (P).

Paraná: Jaguariaíva, *Dusén* 10071 (S). Pôrto Amazonas, *Langs in Dusén* 9530 (S, US). Mun. Lapa: Engenheiro Blei, *Hatschbach* 1201 (US). Mun. Ponta Grossa: Vila Velha, *Dusén* 4107 (R); *Foster* 413 (GH, R); *M. Kuhlmann* (SP).

Santa Catarina: Tuberão, *Ule* 1313 in part (GH). Mun. Araranguá: Turvo, *Reitz* C-399 (GH); 876 (R). Mun. Florianópolis: Florianópolis, *Reitz* 3903 (HBR). Rio Tavares, *Reitz* 4593 (HBR); *Smith & Reitz* 6194 (R, RB, US). Mun. Jaraguá do Sul: Corupá, *Reitz* 4283 (HBR); *Seidel* 16 (HBR).

Rio Grande do Sul: Cachoeira to Colonia Santo Angelo, *Lindman* A-1007 (S). Morro Grande, near Osório, *Rambo* (US). Lagoa de Pinguela, near Osório, *Pabst* 10162 (RB). Pelotas, *Parcus* (Montevideo). Pôrto Alegre, *Rambo* (LIL). Lagoa dos Quadros, *Rambo* (HBR, US). São Leopoldo, *Rambo* (LIL). São Salvador, *Eugenio* 2210 (GH). Mun. Tôrres: Campo Bonito, *Reitz* 4413 (HBR).

Subgenus *Diaphoranthema* (Beer) Baker

29. ***Tillandsia loliacea*** Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1204. 1830.
Tillandsia undulata Baker, Journ. Bot. 16:240. 1878.
Tillandsia quadriflora Baker, Handb. Bromel. 163. 1889. In part.
Tillandsia atrichoides S. Moore, Trans. Linn. Soc. Bot. II. 4:491. 1895.

Piauí: Guaribas, *Luetzelburg* (! Mez). Colonia e Manga, *Luetzelburg* (! Mez).

Ceará: 20 km. west of Canindé, *Cutler* 8430 (US). Cariri, near Imbuzeiro, *Loefgren* 496 (R).

PARAÍBA: Campina Grande, *Wright* 4338 (GH). Passagem, *Luetzelburg* (! Mez).
BAÍA: Itumirim, *Campos Porto* (RB). Jacobina, *Foster* 95 (GH, R). Lenções, *Luetzelburg* (! Mez). Monte Santo, near Joazeiro, *Martius* (M, type).
MINAS GERAIS: *Glaziou* 13241 (P). Conselheiro Matta-Rodeador, *Brade* (RB).
MATO GROSSO: Corumbá, *Hoehne in Rondon* 3556 (R); 3557 (R); 3558 (R); 3559 (R); *Robert* 791 (BM). Corumba to Ladario, *Moore* 1046 (BM, type of *Tillandsia atrichoides* S. Moore, US neg. 3991). Diamantino, *Lindman* b (S).
SÃO PAULO: Descalvado, *Foster* 500 (GH); *Gehrt* (SP).
ALSO: BOLIVIA, PARAGUAY, ARGENTINA.

30. ***Tillandsia tricholepis*** Baker, Journ. Bot. 16:237. 1878.
Tillandsia bryoides Griseb. Goett. Abh. 24:334. 1879. In part.
Tillandsia polytrichoides E. Morr. Belg. Hortic. 30:240. 1880.
CEARÁ: *Allemão* CLXXI in part (R); *Allemão e Cysneiros* 1525 (R); 1526 (R); *Saldanha hb.* 8102 (R). West of Canindé 20 km., *Cutler* 8431 (US).
MINAS GERAIS: Conselheiro Matta-Rodeador, *Brade* 13497 (RB).
RIO DE JANEIRO: Paraiba do Sul, *M. Kuhlmann* (SP). Petrópolis, *Luetzelburg* 911 (M).
DISTRITO FEDERAL: Campo Grande, *Passareli* 7 (R). Praia de Grumari, near Guaratiba, *Smith & Mus. R* 6533 (R, US). Jardim Botânico, *Brade* 20620 (RB); *Swingle* (US). Parque da Bôa Vista, *Diogo* 790 (R). Quinta, *Glaziou* 3124 (P). Ilha do Raimundo, *Vidal* (R). Rio de Janeiro, *Foster* 1175 (GH). São Cristovão, *Brade in L. B. Smith* 2168 (GH); *Lindman* A-37 (S). Restinga da Tijuca, *Machado* (RB).
RIO GRANDE DO SUL: São Leopoldo, *Eugenio* 121 (R); 444 (NY); 1896 (GH).
ALSO: BOLIVIA, PARAGUAY, ARGENTINA.

31. ***Tillandsia recurvata*** (L.) L. Sp. Pl. ed. 2. 410. 1762.
Renealmia recurvata L. Sp. Pl. 287. 1753. Excluding var. β.
Diaphoranthema recurvata Beer, Bromel. 156. 1857.
PARÁ: Cachoeira Grande, Rio Cumina, *Sampaio* 5478 (R). Cachoeira da Zoáda, Rio Cumina, *Sampaio* 5399 (R).
PIAUÍ: São João do Piauí, *Luetzelburg* (! Mez).
CEARÁ: Arará, north of Araripe, *Cutler* 8409 (US). West of Canindé 20 km., *Cutler* 8429 (US). Mun. Maranguape: Sitio Agua Verde, north of Palmeiras, *Cutler* 8242 (US).
PERNAMBUCO: *Pickel* (SP). Russinha, *Pickel* 138 (GH).
ALAGÓAS: Cachoeira de Paulo Affonso, *Chase* 7809 (US).
BAÍA: Serra das Almas, *Luetzelburg* (! Mez). Serra da Chuquê, *Luetzelburg* (! Mez). Itumirim, *Campos Porto* (RB). Jacobina, *Foster* 92 (GH, R); 93 (GH, R); 94 (GH, R). Mun. Sento Se: Uauá, *Schery* 567 (GH).
MINAS GERAIS: Serra de Caracol *Mosén* 1736 (S); 1737 (S); 4441 (S). Coronel Pacheco, *Heringer* 910 (SP). Lagoa Santa, *Hoehne in Rondon* 6418 (R); 6419 (R); *Warming* (C). Lavras, *Black* 2084-B (RB). Paraisópolis, *Hoehne* (SP). Sabará, *Hoehne in Rondon* 6891 (R); 6892 (R). Mun. Jaboticatubas: Serra do Cipó, *Foster* 632 (GH). Chapeu de Sol, Serra do Cipó, *Smith & Mus. R* 7004 (R, US). Mun. Santa Luzia: Nova Granja, *Williams & Assis* 6761 (GH, R, US).
RIO DE JANEIRO: Barra do Piraí, *Hoehne & Gehrt* (SP). Serra da Estrella, *Luetzelburg* (! Mez). (Pedra do Rio), *Viana Freire* 33 (R). Serra dos

Orgãos, *Luetzelburg* (! Mez). Mun. Petrópolis: Carangola, *Goés & Constantino* 635 (RB, US).

São Paulo: Atibaia, *Foster* 479 (GH, R); *Lindberg* 563 (S). Campinas, *Aloisi* (IAC); *Campos Novaes* 1200 (US); *Mosén* 375 (S); *Severin* 39 (US). Carioba, *M. Kuhlmann* 862 (SP). Conchas, *Gehrt* (SP). Cotia to Una, *Foster* 385 (GH, R). Itapira, *Hoehne* (GH, SP). Monte Alegre do Sul, Rio Camanducaia, *M. Kuhlmann* 141 (SP). Monte Alegre do Sul, *Kuhlmann & Kühn* 1818 (SP). Serra Negra, *Hoehne* (GH, SP). Mun. Itirapina: Morro Pelado, *Derby* (SP). Mun. São Paulo: Pirajussára, *Gehrt* (GH, SP). São Paulo, *Loefgren* (GH, SP).

Paraná: Pôrto Amazonas, *Dusén* 9530 (NY). Tibagi, *Reiss* (GH). Mun. Ponta Grossa: Vila Velha, *Dusén* 2763 (R).

Rio Grande do Sul: Colonia Santo Angelo, *Lindman* A-915-b (S). Piratiní, *Lindman* A-915 (S). Pôrto Alegre, *Lindman* A-255 (S); A-1631-a (S); *Rambo* (LIL). Santa Maria, *Lindman* A-1631-b (S). São Leopoldo, *Eugenio* 128 (NY); 2527 (GH). Mun. Quarai: Jarau, *Rambo* (LIL).

Also: Southern United States to Argentina and Chile.

32. ***Tillandsia usneoides*** (L.) L. Sp. Pl. ed. 2. 411. 1762. Figure 28.
Renealmia usneoides L. Sp. Pl. 287. 1753.
Dendropogon usneoides Raf. Fl. Tellur. 4:25. 1838.
Strepsia usneoides Steud. Nomencl. ed. 2. 2:645. 1841.

Brazil: *Blanchet* (BM); *Bowie & Cunningham* (BM); 45 (BM); *Freyreis* (S); *Martius* 463 (MO, NY); *Richard* (S); *Riedel* (BM).

Pará: São Miguel do Guamá, Rio Guamá, *Dias* 11 (IAN, US).

Pará–Maranhão: Rio Gurupi, *F. Lima* (MG).

Piauí: São João do Piauí, *Luetzelburg* (! Mez).

Ceará: *Allemão* CLXXI in part (R); *Allemão e Cysneiros* 1524 (R); *Neves Armond* (R). Aratuba (Coite or Santos Dumont), *Cutler* 8176 (US).

Paraíba: Campina Grande, *Wright* 50 (GH).

Pernambuco: (Jaqueira), *Ridley, Lea & Ramage* (BM).

Alagoas–Sergipe: Lower Rio São Francisco, *Luetzelburg* (! Mez).

Baía: *Glocker* 198 (S). Agua Preta, *Foster* 110 (GH, R). Serra do Chuquê, *Luetzelburg* (! Mez). Iguaçu, *Campos Porto* (RB). Itatinga to Bom Gosto, *Fróes* 19973 (IAN, US). Serra do Itubira, *Luetzelburg* (! Mez). Machado Portela, *Rose & Russell* 19985 (US).

Espírito Santo: Rio São Gabriel, northern Rio Doce, *Vieira* 23 (RB). Mun. Vitória: Araguai, *Foster* (GH).

Minas Gerais: Caldas, *Regnell* III-1251 (F, GH, R, S, US). Lagoa Santa, *Hoehne in Rondon* 6353 (R). Passa Quatro, *Sampaio* 6224 (R). Sitio, *Sampaio* 154 (R). Turvo, *Hoehne & Gehrt* (GH, SP). Mun. Diamantina: Mato do Izidoro, *Baptista in Williams* 6985-a (GH). Mun. Santa Luzia: Capão, Serra do Cipó, *Oliveira* (IAN).

Rio de Janeiro: Campos, *Sampaio* 8262 (R). Serra da Estrella, *Luetzelburg* (! Mez). Niteroi, *Smith & Brade* 2328 (GH). Serra dos Orgãos, *Luetzelburg* (! Mez). Teresópolis, *Brade* 9225 (R); *Sampaio* 2211 (R).

Distrito Federal: Campo Grande, *Parker* (R). Praia de Grumari, near Guaratiba, *Smith & Mus. R* 6531 (R, US). Jardim Botânico, *Sampaio* (R). Rio de Janeiro, *Andersson* (S); *Forsett* 93 (S); *Mosén* 2622 (S); *Saldanha hb.* (R); *Widgren* (S); 462 (S, US); *Wilkes Expedition* (US). Restinga da Tijuca, *Machado* (RB).

São Paulo: Ilha dos Alcatrazes, Santos, *Luederwaldt & Fonseca* (GH, SP). Campinas, *Santoro* (IAC). Cubatão, *L. B. Smith* 2041 (GH). Itú, *Russel* (SP). Piquete, *Robert* (BM). Piracicaba, *Puttemans* (SP). Mun. São Paulo: *M. Kuhlmann* 2704 (SP). Butantã, *Hoehne* (GH, SP). Cidade Jardim, *Smith & Kuhlmann* 1811 (GH). Mooça, *Brade* (SP); 6310 (S); 6311 (S).

Fig. 27.

Fig. 28.

Fig. 27.—*Tillandsia streptocarpa: a,* Habit, × ⅕; *b,* inflorescence, × 1; *c,* petal, stamen, and pistil, × 1. (All after Flora Brasiliensis.)

Fig. 28.—*Tillandsia usneoides: a,* Habit, × ½; *b,* flower, leaves, and section of stem, × 2.5; *c,* petals, stamens, and pistil, × 5. (All after Botanical Magazine.)

Paraná: Restinga Secca, R. R. Station, *Dusén* 3130 (R, S). Serrinha, *Dusén* 17673 (BM, GH, S, US). Tibagi, *Reiss* 16 (GH, US).

Santa Catarina: *Gaudichaud* 134 (GH); *Macrae* (BM). Laguna, *Reitz & Klein* 86 (HBR). Pôrto União, *Dionysio* 7 (SP). São Francisco do Sul, *Reitz* 3795 (HBR). Mun. Araramguá: Meleiro, *Reitz* C-13 (GH, HBR). Mun. Florianópolis: Armação de Piedade, *Smith & Reitz* 6198 (US).

Rio Grande do Sul: Bom Jesús, *Rambo* (SP). Canoas, *Teodoro* 72 (US). Rio Guaíba, Belém Nova, *Palacios & Cuezzo* 391 (LIL). Morro Sapucaia, *Palacios & Cuezzo* 535 (LIL). Pinhal, *Palacios & Cuezzo* 2334 (LIL). Pôrto Alegre, *Lindman* A-469 (S); *Palacios & Cuezzo* 636 (LIL). São Leopoldo, *Reitz* (HBR). Mun. São Francisco de Paula: Tainhas, *Rambo* (HBR).

Also: Southeastern United States to Argentina and Chile.

Subgenus *Pseudo-Catopsis* Baker

33. ***Tillandsia triticea*** Burchell ex Baker, Journ. Bot. 26: 42. 1888.
Tillandsia parkeri Baker, Journ. Bot. 26: 42. 1888.
Tillandsia viridis Baker, Handb. Bromel. 204. 1889.
Vriesia luschnathii Mez in Mart. Fl. Bras. 3, pt. 3: 555, *pl. 103.* 1894.

BAÍA: Rio Grungogi, *Curran* 137 (US).

ESPÍRITO SANTO: Campinas to Vitória, *Foster* 204 (GH). Santa Teresa, *Foster* 275 (GH, R).

RIO DE JANEIRO: Petrópolis, *Glaziou* 16465 (P).

SÃO PAULO: Alto da Serra, *Edwall* (SP); *Foster* 370 (GH); 371 (GH, R); *Gehrt* (SP); *Smith, Hoehne & Kuhlmann* 1827 (GH). Santos, *Burchell* 3217 (K, type, US neg. 3980); *Mosén* 3494 (S).

PARANÁ: Guaratuba, *Reitz* 4274 (HBR); *Smith & Reitz* 5747 (R, RB, US). Jacareí, *Dusén* 14694 (S); 14755 (S); 17070 (GH). Joinvile-Curitiba road near Santa Catarina line, *Reitz* 3892 (HBR); *Reitz* 5756 (! Reitz). Morrêtes to Antonina, *Dusén* 15472 (S, US). Paranaguá, *Dusén* 9796 (S); *Foster* 448 (GH); *Handro* (SP). Pôrto de Cima, *Dusén* 6975 (S); 14605 (S). Serra do Mar, Volta Grande, *Dusén* 12034-A (S); 12035 (S).

SANTA CATARINA: Joinvile, *Reitz* 3716 (HBR). Mun. Brusque: Brusque, *Reitz* 3818 (HBR); 3949 (HBR, US). Morro da Bateia, *Reitz* 3595 (HBR). Morro Spitzkopf, *Reitz* 3462 (HBR, US). Mun. Jaraguá do Sul: Corupá, *Reitz* 4130 (HBR); 4229 (HBR); *Seidel* 1 (HBR); 10 (HBR). Mun. Palhoça: Pilões, *L. B. Smith* 6222 (R, US).

ALSO: BRITISH GUIANA, TRINIDAD, COLOMBIA, BOLIVIA, PERÚ.

34. ***Tillandsia aëris-incola*** (Mez) Mez in DC. Monogr. Phan. 9: 759. 1896. FIGURE 29.
Catopsis maculata E. Morr. ex Baker, Handb. Bromel. 155. 1889. Not *Tillandsia maculata* R. & P. 1802.
Vriesia? aerisincola Mez in Mart. Fl. Bras. 3, pt. 3: 555. 1894.
Catopsis deflexa Ule, Bericht. Deutsch. Bot. Gesellsch. 18: 323, *pl. 10, figs. 1–6.* 1900.

ESPÍRITO SANTO: Santa Teresa, *Foster* 274 (GH, R).

MINAS GERAIS: Pico da Piedade, near Belo Horizonte, *Foster* 580 (GH).

RIO DE JANEIRO: Nova Friburgo, *Ule* 4957 (B, F neg. 11474, type of *Catopsis deflexa* Ule). Petrópolis, *Foster* 39 (GH). Teresópolis, *Frazão* (RB).

DISTRITO FEDERAL: Rio de Janeiro, *Binot* (LG, GH neg. 2935); *Wilkes Expedition* (GH).

SÃO PAULO: Alto da Serra, *Dusén* 18118 (S); *Foster* 274-A (GH); *Hoehne & Gehrt* (SP); *L. B. Smith* 2018 (GH, US); *Smith, Hoehne & Kuhlmann* 1828 (F, GH). São Paulo, *Ostermeyer* (SP).

PARANÁ: Curitiba-Joinvile road near the Santa Catarina line, *Reitz* 4004 (HBR).

SANTA CATARINA: Mun. Brusque: Morro da Bateia, *Reitz* 3816 (HBR); 3947 (HBR, US). Morro Spitzkopf, *Reitz* 2299 (HBR, US). Mun. Jaraguá do Sul: Corupá, *Reitz* 4225 (HBR).

ALSO: COLOMBIA.

35. ***Tillandsia jenmanii*** Baker, Journ. Bot. 25: 345. 1887.

BRAZIL: Probable, but not yet recorded.

BRITISH GUIANA: Kaieteur, *Jenman* 848 (K, type (GH neg. 1632), BRG).

36. ***Tillandsia caribaea*** L. B. Smith, Proc. Amer. Acad. 70: 155. Sept. 1935.
Tillandsia parviflora sensu Griseb. Nachr. Ges. Wiss. Goett. for 1864: 16. 1865. Not R. & P. 1802.
Catopsis fendleri Baker, Journ. Bot. 25: 175. 1887.
Tillandsia fendleri Mez in DC. Monogr. Phan. 9: 741. 1896. Not Griseb. 1865.
Tillandsia ferruginascens Mez in Engl. Pflanzenreich IV. 32: 500. Oct. 1935.
RIO BRANCO: Mount Roraima, *Steyermark* 59005 (F, GH).
ALSO: CUBA, HISPANIOLA, VENEZUELA.

Subgenus *Tillandsia*

(Subgenus *Platystachys* (Beer) Baker)

37. ***Tillandsia polystachia*** (L.) L. Sp. Pl. ed. 2. 410. 1762.
Renealmia polystachia L. Sp. Pl. 286. 1753.
Tillandsia angustifolia Sw. Prodr. 57. 1788.
Tillandsia parvispica Baker, Journ. Bot. 25: 244. 1887.
ACRE: (Seringal São Francisco), *Ule* 9161 (MG).
CEARÁ: Cacimba Nova, *Loefgren* 794 (R); 795 (R). Maracanú, near Fortaleza, *Dahlgren* 838 (F).
PARAÍBA: Ipanargna, Campina Grande to Mata Luiz de Melo, *Foster* 2412 (US).
BAÍA: Jacobina, *Foster* 97 (GH). Milagres to Maracás, *Foster* 2443 (US).
MINAS GERAIS: Serra do Picú, *Glaziou* 13258 (P); 16452 (P). Viçosa, *J. G. Kuhlmann* (RB).
MATO GROSSO: Campo Grande, *Foster* 1140 (GH). "Humaïtá," Rio dos Bugres, *Lindman* A-3199 (S).
RIO DE JANEIRO: Paraíba do Sul, *M. Kuhlmann* (SP).
DISTRITO FEDERAL: Cultivated?, São Cristovão, *Lindman* A-29 (S).
ALSO: MÉXICO and the WEST INDIES to BOLIVIA.

38. ***Tillandsia fasciculata*** Sw. Prodr. 56. 1788. var. ***fasciculata.***
Vriesia glaucophylla Hook. Bot. Mag. 74: *pl. 4415.* 1848.
Tillandsia glaucophylla Baker, Journ. Bot. 25: 243. 1887.
Tillandsia pungens Mez in DC. Monogr. Phan. 9: 684. 1896.
AMAPÁ: Mun. Macapá: Igarapé do Lago, *Fróes & Black* 27527 (IAN).
PARÁ: Pico Ricardo Franco, *Sampaio* 5872 (R).
ALSO: FLORIDA, MÉXICO, and the WEST INDIES to COLOMBIA and GUIANA.

39. ***Tillandsia kegeliana*** Mez in DC. Monogr. Phan. 9: 725. 1896.
PERNAMBUCO: Vitória, *Pickel* 3783 (IPA, US neg. 4229).
ALSO: PANAMÁ, COLOMBIA, SURINAM.

40. ***Tillandsia tenuifolia*** L. Sp. Pl. ed. 2. 410. 1762.
Renealmia recurvata β L. Sp. Pl. 287. 1753.
PARÁ: Belém, *Poeppig* (P, GH neg. 3043).
ALSO: SOUTHERN UNITED STATES, WEST INDIES, MÉXICO, NORTHERN CENTRAL AMERICA, VENEZUELA.

41. *Tillandsia juncea* (R. & P.) Poir. in Lam. Encycl. Suppl. 5: 309. 1817.
Bonapartea juncea R. & P. Fl. Peruv. 3: 38, *pl. 262.* 1802.
Tillandsia setacea sensu Baker, Journ. Bot. 25: 241. 1887.
BAÍA: (Calderão), Rio das Contas, *Ule* 7048 (cf. Mez in Engl. Pflanzenreich IV. 32: 465. 1935).
ALSO: WEST INDIES, SOUTHERN MÉXICO to PERÚ and BOLIVIA.

42. *Tillandsia paraënsis* Mez in Mart. Fl. Bras. 3, pt. 3: 586, *pl. 109.* 1894. FIGURE 30.
Tillandsia boliviensis Baker, Mem. Torrey Bot. Club 4: 267. 1895. In part, not as to type.
Vriesia sanctae-crucis S. Moore, Trans. Linn. Soc. Bot. II. 4: 491. 1895.
Tillandsia sanctae-crucis S. Moore ex Mez in DC. Monogr. Phan. 9: 710. 1896.
Tillandsia juruana Ule, Verh. Bot. Ver. Brand. 48: 143. 1907.
AMAZONAS: Humaitá, near Livramento, *Krukoff* 6774 (NY). Jurua Mirim, *Ule* 5734 (B, type of *Tillandsia juruana* Ule, F neg. 11508). Panuré, Rio Uaupes, *Pires* 1087 (IAN); 1100 (IAN); 1101 (IAN). Serra de Tunuí, Rio Negro, *Black* 48–2689 (IAN).
ACRE: Rio Macauã and Rio Iaco, ca. 9° 20′ S. lat., 69° W. long., *Krukoff* 5499 (F, GH, MICH, MO, NY). (Seringal São Francisco), *Ule* 9162 (MG).
PARÁ: *Sieber* 68 (BR, type). Rio Mapuera, *Pires & Silva* 4188 (IAN, US). Cachoeira da Zoáda, Rio Cuminá, *Sampaio* 5409 (R).
MATO GROSSO: Buritizinho, Mount Itapirapuã, *Lindman* A-3379 (S). Rio Juruena, *Hoehne in Rondon* 5162 (R); 5163 (R). Santa Cruz, *Moore* 361 (BM, type of *Vriesia sanctae-crucis* S. Moore). Utiariti, *Hoehne in Rondon* 2032 (R).
ALSO: COLOMBIA, PERÚ, BOLIVIA.

43. *Tillandsia bulbosa* Hook. Exot. Fl. 3: *pl. 173.* 1826.
BRAZIL: *Blanchet* 1467 (BM).
AMAZONAS: Rio Japurá, *Martius* (! Mez).
RIO BRANCO: Cujubim, *Luetzelburg* 21394 (R).
AMAPÁ: Rio Oiapoque, *Fróes* 25927 (IAN); 26758 (IAN); *Luetzelburg* 20359 (R).
PARÁ: Approagas, Rio Capim, *Huber* (MG). Belém, *Archer* 7828 (IAN, US); *Drouet* 1946 (GH); *Pires & Black* 1520 (IAN). Rio Irituia, *C. F. Baker* 441 (MG). Ilha do Mosqueiro, Belém, *Killip & Smith* 30477 (US); 30553 (US).
PERNAMBUCO: Iguaraçú, *Ridley, Lea & Ramage* (BM).
BAÍA: Agua Preta, *Foster* 72 (GH, R).
ALSO: SOUTHERN MÉXICO and the WEST INDIES to COLOMBIA and GUIANA.

44. *Tillandsia pruinosa* Sw. Fl. Ind. Occ. 1: 594. 1797.
BRAZIL: *Glaziou* 15462 (P).
ESPÍRITO SANTO: Vitória, *Foster* 205 (GH, R).
RIO DE JANEIRO: Cantagallo, *Glaziou* 16461 (P). Mauá, *Ule* 4052 (R).
ALSO: FLORIDA, SOUTHERN MÉXICO, and the WEST INDIES to ECUADOR and VENEZUELA.

12. *Vriesia* Lindl.

Vriesia Lindl. Bot. Reg. 29: *pl. 10.* 1843, nomen conservandum.

The original spelling *"Vriesia"* is used here because obviously it was so intended by Lindley where he published it consistently in four different places in the original description. It would appear that this was an intentional latinization of a personal name. Unfortunately the

Fig. 29.

Fig. 30.

Fig. 29.—*Tillandsia aëris-incola: a,* Habit, × ⅙; *b,* branch of inflorescence, × 1; *c,* sepal, × 1.

Fig. 30.—*Tillandsia paraënsis: a,* Habit (after Flora Brasiliensis), × ¼; *b,* sepal, × 1.

spelling *"Vriesea"* was employed in conserving the generic name against the earlier *Hexalepis* Rafinesque. This name should be corrected to *"Vriesia"* in future lists.

México and the West Indies to Argentina.

1. Apical appendage of the seed minute or lacking; petals firm and remaining more or less in position after anthesis.

Subgenus Vriesia (Species 1–95)

1. Apical appendage of the seed well developed: petals soon flaccid and pendent. ..... **Subgenus Alcantarea** (Species 96–100)

It has not been possible to follow Mez's division of the subgenus *Vriesia* (*Euvriesia*) into sections based on the relative length of the petals and stamens, because these parts are unknown in so many species. Furthermore, in a large

number of the species where these parts have been examined, the stamens are not consistently or clearly longer or shorter than the petals. This is particularly the case in several of the commoner species with compound inflorescences. Consequently it seems best to construct a key that is artificial insofar as is necessary to give it maximum efficiency. This key is divided into a number of subkeys to make it less unwieldy and to save it from extreme indentation.

Conspectus of subkeys

1. Flowers in exactly 2 ranks (fig. 32), but sometimes twisted until secund. (Fig. 36.)
   2. Inflorescence compound.
      3. Flowers not secund. (Fig. 32.)
         4. Upper scape-bracts equaling or exceeding the internodes. **Subkey A**
         4. Upper scape-bracts shorter than the internodes..... **Subkey B**
      3. Flowers secund at anthesis and after; the floral bracts often secund as well. (Fig. 36.)..... **Subkey C**
   2. Inflorescence simple.
      5. Flowers not secund except sometimes insofar as the petals are exserted from the bracts on one side.
         6. Scape straight or ascending; inflorescence erect.
            7. Flowers all erect, either imbricate or appressed to the rhachis. (Figs. 41, 42.)..... **Subkey D**
            7. Flowers (at least the lower ones) not imbricate, spreading or divergent with evident space between them. (Fig. 43.).. **Subkey E**
         6. Scape decurved; inflorescence pendulous. (Fig. 47.)..... **Subkey F**
      5. Flowers secund at anthesis and after; the floral bracts often secund as well. ..... **Subkey G**
1. Flowers in more than 2 ranks; inflorescence simple or few-branched; leaf-blades very narrowly triangular, acuminate. (Fig. 48.)..... **Subkey H**

SUBKEY A

1. Flowers all erect and contiguous at anthesis.
   2. Sterile bracts of the branches remote; floral bracts fleshy, black. **1. V. funebris**
   2. Sterile bracts of the branches imbricate or lacking; floral bracts coriaceous or subcoriaceous, lighter.
      3. Floral bracts shorter than the sepals.
         4. Primary bracts shorter than the elongate sterile bases of the branches; floral bracts obtusely carinate, 35 mm. long..... 2. **V. gravisiana**
         4. Primary bract equaling the short sterile base of the lateral branch; floral bracts ecarinate, less than 25 mm. long..... 3. **V. sincorana**
      3. Floral bracts equaling or exceeding the sepals.
         5. Rhachis alate; floral bracts glabrous, narrow, even; Amazonian species. ..... 4. **V. rubra**
         5. Rhachis merely angled; floral bracts more or less lepidote, broad, strongly incurved.
            6. Branches 8–14-flowered with one or no sterile bracts at the base; floral bracts sparsely lepidote toward the apex, 27–32 mm. long. 5. **V. schwackeana**

6. Branches 6–8 flowered with 1–5 sterile bracts at the base; floral bracts sparsely lepidote throughout, 35 mm. long. 6. **V. pinottii**

1. Flowers (or at least the lower ones) divergent or spreading and not touching one another at anthesis. (Figs. 31–34.)

7. Leaf-blades very narrowly triangular or linear, acuminate, 15 mm. wide.

8. Primary bracts much shorter than the spreading branches of the broad lax inflorescence; floral bracts 18–25 mm. long, about equaling the sepals. ..... 7. **V. lubbersii**

8. Primary bracts much exceeding the short strict branches of the slenderly cylindric inflorescence; floral bracts 8–10 mm. long, one-half or one-third as long as the sepals..... 8. **V. drepanocarpa**

7. Leaf-blades ligulate, broadly acute or rounded, or if acuminate then much more than 15 mm. wide.

9. Floral bracts 7–17 mm. long, suborbicular or even broader than long, about half as long as the sepals.

10. Inflorescence tripinnate with its lower branches divided and recurving; floral bracts 7 mm. long..... 9. **V. leptantha**

10. Inflorescence bipinnate with all its branches simple; floral bracts 10–17 mm. long.

11. Scape decurved; inflorescence pendulous... 10. **V. billbergioides**

11. Scape straight; inflorescence erect.

12. Inflorescence lax, broad..... 11. **V. rodigasiana**

12. Inflorescence dense, slenderly cylindric..... 12. **V. thyrsoidea**

9. Floral bracts 20–40 mm. long, usually longer than wide.

13. Branches of the inflorescence slender, about 2 mm. in diameter.

14. Floral bracts strongly incurved and carinate.

15. Sepals exceeding the coriaceous floral bracts, 20–30 mm. long; inflorescence dense, narrow; lower primary bracts nearly equaling the branches, subfoliaceous. (Fig. 32.).. 13. **V. sceptrum**

15. Sepals shorter than the floral bracts; inflorescence lax, broad; primary bracts all much shorter than the branches.

16. Sterile bases of the branches short, naked or with a single bract. ..... 5. **V. schwackeana**

16. Sterile bases of the branches elongate with several bracts. 14. **V. brusquensis**

14. Floral bracts nearly or quite straight toward the apex, often ecarinate.

17. Leaves acuminate.

18. Scape-bracts apiculate, the upper ones much reduced; stamens equaling or exceeding the petals..... 15. **V. neoglutinosa**

18. Scape-bracts acuminate, all large and subfoliaceous; stamens included. ..... 16. **V. altodaserrae**

17. Leaves more or less rounded and apiculate.

19. Sepals acute; leaf-sheaths purple.

20. Sterile bases of the branches bracteate..... 17. **V. muelleri**

20. Sterile bases of the branches naked..... 18. **V. haematina**

19. Sepals obtuse; leaf-sheaths pale green throughout or castaneous toward the base, sometimes red-spotted.

21. Leaf-blades densely cinereous-lepidote... 19. **V. saundersii**

21. Leaf-blades green, soon glabrous.
22. Floral bracts sharply carinate for most of their length, about 4 times as long as the internodes.
20. **V. monacorum**
22. Floral bracts slightly if at all carinate, mostly much less than 4 times as long as the internodes.
23. Primary bracts exceeding the short bracteate or naked sterile bases of the branches. (Fig. 33.)
21. **V. friburgensis**
23. Primary bracts shorter than the long bracteate sterile bases of the branches. (Fig. 34.)... 22. **V. procera**
13. Branches of the inflorescence stout; floral bracts only about half as long as the sepals; leaves acute to acuminate.
24. Floral bracts very broadly acute to obtuse or truncate, usually ecarinate.
25. Rhachis merely flexuous; flowers suberect. (Fig. 35.)
23. **V. gigantea**
25. Rhachis geniculate; flowers spreading.
26. Inflorescence narrow, many-branched; floral bracts mostly straight along the apical half..... 96. **V. geniculata**
26. Inflorescence ample with few and elongate branches; floral bracts gibbous near the middle..... 97. **V. extensa**
24. Floral bracts acute, carinate.
27. Rhachis scarcely if at all geniculate; floral bracts not more than twice as long as the internodes at anthesis..... 98. **V. regina**
27. Rhachis strongly geniculate; floral bracts more than twice as long as the internodes..... 99. **V. brasiliana**

SUBKEY B

1. Inflorescence subcorymbose, only 45 mm. long, its primary bracts involucrate below it; sepals 22 mm. long, much exceeding the floral bracts.
24. **V. paradoxa**
1. Inflorescence elongate, much exceeding its primary bracts.
2. Scape decurved; inflorescence pendulous; floral bracts suborbicular to broadly ovate, much shorter than the sepals, membranaceous.
3. Axis of the inflorescence geniculate; leaves broadly rounded.
10. **V. billbergioides**
3. Axis of the inflorescence nearly straight; leaves subobtuse.
25. **V. languida**
2. Scape straight or ascending; inflorescence erect.
4. Primary bracts much exceeding the short naked sterile bases of the branches; plants 3–8.5 dm. high.
5. Floral bracts about equaling the sepals, 28 mm. long, 2 to 3 times as long as the internodes; branches spreading lax... 26. **V. triligulata**
5. Floral bracts much shorter than the sepals, 10–17 mm. long.
6. Leaf-blades spotted; bracts and sepals castaneous; inflorescence dense, its branches erect..... 27. **V. maculosa**
6. Leaf-blades concolorous, green; bracts and sepals yellow; inflorescence lax, its branches spreading. (Fig. 31.)
11. **V. rodigasiana**

4. Primary bracts shorter than the long, usually bracteate, sterile bases of the branches; plants 5–20 dm. high.
7. Floral bracts about equaling the internodes or slightly more; branches usually spreading.
8. Leaves acuminate; stamens exserted..... 15. **V. neoglutinosa**
8. Leaves broadly acute or rounded and apiculate; stamens included. 22. **V. procera**
7. Floral bracts much exceeding the internodes; branches erect or ascending.
9. Floral bracts sharply carinate; branches subequal... 28. **V. stricta**
9. Floral bracts ecarinate; the terminal branch much larger and with a longer sterile base than the lateral ones..... 29. **V. minarum**

SUBKEY C

1. Floral bracts black from the first, fleshy; branches of the inflorescence with elongate sterile bases bearing many remote bracts. (*V. funebris,* no. 1, is accounted for here because its flowers are known in a very young stage only and might become secund at maturity).
1. Floral bracts pale or at most dark castaneous, never black or fleshy.
2. Scape-bracts (or at least the upper ones) shorter than the internodes.
3. Sterile base of the branch much longer than the fertile part; rhachis less than 2 mm. thick; inflorescence very lax; floral bracts ovate, half as long as the sepals, membranaceous; sepals 15 mm. long, narrow, carinate. ..... 30. **V. sparsiflora**
3. Sterile base of the branch relatively short; rhachis stout; inflorescence dense; floral bracts very broad; sepals ecarinate.
4. Leaf-sheaths dark castaneous; scape-bracts half as long as the internodes; sepals 24 mm. long..... 31. **V. crassa**
4. Leaf-sheaths pale; scape-bracts only a little shorter than the internodes; sepals 22 mm. long..... 32. **V. densiflora**
2. Scape-bracts equaling or exceeding all of the internodes.
5. Branches laxly flowered; floral bracts distinctly less than twice as long as the internodes.
6. Branches of the inflorescence very slender, at most barely exceeding 2 mm. in diameter; floral bracts membranaceous.
7. Floral bracts much shorter than the sepals; inflorescence much branched.
8. Branches to 50 cm. long, many-flowered; floral bracts ovate, acute; sepals acute, 25 mm. long. (Fig. 36.) 33. **V. philippocoburgii**
8. Branches 8–12 cm. long, few-flowered; floral bracts ovate to semi-orbicular, obtuse; sepals obtuse, 13 mm. long. 9. **V. leptantha**
7. Floral bracts about equaling the 23 mm. long sepals, broadly elliptic, acute; inflorescence few-branched.....34. **V. delicatula**
6. Branches of the inflorescence stout, much more than 2 mm. in diameter; floral bracts coriaceous, much exceeded by the sepals.
9. Sepals acute.

10. Primary bracts with distinct elongate blades; inflorescence much branched.
11. Floral bracts ovate, loosely and incompletely sheathing the base of the flower, becoming slightly if at all secund, sulcate when dry with a broad thin margin; sepals oblong, to 37 mm. long, about 3 times as long as broad. (Fig. 35.) 23. **V. gigantea**
11. Floral bracts suborbicular, tightly and completely sheathing the base of the flower, becoming secund, even; sepals lance-ovate, 30 mm. long, about twice as long as broad. 35. **V. morrenii**
10. Primary bracts bladeless, inconspicuous; inflorescence few-branched; sepals 26 mm. long..... 36. **V. ruschii**
9. Sepals obtuse.
12. Floral bracts 32 mm. long, about twice as long as the internodes; sepals elliptic. (Fig. 37.)..... 37. **V. hoehneana**
12. Floral bracts 25 mm. long, about equaling the internodes; sepals broadly elliptic. (Fig. 38.)..... 38. **V. amazonica**

5. Branches densely flowered; floral bracts twice as long as the internodes or longer.
13. Floral bracts drying dark castaneous except for the apex or the margins.
14. Sepals acute; floral bracts broadly ovate, acute, pale and slightly rugulose near the apex, 3–8 cm. long, usually much exceeding the sepals..... 39. **V. longicaulis**
14. Sepals obtuse; floral bracts suborbicular with narrow pale margins, 2–3 cm. long, usually shorter than the sepals... 40. **V. itatiaiae**
13. Floral bracts usually green or yellow, sometimes red or pale brown, but always pale on drying.
15. Sepals much exceeded by the sharply carinate laterally compressed floral bracts, 20 mm. long, 8 mm. wide..... 14. **V. brusquensis**
15. Sepals always somewhat exserted above the floral bracts.
16. Inflorescence few-branched, the terminal branch with an elongate sterile base almost completely covered by bracts.
17. Sepals up to 35 mm. long; floral bracts barely twice as long as the internodes; plant generally 2 m. or taller. (Fig. 37.) 37. **V. hoehneana**
17. Sepals 20–27 mm. long; floral bracts 2.5 to 3.5 times as long as the internodes; plant 6–12 dm. tall.... 41. **V. longiscapa**
16. Inflorescence many-branched, the terminal branch not much different from the others.
18. Leaves ornamented with dark purple irregular transverse bands; floral bracts broadly ovate, carinate; sepals narrowly elliptic, 25 mm. long, much exserted. (Fig. 39.) 42. **V. hieroglyphica**
18. Leaves without purple bands but sometimes with narrow dark green lines.
19. Flowers downwardly secund.
20. Branches 4–8-flowered, short, very slender; sepals 20 mm. long.

21. Sepals barely exceeding the floral bracts; branches eprophyllate. ..... 43. **V. penduliflora**
21. Sepals about twice as long as the floral bracts; branches prophyllate. (Fig. 40.).... 44. **V. segadas-viannae**
20. Branches many-flowered, elongate, rather stout; sepals 28–34 mm. long.
22. Floral bracts 3 to 4 times as long as the internodes, remaining imbricate, obtusely carinate; leaf-blades concolorous. ..... 45. **V. hydrophora**
22. Floral bracts scarcely more than twice as long as the internodes, faintly or not at all carinate; leaf-blades marked with dark green cross-lines.
46. **V. pastuchoffiana**
19. Flowers upwardly secund; leaves acuminate; sepals 35–40 mm. long.
23. Rhachis strongly geniculate; only a few flowers secund.
99. **V. brasiliana**
23. Rhachis merely flexuous; all the flowers secund.
100. **V. imperialis**

SUBKEY D

1. Leaf-blades narrowly triangular, acuminate; floral bracts sparsely lepidote.
2. Floral bracts carinate, 30 mm. long, distinctly exceeding the sepals.
47. **V. biguassuensis**
2. Floral bracts not carinate, 25 mm. long, about equaling the sepals.
48. **V. triangularis**
1. Leaf-blades ligulate, abruptly acute or rounded and apiculate.
3. Sepals (or at least the lowest ones) exceeding the very broad floral bracts, 34–40 mm. long.
4. Inflorescence many-flowered, to 27 cm. long, exceeding the leaves; floral bracts scarcely or not at all carinate..... 49. **V. gradata**
4. Inflorescence few-flowered, 6–12 cm. long, about equaling the leaves; floral bracts sharply carinate..... 50. **V. modesta**
3. Sepals equaling the floral bracts or shorter.
5. Inflorescence lax; flowers erect and appressed to the rhachis; floral bracts to 45 mm. long, scarcely twice as long as the internodes, equaling the sepals, obtuse, ecarinate, strongly nerved..... 51. **V. pauciflora**
5. Inflorescence dense or subdense; flowers imbricate; floral bracts much more than twice as long as the internodes.
6. Floral bracts dark castaneous except near the apex, slightly and obtusely carinate, 3–8 cm. long..... 39. **V. longicaulis**
6. Floral bracts pale or brightly colored, green, yellow, or red.
7. Apical half of the floral bract spreading and not imbricate even before anthesis; keel of the floral bracts straight or concave toward the base, convex toward the apex; inflorescence broadly rounded at the apex. (Fig. 41.)
8. Floral bracts acuminate, 60–70 mm. long.
52. **V. erythrodactylon**
8. Floral bracts broadly acute, about 45 mm. long.
53. **V. heliconioides**

7. Apical half (as well as the remainder) of the floral bract imbricate until after anthesis; keel of the floral bracts evenly convex; inflorescence usually acute. (Fig. 42.)
9. Floral bracts densely lepidote with appressed cinereous scales, 45 mm. long, sharply carinate; flowers malodorous.
54. **V. vulpinoidea**
9. Floral bracts glabrous or very sparsely and obscurely lepidote.
10. Margins of the floral bracts with a strong almost semicircular curve; sepals broadly convex.
11. Inflorescence subterete; floral bracts slightly and obtusely carinate near the apex, inflated, rose, to 42 mm. long.
55. **V. rhodostachys**
11. Inflorescence strongly complanate; floral bracts sharply carinate.
12. Floral bracts with obtusely angled margins, bright red with broad yellow margins, 45–60 mm. long; inflorescence oblong to linear, 15–40 cm. long.
56. **V. incurvata**
12. Floral bracts with evenly curved margins, 40–50 mm. long; inflorescence usually lanceolate or elliptic.
13. Inflorescence very dense; each floral bract more than half covered by the one below it, red with yellow or green margins, its keel slightly curved.
57. **V. inflata**
13. Inflorescence subdense; each floral bract less than half covered by the one below it, orange, its keel strongly curved. ..... 58. **V. petropolitana**
10. Margins of the floral bracts lightly curved. (Fig. 42.)
14. Floral bracts 6–8 cm. long, 2 to 3 times as long as the broadly convex sepals, wholly red or green..... 59. **V. splendens**
14. Floral bracts not over 5 cm. long, about twice as long as the carinate sepals at most, mostly bicolorous.
15. Inflorescence subquadrate, almost as broad as long; scape very slender. (Fig. 42.)..... 60. **V. carinata**
15. Inflorescence much longer than broad; scape stouter.
16. The inflorescence much exceeding the leaves, 16–26 cm. long, much more than 3 times as long as broad; floral bracts 45–50 mm. long; sepals narrowly elliptic, obtuse or emarginate..... 61. **V. duvaliana**
16. The inflorescence barely or not exceeding the leaves, 11 cm. long, much less than 3 times as long as broad; floral bracts 40 mm. long; sepals lance-ovate, acute.
62. **V. paraïbica**

SUBKEY E

1. Leaf-blades narrowly triangular, acuminate.
2. Rhachis less than 2 mm. in diameter; flowers slender, spreading; floral bracts 18–25 mm. long, about equaling the sepals, membranaceous.
7. **V. lubbersii**

2. Rhachis 6–7 mm. in diameter; flowers stout, suberect; floral bracts 20 mm. long, much shorter than the sepals, fleshy-coriaceous.
63. **V. goniorachis**

1. Leaf-blades linear, ligulate, or lance-triangular.
3. Flowers merely divergent at anthesis; upper scape-bracts shorter than the internodes; floral bracts much shorter than the sepals.
4. Pedicels slender, 8 mm. long; sepals subacute, 25–30 mm. long.
64. **V. amethystina**
4. Pedicels very short; sepals obtuse, 16–18 mm. long.
5. Leaf-blades lance-triangular, almost the same length as the sheaths, 35 mm. wide..... 65. **V. lancifolia**
5. Leaf-blades linear, several times longer than the sheaths, 13 mm. wide.
66. **V. parviflora**
3. Flowers spreading to reflexed at anthesis.
6. Floral bracts with truncate bases, usually bright red or yellow, sometimes pale green.
7. The floral bracts from about the same length as the internodes to twice as long, from slightly shorter than the sepals to equaling them; rhachis slender, flexuous, its internodes more or less curved; inflorescence few-flowered. (Fig. 43.)
8. Sepals 35–40 mm. long; floral bracts about twice as long as the internodes; scape-bracts all imbricate; stamens exserted.
67. **V. psittacina**
8. Sepals to 25 mm. long; floral bracts about equaling the internodes; scape-bracts nearly all shorter than the internodes in this variety with a simple inflorescence; stamens included.... 22. **V. procera**
7. The floral bracts mostly 3 times as long as the internodes or more; rhachis stout, straight or geniculate with straight internodes; inflorescence usually many-flowered. (Fig. 44.)
9. Floral bracts recurved toward the apex and with undulate margins, ample, to 55 mm. long, enfolding and exceeding the sepals.
68. **V. recurvata**
9. Floral bracts straight or slightly incurved toward the apex.
10. The floral bracts sharply carinate, the keel incurved toward the apex, nerved; sepals 20–30 mm. long..... 69. **V. morreniana**
10. The floral bracts slightly if at all carinate, the keel nearly straight; sepals 30–40 mm. long.
11. Sepals exserted; floral bracts suborbicular, rather thin, only the lowest spreading and not imbricate..... 49. **V. gradata**
11. Sepals included; floral bracts narrower, coriaceous, all spreading with age. (Fig. 44.)..... 70. **V. ensiformis**
6. Floral bracts with decurrent auricles at base, usually dull green; stamens included so far as known.
12. Sepals 45 mm. long, narrow, much exserted; floral bracts recurved toward the apex, acute, subchartaceous; leaves densely marked with spots or lines or both together..... 71. **V. fenestralis**
12. Sepals 20–33 mm. long; floral bracts from nearly straight to incurved.
13. Floral bracts coriaceous, smooth and even when dry, not at all fleshy.

14. The floral bracts dark castaneous with pale margins, from slightly shorter to slightly longer than the sepals. 72. **V. atra**

14. The floral bracts wholly dull green or with dark margins.

15. Sepals very broad, distinctly less than half exserted from the floral bracts if at all; plants robust.

16. Scape-bracts imbricate; leaves concolorous or transversely marked with dark irregular green lines; flowers spreading at anthesis; sepals broadly ovate, acute or subacute. (Fig. 45.) ..... 73. **V. jonghii**

16. Scape-bracts shorter than the upper internodes; leaves transversely marked with purple lines; flowers reflexed at anthesis; sepals broadly elliptic, obtuse... 74. **V. fosteriana**

15. Sepals narrowly elliptic or suboblong, much longer than broad, about half exserted; flowers usually reflexed at anthesis. (Fig. 46.)..... 75. **V. platynema**

13. Floral bracts fleshy or subchartaceous, becoming rugose or nerved when dry; sepals mostly much exserted from the floral bracts.

17. The floral bracts fleshy, becoming rugose when dry; rhachis stout.

18. Sepals acute, to 35 mm. long; floral bracts obtusely carinate. 76. **V. wawranea**

18. Sepals subobtuse, 25–44 mm. long; floral bracts convex, ecarinate.

19. Inflorescence covered with a strongly glutinous material; floral bracts broadly ovate, imbricate before anthesis, usually with dark margins..... 77. **V. bituminosa**

19. Inflorescence dry; floral bracts elliptic, never imbricate, concolorous. ..... 78. **V. regnellii**

17. The floral bracts subchartaceous, becoming nerved when dry; rhachis slender; sepals 22 mm. long, obtuse; upper scape-bracts slightly shorter than the internodes..... 29. **V. minarum**

SUBKEY F

1. Leaf-blades marked on the upper or both sides with dark spots, broadly rounded; floral bracts farinaceous, 30–40 mm. long.

2. Floral bracts imbricate and concealing the rhachis, broader than long, equaling the sepals..... 79. **V. pardalina**

2. Floral bracts enfolding the spreading flowers and thus exposing the rhachis, broadly ovate, equaling or shorter than the sepals..... 80. **V. guttata**

1. Leaf-blades concolorous, pale green.

3. Floral bracts imbricate and concealing the rhachis, 50–55 mm. long, exceeding the sepals..... 81. **V. obliqua**

3. Floral bracts spreading and exposing the rhachis at anthesis.

4. The floral bracts laterally compressed, sharply carinate, incurved, to 40 mm. long, slightly shorter than the sepals..... 82. **V. retroflexa**

4. The floral bracts not compressed, slightly if at all carinate, usually much shorter than the sepals; pedicels slender, 8–20 mm. long.

5. Floral bracts much more than half as wide as long, 35–45 mm. long, their margins much overlapping behind the sepals... 83. **V. simplex**

5. Floral bracts not more than half as wide as long, not over 35 mm. long, their margins overlapping little if at all. (Fig. 47.)
84. **V. scalaris**

SUBKEY G

1. Inflorescence dense; floral bracts more than twice as long as the internodes.
2. Floral bracts strongly compressed, sharply carinate, bright red with green margins, thin, 34 mm. long, about equaling the carinate sepals.
85. **V. interrogatoria**
2. Floral bracts not compressed, obtusely if at all carinate, green or castaneous, usually coriaceous.
3. Scape-bracts shorter than the internodes; floral bracts 35 mm. long, exceeded by the sepals, castaneous, sublustrous... 86. **V. clausseniana**
3. Scape-bracts exceeding the internodes.
4. Floral bracts castaneous and coriaceous except for the rugulose pale thin apical third, 3–8 cm. long, usually much exceeding the sepals.
39. **V. longicaulis**
4. Floral bracts green or stramineous, mostly uniform.
5. The floral bracts obtusely carinate; leaves broadly acute or rounded and apiculate.
6. Sepals 20–27 mm. long; floral bracts 2.5 to 3.5 times as long as the internodes; plants 6–12 dm. high..... 41. **V. longiscapa**
6. Sepals 34 mm. long; floral bracts barely twice as long as the internodes; plant usually 2 m. high or more.
37. **V. hoehneana**
5. The floral bracts ecarinate, evenly convex.
7. Leaves acuminate; floral bracts becoming secund with the flowers; sepals 15–20 mm. long..... 87. **V. viridiflora**
7. Leaves broadly rounded and apiculate; floral bracts never secund; sepals to 24 mm. long..... 88. **V. unilateralis**
1. Inflorescence lax; floral bracts distinctly less than twice as long as the internodes.
8. Scape-bracts (or at least the upper ones) shorter than the internodes; sepals 25–28 mm. long, much exserted, elliptic, obtuse.
9. Leaf-blades narrowly triangular, acuminate; floral bracts obtuse, ecarinate. ..... 89. **V. brassicoides**
9. Leaf-blades ligulate, broadly rounded and apiculate; floral bracts acute, carinate. ..... 90. **V. platzmannii**
8. Scape-bracts all imbricate.
10. Leaf-blades narrowly triangular, long-acuminate, not over 30 mm. wide; floral bracts lepidote, 24 mm. long, much exceeded by the sepals.
91. **V. oligantha**
10. Leaf-blades ligulate, acute or rounded and apiculate or sometimes short-acuminate, 15–80 mm. wide.
11. Plants less than 1 m. high; scape slender; floral bracts ecarinate.
12. Floral bracts to 35 mm. long, nearly twice as long as the internodes; leaf-blades concolorous; sepals 24 mm. long.
88. **V. unilateralis**
12. Floral bracts 18 mm. long, barely exceeding the internodes; leaf-blades dark-spotted; sepals 18 mm. long..... 92. **V. racinae**

11. Plants 1–2 m. or higher; scape stout; floral bracts obtusely carinate toward the apex.
13. Floral bracts 32 mm. long, about twice as long as the internodes; sepals elliptic. (Fig. 37.) ..... 37. **V. hoehneana**
13. Floral bracts 25 mm. long, about equaling the internodes; sepals very broadly elliptic. (Fig. 38.) ..... 38. **V. amazonica**

SUBKEY H

1. Scape-bracts all bearing recurved elongate blades; inflorescence simple, dense, few-flowered, 4–9 cm. long ..... 93. **V. poenulata**
1. Scape-bracts bearing erect blades, those of the upper ones very short.
2. Inflorescence dense except at base; flowers in about 4 ranks, mostly suberect; floral bracts inflated ..... 94. **V. flammea**
2. Inflorescence or its branches lax; flowers in slightly more than 2 ranks, all divergent or spreading at anthesis; floral bracts closely enfolding the sepals. (Fig. 48.) ..... 95. **V. corcovadensis**

Subgenus *Vriesia*

(Subgenus *Euvriesia* Mez)

(Subgenus *Cylindrostachys* (Wittm.) Harms)

1. ***Vriesia funebris*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 117, *pl. 122.* 1943.

Espírito Santo: Cuibiça, *Foster* 896 (GH, type, US neg. 4079).

2. ***Vriesia gravisiana*** Wittm. Gartenflora 39: 494, *figs. 81, 82.* 1890.

Brazil: Cultivated, *Atkinson* 104 (GH).

3. ***Vriesia sincorana*** Mez, Repert. Sp. Nov. Fedde 12: 418. 1913.

Baía: Serra do Sincorá, *Ule* 7131 (B, type, F neg. 11470).

4. ***Vriesia rubra*** (R. & P.) Beer, Bromel. 98. 1857.
Tillandsia rubra R. & P. Fl. Peruv. 3: 40, *pl. 266.* 1802.
Vriesia albiflora Ule, Verh. Bot. Ver. Brand. 48: 141. 1907.
Tillandsia rhododactyla Mez, Repert. Sp. Nov. Fedde 16: 76. 1919.

Acre: Rio Juruá-Mirim, *Ule* 5615 (MG, type collection of *Vriesia albiflora* Ule).

Also: Trinidad, British Guiana, Colombia, Perú.

5. ***Vriesia schwackeana*** Mez in DC. Monogr. Phan. 9: 590. 1896.

Brazil: Cultivated, *Foster* (US); 511 (GH).

Minas Gerais: Ouro Preto, *Schwacke* 9209 (B, type, F neg. 11469).

São Paulo: Mun. São Paulo: Parque do Estado, *Hoehne* (SP). Pirajussára, *Gehrt* (SP).

6. ***Vriesia pinottii*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 12, *pl. 3.* 1952.

Paraná: Guaratuba, *Reitz* 4023 (HBR, type); 5683 (! Reitz).

7. ***Vriesia lubbersii*** (Baker) E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3: 533, *pl. 99.* 1894.
Tillandsia lubbersii Baker, Handb. Bromel. 219. 1889.

Brazil: Cultivated, *Binot* (LG, basis of Morren Icon.?); *E. Morren* Icon. (K, type).

Espírito Santo: Santa Teresa, *Foster* 256 (GH, R, US); 256-A (GH).
Minas Gerais: [Caldas], *Regnell* (R, S).
Rio de Janeiro: Serra dos Orgãos, *Burchell* 2354 (! Mez).
Distrito Federal: Pão de Assucar, *Schenck* 3083 (! Mez).
São Paulo: Monte Alegre, Amparo, *M. Kuhlmann* 346 (SP).
Santa Catarina: Blumenau, *Reitz* (HBR), 4280 (HBR).

8. ***Vriesia drepanocarpa*** (Baker) Mez in DC. Monogr. Phan. 9: 581. 1896.
Tillandsia drepanocarpa Baker, Journ. Bot. 26: 41. 1888.
Vriesia dusenii L. B. Smith, Contr. Gray Herb. 98: 17, *pl. 5, figs. 3, 4.* 1932.
Espírito Santo: Santa Teresa, *Foster* 797 (GH).
São Paulo: *Burchell* 3596 (K, type, US neg. 3979). São Paulo, *Hoehne* (GH, SP).
Paraná: Guaratuba, *Reitz* 4269 (HBR). Jacareí, *Dusén* 10712-B (S, type of *Vriesia dusenii* L. B. Smith).
Santa Catarina: Joinvile, *Reitz* 3758-k (! Reitz). Mun. Brusque: Morro Santa Luzia, *Reitz* 3703 (HBR); 3759 (! Reitz); 4009 (HBR, US). Mun. Jaraguá do Sul: Corupá, *Seidel* 4 (HBR).

9. ***Vriesia leptantha*** Harms, Notizblatt 12: 532. 1935.
Rio de Janeiro: Pedra da Republica, Santo Antonio de Imbé, *Brade & Santos Lima* 11586 (B, type; R). Alto da Republica, Santa Maria Madalena, *Santos Lima & Brade* 14179 (RB, US neg. 4202).

10. ***Vriesia billbergioides*** E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3: 534, *pl. 100.* 1894.

1. Scape-bracts imbricate..... Var. a. **billbergioides**
1. Scape-bracts shorter than the internodes..... Var. b. **subnuda**

10a. ***Vriesia billbergioides*** var. ***billbergioides.***
Minas Gerais: Serra da Caparao, *Brade* 17124 (RB).
Rio de Janeiro: Serra dos Orgãos, *Glaziou* 2837 (P); 3630 (BR, isotype, GH neg. 2801); *Ule* (R); 4141 (R). Petrópolis, *Glaziou* 16466-a (P). Teresópolis, *Foster* 994 (GH). Guaraní, Teresópolis, *Brade* 9320 (R).
São Paulo: Serra da Bocaina, *Brade* 21151 (RB).

10b. ***Vriesia billbergioides*** var. ***subnuda*** L. B. Smith, Arquiv. Jard. Bot. Rio de Janeiro 10: 147. 1951.
Rio de Janeiro: Pedra S. João, Serra dos Orgãos, *Brade* 16660 (US, type; RB).

11. ***Vriesia rodigasiana*** E. Morr. Ill. Hortic. 29: 171, *pl. 467.* 1882. Figure 31.
Tillandsia rodigasiana Baker, Journ. Bot. 26: 138. 1888.
Tillandsia tweedieana Baker, Journ. Bot. 26: 138. 1888.
Tillandsia citrina Baker, Handb. Bromel. 224. 1889.
Vriesia vitellina F. Mueller, Gartenflora 42: 738. 1893.
Vriesia tweedieana F. Mueller, Gartenflora 42: 738. 1893.
Brazil: Cultivated, *E. Morren* (LG, type?).
Ceará: Bico Alto, Serra da Baturité, *Ducke* (MG).
Distrito Federal: Rio de Janeiro, *Glaziou* 15465 (P); *Tweedie* 1342 (K, type of *Tillandsia tweedieana* Baker, US neg. 4027).
São Paulo: Cubatão, *L. B. Smith* 2048 (B, F, GH, S). Rio Quilombo, *Doering* (SP). Santos, *Regnell* I-38 1/32 in part (S). Bertioga, Santos, *Hoehne & Gehrt* (SP). Rio Buturoca, Santos, *Mosén* 3709 (S).

Paraná: Caiobá, *Foster* 427 (GH, R); 429 (GH, R). Ipiranga, Serra do Mar, *Dusén* 14736 (GH, S, US). Jacareí, *Dusén* (S, US). Morro Grande, *M. Kuhlmann* (SP). Paranaguá, *Dusén* 9798 (S). Porto Dom Pedro II, *Dusén* 9875 (S). Mun. Morrêtes: Rio Mãe Catira, *Hatschbach* 2012 (US). Morrêtes, *Dusén* 4357 (R, S).

Santa Catarina: Brusque, *Foster* 2502 (US); *Reitz* 3102 (HBR); 3570 (HBR); 3600 (HBR); 4161 (HBR). Mun. Araranguá: Maracajá, *Reitz* C-539 (GH, HBR). Peroba, *Reitz* C-478 (GH, HBR). Sanga da Anta, *Reitz* C-1020 (HBR). Mun. Biguaçú: Fachinal, *Reitz* C-934 (GH, HBR). Mun. Blumenau: Garcia, *Smith & Reitz* 6298 (R, US). Mun. Jaraguá do Sul: Corupá, *Seidel* 20 (HBR); 22 (HBR).

12. ***Vriesia thyrsoidea*** Mez in Mart. Fl. Bras. 3, pt. 3: 556. 1894.

Rio de Janeiro: Petrópolis, *Glaziou* 16472 (US, isotype). Campo das Antas, Teresópolis, *Emygdio, Pessoa & Gomes* (R (US neg. 4198), US).

Fig. 31.

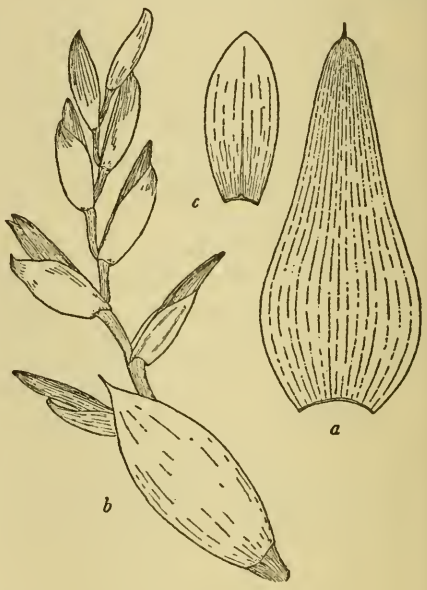

Fig. 32.

Fig. 31.—*Vriesia rodigasiana: a,* Leaf, × ¼; *b,* scape and inflorescence, × ¼; *c,* floral bract and flower, × 1.

Fig. 32.—*Vriesia sceptrum: a,* Lower primary bract, × ½; *b,* spike, × ½; *c,* sepal, × 1.

13. ***Vriesia sceptrum*** Mez in DC. Monogr. Phan. 9: 606. 1896. Figure 32.

Minas Gerais: Caldas, *Mosén* 4437 (S); *Regnell* III-1254 in part (US, type; S).

Rio de Janeiro: Itatiaia, *Foster* 117 (GH); 1036 (US); *L. B. Smith* 1781 (GH); 1782 (GH).

São Paulo: Campos do Jordão, *Eugenio* 3443 (GH); *M. Kuhlmann* (SP); 2201 (SP).

14. ***Vriesia brusquensis*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 10, *pl. 2.* 1952.

SANTA CATARINA: Blumenau, *Reitz* 4539 (HBR). Mun. Brusque: Azambuja, *Reitz* 3624 in part (HBR, type, US neg. 3600). Mun. Itajaí: Luiz Alves, *Reitz* 4677 (! Reitz).

15. ***Vriesia neoglutinosa*** Mez, Engl. Pflanzenreich IV. 32: 636. 1935.

Tillandsia glutinosa Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1225. 1830. *Vriesia glutinosa* Wawra, It. Sax.-Cob. 167. 1883. Not Lindl. 1856.

RIO DE JANEIRO: Mun. Cabo Frio: Praia do Pontal, Cabo Frio, *Smith & Mus. R* 6598 (R, US).

DISTRITO FEDERAL: Botafogo, *Martius* (M, type). Pedra Dois Irmãos, *L. B. Smith* 2145 (GH, S). Restinga da Itapeba, Recreio dos Bandeirantes, *Lutz* 616 (GH, R, US). Rio de Janeiro, *Foster* 1143 (GH); *Widgren* (S). Praia de Sernambetiba, *Smith & Mus. R* 6823 (R, US), 6830 (R, US).

SÃO PAULO: Mun. São Paulo: Florestal, *Foster* 345 (GH, R).

PARANÁ: Caiobá, *Foster* 444 (GH, US); *M. Kuhlmann* (GH, SP). Jacareí *Dusén* (S, US); 9562 (S, US); 17040 (S, US); 17040-B (S, US).

SANTA CATARINA: Mun. Brusque: Azambuja, *Reitz* Icon. (HBR).

16. ***Vriesia altodaserrae*** L. B. Smith, Contr. Gray Herb. 98: 16, *pl. 5, figs. 1, 2.* 1932.

SÃO PAULO: Alto da Serra, *Foster* 358 (GH, US); *Hoehne* (SP); *L. B. Smith* 1875 (GH, type); 1926 (GH, US). Boracéa, *Ramalho* (SP). São Vicente, Santos, *Mosén* 3197 (S).

PARANÁ: Banhado, *Dusén* 9537 (S); 17496 (S, US). Guaratuba, *Reitz* 4273 (HBR). Estação Marumbi, Serra do Mar, *Frenzel* (Inst. Biol. Pesq. Tec.); 497 (HBR). Ipiranga, *Dusén* 14414 (S, US).

SANTA CATARINA: Blumenau, *Reitz* 4652 (HBR); *Smith & Reitz* 6280 (R, US). Brusque, *Reitz* 3591 (HBR, US), 4079 (HBR). Mun. Jaraguá: Corupá, *Reitz* 4230 (HBR). Campo Alegre, *Reitz* 3718 (HBR). Imaruí, *Reitz* 4531 (HBR).

17. ***Vriesia muelleri*** Mez, Bot. Jahrb. 30, Beibl. 67: 7. 1901.

PARANÁ: Guaratuba, *Inst. Malariologia in Reitz* 3598 (! Reitz).

SANTA CATARINA: Blumenau, *F. Mueller* (B, type).

I have seen no complete material of this species, but from the description it would seem possible that it is a hybrid of *Vriesia philippocoburgii* with *V. procera* or *V. friburgensis,* the former accounting for the acute sepals and the latter for the non-secund flowers.

18. ***Vriesia haematina*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 117, *pl. 123.* 1943.

RIO DE JANEIRO: Teresópolis, *Foster* 1013 (GH, type, US neg. 4076, 4077).

19. ***Vriesia saundersii*** (Carr.) E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3: 540. 1894.

Encholirion saundersii Carr. Rev. Hortic. 44: 300. 1872.

Tillandsia saundersii C. Koch, Ind. Sem. Hort. Berol. for 1873, App. 4: 6. 1874.

Vriesia botafogensis Mez in Mart. Fl. Bras. 3, pt. 3: 536. 1894.

BRAZIL: Cultivated, *Atkinson* 116 (GH); *Foster* (GH); *Dallière* (LG).

RIO DE JANEIRO: Niteroi, *Foster* 106 (GH).

DISTRITO FEDERAL: Barra da Tijuca, *Reitz* 3910 (HBR). Botafogo, *Glaziou* 16466 (B, type of *Vriesia botafogensis* Mez; K, US neg. 4026).

20. ***Vriesia monacorum*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 119, *pl. 127.* 1943.

MINAS GERAIS: Mun. Santa Barbara: Mosteiro de Caraça, *Foster* 693 (GH, type; US).

21. ***Vriesia friburgensis*** Mez in Mart. Fl. Bras. 3, pt. 3: 537. 1894.

1. Branches erect or suberect, inflorescence distinctly longer than broad.
   2. Floral bracts all ecarinate, to 35 mm. long; flowers all spreading. Var. a. **friburgensis**
   2. Upper floral bracts carinate, about 25 mm. long; upper flowers often imbricate. ..... Var. b. **paludosa**
1. Branches spreading to arching-recurved, lax; flowers spreading. Var. c. **tucumanensis**

Field studies show that the species is highly variable, even a single colony having some individuals wholly lacking prophyllae on the branches and others having them on nearly every branch. The same individual may have both carinate and ecarinate floral bracts.

21a. ***Vriesia friburgensis*** var. ***friburgensis.***

Vriesia tweedieana sensu F. Mueller, Gartenflora 42: 738. 1893, in part.

RIO DE JANEIRO: Nova Friburgo, *Glaziou* 16467 (K (US neg. 4028), P, isotypes).

PARANÁ: Jacareí, *Dusén* (S, US). Serra São Luiz, *M. Kuhlmann* (SP). Mun. Piraquara: Campininha, *Hatschbach* 1857 (US).

RIO GRANDE DO SUL: Cascata, Serra dos Tapes, *Lindman* A-779 (S). São Salvador, *Eugenio* 124 (R).

21b. ***Vriesia friburgensis*** var. ***paludosa*** (L. B. Smith) L. B. Smith, Anais Bot. Herb. Barbosa Rodrigues 4: 68. 1952. FIGURE 33.

Vriesia paludosa L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 119, *pl. 128.* 1943.

Vriesia saundersii sensu L. B. Smith, Anais Bot. Herb. Barbosa Rodrigues 2: 26, 54. 1950, non E. Morr.

SÃO PAULO: Apiaí, *M. Kuhlmann* (SP). Cotia to Una, *Foster* 383 (GH). Guapiára, *M. Kuhlmann* (SP). São Paulo to Curitiba, km. 279, *Foster* 394 (GH).

PARANÁ: Curitiba, *Foster* 459 (GH, type; R). Curitiba to Paranaguá, *Reitz* 5763 (! Reitz). São Luiz, *Foster* 410 (GH).

SANTA CATARINA: *Foster* 2517 (US). Blumenau, *Reitz* 3590 (HBR). Campo Alegre, *Reitz* 3906 (HBR). Laguna, *Reitz & Klein* 93 (HBR). São Francisco do Sul, *Reitz* 3907 (HBR). Ribeirão Grande, Taió, *Reitz* 3993 (HBR). Serra do Mirador, Taió, *Reitz* 3958 (HBR, US). Mun. Araranguá: Curralinhos, *Reitz* C-900 (GH, HBR). Sombrio, *Reitz* C-400 (GH, HBR). Mun. Brusque: Spitzkopf, *Reitz* 2303 (HBR, US). Mun. Florianópolis: Canavieiras, *Reitz* 4265 (HBR). Mun. Itajaí: Praia Braba, *Reitz* 2296 (HBR, US); 3871 (HBR); 3872 (HBR, prophyllate); 3873 (HBR, US, eprophyllate); 3905 (HBR, US); 4103 (HBR, US); 4104 (HBR, US); *Reitz & Foster* 2296 (HBR); *Smith & Reitz* 6089 (R, RB, US).

Mun. Palhoça: Campo do Massiambú, *Reitz* 4985 (! Reitz). Mun. Pôrto Belo: Canto Grande, *Reitz* (HBR, US); 3641 (HBR).

Rio Grande do Sul: Morro Sapucaia, São Leopoldo, *Eugenio* 127 (R); 2212 (GH, HBR). Mun. Tôrres: Campo Bonito, *Reitz* 4412 (HBR); 4441 (HBR); *Smith & Reitz* 5834 (US).

21c. ***Vriesia friburgensis*** var. ***tucumanensis*** (Mez) L. B. Smith, Anais Bot. Herb. Barbosa Rodrigues 4:68. 1952.

Vriesia tucumanensis Mez in DC. Monogr. Phan. 9:585. 1896.
Vriesia caldasiana Mez in DC. Monogr. Phan. 9:607. 1896.
Vriesia argentinensis Spegazzini, Physis 3:158. 1917.
Vriesia glutinosa Wawra var. *viridis* Hassler, Ann. Conserv. & Jard. Bot. Genève 20:319. 1919.

Minas Gerais: Caldas, *Henschen in Regnell* III-1254 (US); *Mosén* 4436 (S); *Regnell* II-286 in part (S). Pouso Alegre, *Hoehne* (GH, SP).

São Paulo: Campinas, *Viegas* (IAC). São Paulo, *Foster* 347 (GH, R); *Hoehne* (SP).

Paraná: Barracão, *Reitz* 4278 (! Reitz). Ipiranga, *Dusén* 3552 (R). Morrêtes, *Dusén* 4357 (R). Ponta Grossa, *Dusén* 2699 (S).

Santa Catarina: Mun. Chapecó: Dionísio Cerqueira, *Reitz* 4281 (! Reitz). Mun. Itajaí: Praia Braba, *Reitz* 4102 (HBR, US).

Rio Grande do Sul: São Salvador, *Eugenio* 2213 (GH). Silveira Martins, Val Veneta, *Lindman* A-1331 (S).

22. ***Vriesia procera*** (Mart. ex Schult.) Wittm. Bot. Jahrb. 13, Beibl. 29:21. 1891.

1. Inflorescence amply paniculate; scape-bracts imbricate.
  2. Floral bracts even, subcoriaceous, equaling the sepals or slightly shorter; branches divergent to spreading, not twisted.
    3. Floral bracts green..... Var. a. **procera**
    3. Floral bracts red with yellow apices..... Var. b. **rubra**
  2. Floral bracts nerved, membranaceous, much shorter than the sepals; branches spreading to recurving, often twisted so that the flowers are secund..... Var. c. **tenuis**
1. Inflorescence simple or subsimple; scape-bracts nearly all shorter than the internodes; some of the floral bracts incurved..... Var. d. **debilis**

22a. ***Vriesia procera*** var. ***procera***. Figure 34.

Tillandsia procera Mart. ex Schult. in R. & S. Syst. 7, pt. 2:1224. 1830.
Vriesia gracilis Gaud. Atl. Voy. Bonite. *pl. 67*. 1846.
Tillandsia gracilis Griseb. Nachr. Ges. Wiss. Goett. for **1864**:17. 1865.
Tillandsia erectiflora Baker, Journ. Bot. 25:346. 1887.
Vriesia catharinensis F. Mueller, Gartenflora 42:738. 1893.
Vriesia procera var. *gracilis* Mez in Mart. Fl. Bras. 3, pt. 3:540. 1894.
Tillandsia viscidula Britton, Bull. Torrey Bot. Club 48:328. 1922.

Brazil: *Boog* (K, type of *Tillandsia erectiflora* Baker, GH neg. 1630).

Piauí: *Luetzelburg* (! Mez).

Ceará: *Luetzelburg* (! Mez).

Paraíba: Areia, *Vasconcellos* 150 (RB). Campina Grande, *Foster* 2407 (US).

Pernambuco: Iguaraçu, *Ridley & Ramage* (! Mez). Palmares, Santa Teresinha, *Pickel* 3436 (IPA).

Baía: Agua Preta, *Foster* 67 (GH, R). Rio Itaipé, *Martius* (M, type). Maracás, *Ule* 7018 (! Mez). Milagres to Maracás, *Foster* 2442 (US).

Espírito Santo: Vitória, *Foster* 185 (GH).

Rio de Janeiro: Suruí, *Foster* 326 (GH, R). Teresópolis, *Sampaio* 3366 (R).

Distrito Federal: Baixada Fluminense, *Lutz* 1340 (R). Praia de Grumari, near Guaratiba, *Smith & Mus. R* 6536 (R, US). Restinga Recreio dos Bandeirantes, *Lutz* 1454 (GH). Rio de Janeiro, *Foster* 494 (GH); *Gaudichaud* 365 (P, type of *Vriesia gracilis* Gaud., GH neg. 3046); 369 in part (P).

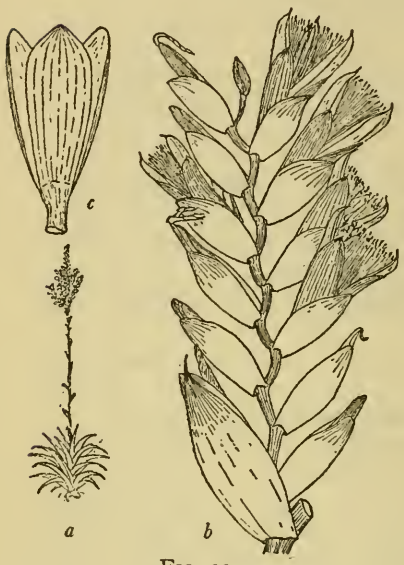

Fig. 33.

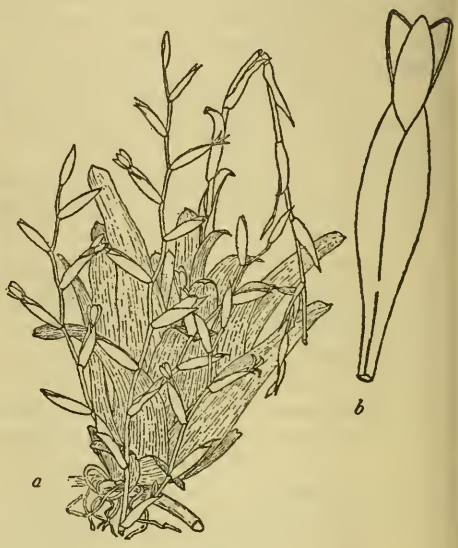

Fig. 34.

Fig. 33.—*Vriesia friburgensis* var. *paludosa: a,* Habit, × 1/50; *b,* primary bract and spike, × ½; *c,* sepals, × 1.

Fig. 34.—*Vriesia procera* var. *procera: a,* Habit, × ¼; *b,* flower, × 1. (Both after Gaudichaud.)

São Paulo: Santos, *Regnell* I-38 1/32 in part (S). São Vicente, Santos, *Mosén* 3710 (S).

Paraná: Caiobá, *Foster* 436 (GH); 501 (GH). Guaratuba, *Reitz* 4275 (HBR); *Smith & Reitz* 5725 (R, US). Jacareí, *Dusén* 15481 (GH, S); 15835 (S).

Santa Catarina: Blumenau, *F. Mueller* (! Mez); *Reitz* 3654-a (! Reitz). Canto Grande, Pôrto Belo, *Reitz* 3619 (HBR, US). Joinvile, *Reitz* 3909 (HBR). Laguna, *Reitz & Klein* 95 (HBR); *Smith & Reitz* 5946 (US). Mun. Florianópolis: Cacupé, *Reitz* 3520 (HBR). Mun. Palhoça: Campo de Massiambú, *Reitz & Klein* 858 (! Reitz).

Also: Trinidad, Guiana, Argentina.

22b. ***Vriesia procera*** var. ***rubra*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 2: 197. 1952.

Espírito Santo: Itapemirim, *Foster* 166 (US, type, GH).

22c. ***Vriesia procera*** var. ***tenuis*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 121. 1943.

Tillandsia gracilis Ule, Bericht. Deutsch. Bot. Gesselsch. 18: 325, *pl. 10, figs. 7–11.* 1900.

Tillandsia ernestii Mez, Engl. Pflanzenreich IV. 32: 636. 1935.

Rio de Janeiro: Nova Friburgo, *Ule* 4959 (B, type of *Tillandsia gracilis* Ule).

Distrito Federal: Rio de Janeiro, *Burchell* 2354 (K, US neg. 4129).

São Paulo: Mun. São Paulo: Florestal, *Foster* 352 (GH, R). Pirajussára, *Gehrt* (SP); *Gehrt in L. B. Smith* 1820 (GH, type). Santo Amaro, *Roth* (SP). São Paulo, *Gehrt* (GH); *Loefgren* 2942 (SP).

22d. ***Vriesia procera*** var. ***debilis*** Mez in Mart. Fl. Bras. 3, pt. 3: 540. 1894.

Espírito Santo: (Bananal), *Vianna Freire* 47 (R, US).

Distrito Federal: Restinga da Lagoa Freitas, *Ule* 4047 (! Mez). Rio de Janeiro, *Mikan* (W, type).

Brazil: *Jardim Botanico Rio* 599 (RB, US neg. 3262).

23. ***Vriesia gigantea*** Gaud. Atl. Voy. Bonite *pl. 70* (except the base of the inflorescence erroneously shown as simple). 1846. Figure 35.

Tillandsia gigantea Griseb. Fl. Brit. West Ind. 597. 1864.

Tillandsia tessellata Linden, Catal. 9. 1873.

Vriesia tessellata E. Morr. Belg. Hortic. 32: 381, *pls. 14–16.* 1882.

Tillandsia reticulata Baker, Gard. Chron. ser. 3. 1: 140. 1887.

Vriesia reticulata Mez in Mart. Fl. Bras. 3, pt. 3: 557. 1894.

Vriesia mosenii Mez in Mart. Fl. Bras. 3, pt. 3: 558. 1894.

Brazil: *Dusén* (GH). Cultivated, *Hort. Makoy* (LG).

Espírito Santo: Mun. Collatina: Linhares, *Foster* 788 (GH, US). Monte Claro, *Foster* 230 (GH, R).

Rio de Janeiro: Cantagallo, *Glaziou* 15467 (P). Old road below Petrópolis, *Smith & Mus. R* 6499 (R, US).

São Paulo: Santos, *Mosén* 3247 (S). São Vicente, Santos, *L. B. Smith* 2100 (GH, S). Mun. São Paulo: *Hoehne* (GH, SP). Florestal, *Foster* 346 (GH, R, US).

Paraná: Caiobá, *Foster* 431 (GH, US); *M. Kuhlmann* (SP, US). Guaratuba, *Reitz* 4244 (HBR); *Smith & Reitz* 5729 (R, RB, US). Jacareí, *Dusén* 11763 (GH, S, US).

Santa Catarina: Itajaí, *Reitz* 4242 (HBR). Laguna, *Reitz & Klein* 96 (HBR). Serra do Mirador, Taió, *Reitz* 3964 (! Reitz). Mun. Araquari: Itajuba, *Reitz* 4243 (HBR). Mun. Araranguá: Sombrio, *Reitz* C-1009 (GH, HBR); 4664 (HBR). Mun. Blumenau: Blumenau, Reitz 4246 (HBR). Garcia, Reitz 4648 (HBR); *Smith & Reitz* 6301 (R, US). Mun. Brusque: Azambuja, *Reitz* 3531 (HBR). Brusque, *Reitz* 3593 (HBR). Mun. Florianópolis: Ponta Grossa, *Reitz* 4366 (HBR). Ilha de Santa Catarina, *Gaudichaud* 127 (P, type (GH neg. 3028), B (F neg. 11467)). Mun. Jaraguá do Sul: Corupá, *Reitz* 4245 (HBR); *Seidel* 17 (! Reitz). Mun. Palhoça: Campo de Massiambú, *Reitz* 4957 (! Reitz).

Rio Grande do Sul: Cultivated, *Bull* (K, type of *Tillandsia reticulata* Baker, GH neg. 2657). Esteio, *Rambo* (US). Lagoa dos Quadros near Tôrres, *Rambo* (US). São Leopoldo, *Eugenio* 126 in part (R). São Salvador, *Eugenio* 2235 (GH). Mun. Pôrto Alegre: Gloria, *Orth* (SP).

24. ***Vriesia paradoxa*** Mez in DC. Monogr. Phan. 9: 604. 1896.

Baía: *Luschnath* (B, type).

25. ***Vriesia languida*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 118, *pl. 125, fig. 1.* 1943.

Espírito Santo: Santa Teresa, *Foster* 301 (GH, type, US neg. 4075); 845 (GH).

26. ***Vriesia triligulata*** Mez in Mart. Fl. Bras. 3, pt. 3: 541. 1894.

Rio de Janeiro: Serra dos Orgãos, *Glaziou* 16469 (B, type, F neg. 11471).

27. ***Vriesia maculosa*** Mez, Repert. Sp. Nov. Fedde 12: 418. 1913.

Baía: Serra de Sincorá, *Ule* 7120 (B, type, F neg. 11465).

28. ***Vriesia stricta*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 122, *pl. 133.* 1943.

Minas Gerais: Mun. Jaboticatubas: Serra do Cipó, *Foster* 622 (GH, type (US neg. 3544), US).

29. ***Vriesia minarum*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 118, *pl. 126.* 1943.

Minas Gerais: Mun. Caeté: Pico de Piedade, *Foster* 564 (GH, type, US neg. 4064, 4065).

30. ***Vriesia sparsiflora*** L. B. Smith, Contr. Gray Herb. 95: 48, *pl. 10, figs. 1, 2.* 1931.

São Paulo: Alto da Serra, *Hoehne* (SP, type).

31. ***Vriesia crassa*** Mez in Mart. Fl. Bras. 3, pt. 3: 566, *pl. 104.* 1894.

Minas Gerais: Serra do Cipó, *Duarte* 2105 (RB, US). Mun. Caeté: Serra Piedade, *Foster* 596 (GH, US).

Rio de Janeiro: Nova Friburgo, *Glaziou* 13261 (K, type, US neg. 4131). Mun. Santa Maria Madalena: Desengano, *Santos Lima & Brade* 13248 (RB).

32. ***Vriesia densiflora*** Mez in Mart. Fl. Bras. 3, pt. 3: 567. 1894.

Brazil: *Glaziou* 15672b (B, type, F neg. 11462).

33. ***Vriesia philippocoburgii*** Wawra, Oesterr. Bot. Zeitschr. 30: 219. 1880.

1. Plants without elongate rhizomes; leaf-blades 5–8 cm. wide.
Var. a. **philippocoburgii**

1. Plants with elongate rhizomes; leaf-blades much narrower.
Var. b. **vagans**

33a. ***Vriesia philippocoburgii*** var. ***philippocoburgii.*** Figure 36.
Tillandsia philippocoburgii Baker, Journ. Bot. 26: 138. 1888.

Brazil: *Dusén* 58/85 (S).

Rio de Janeiro: Petrópolis, *Foster* 36 (GH, R); *Glaziou* 16473 (P); *Wawra* II-1 (W, type). Petrópolis to Raiz da Serra, *L. B. Smith* 1324 (GH); *Smith & Mus. R* 6497 (R, US). Soberbo to Guapi, Serra dos Orgãos, *L. B. Smith* 1526 (GH). Teodoro de Oliveira to Nova Friburgo, *Smith & Mus. R* 7111 (R, US). Teresópolis, *Sampaio* (R).

Distrito Federal: Morro Queimado, *Duarte & Pereira* (RB). Tijuca, *Glaziou* 8017 (P); *Lutz* 1270 (R). Tijuca-Excelsior, *Lutz* 1447 (R).

São Paulo: Alto da Serra, *Foster* 375 (GH, R). Santos, *Mosén* 3248 (C, R, S). Rio Buturoca, Santos, *Mosén* 3492 (S). Ramal Mairink to Santos, *Lamber* (GH, SP). São Paulo to Curitiba, km. 279 (near Apiai), *Foster* 398 (GH).

PARANÁ: Guaratuba, *Smith & Reitz* 5726 (R, US). Jacareí, *Dusén* (S); 9821 (S, US); 17704 (S). Matinhos, *M. Kuhlmann* (SP). Paranaguá, *Foster* 443 (GH). Pôrto de União, *Dusén* 16121 (S).

SANTA CATARINA: Blumenau, *F. Mueller* (! Mez); *Schenck* 658 (! Mez). Brusque, *Reitz* 3592 (HBR). Rio Itajaí, *Ule* 545 (! Mez). Mun. Araranguá: Sanga da Anta, *Reitz* C-1019 (GH, HBR). Sombrio, *Reitz* C-495 (GH, HBR); C-1034 (HBR). Mun. Bom Retiro: Campo dos Padres,

FIG. 35.

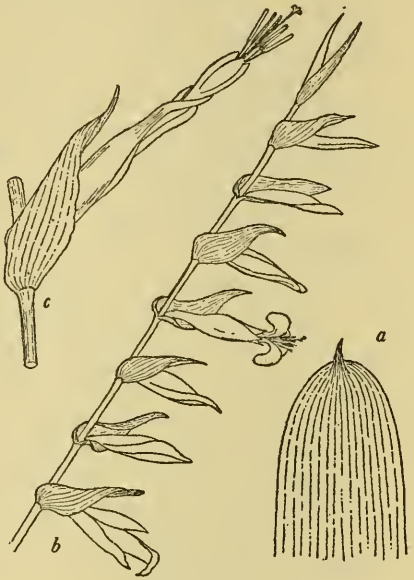

FIG. 36.

FIG. 35.—*Vriesia gigantea: a,* Habit (after Belgique Horticole), × 1/40; *b,* section of spike, × 1; *c,* sepal, × 1.

FIG. 36.—*Vriesia philippocoburgii* var. *philippocoburgii: a,* Apex of leaf, × ½; *b,* branch, × ½; *c,* floral bract and flower, × 1. (All after Wawra.)

Reitz 2634 (HBR). Mun. Canoinhas: Papanduva, *Reitz* 3981 (HBR). Mun. Florianópolis: Cacupé, *Inst. Malariologia* (HBR). Desterro [Florianópolis], *Schenck* 235 (! Mez). Mun. Palhoça: Campo de Massiambú, *Reitz* 4958 (! Reitz). Mun. São Joaquim: Rio das Contas, *Reitz* 3316 (HBR).

33b. ***Vriesia philippocoburgii*** var. ***vagans*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 121, *pl. 131.* 1943.

MINAS GERAIS: Mun. Jaboticatubas: Vaccaria to Palacio, Serra do Cipó, *Foster* 635 (GH).

RIO DE JANEIRO: Itatiaia, *Foster* 114 (GH, R). Petrópolis, *Foster* 35 (GH); 339 (GH). Teresópolis, *Sampaio* 2421 (R).

DISTRITO FEDERAL: Rio de Janeiro, *Reitz* 4277 (HBR).

São Paulo: Guapiára, *M. Kuhlmann* (SP, US). São Paulo to Curitiba, km. 279 (near Apiai), *Foster* 399 (GH, US).

Paraná: Guaratuba, *Reitz* 4251 (HBR); 4374 (HBR). Jacareí, *Dusén* 17195 (GH, SP, S).

Santa Catarina: Mun. Biguaçú: Fachinal, *Reitz* C-952 (HBR). Mun. Brusque: Azambuja, *Smith & Reitz* 6142 (R, US). Brusque, *L. B. Smith* 5673 (R, US). Ribeirão do Ouro, *Reitz* 3636 (HBR). Mun. Palhoça: Paulo Lopes, *Reitz & Klein* 102 (HBR).

Rio Grande do Sul: Lagoa dos Quadros near Tôrres, *Rambo* (US).

33c. × ***Vriesia philippocoburgii*** × *?*

Rio de Janeiro: Old road below Petrópolis, *Smith & Mus. R* 6457 (R, US). Serra do Imbé, Pedra da Republica, *Brade & Santos Lima* 11587 (R).

Santa Catarina: Blumenau, *Reitz* 3654-a (HBR, with *V. rodigasiana?*). Mun. Bom Retiro: Morro da Igreja, *Reitz* 2970 (HBR, US).

Rio Grande do Sul: Mun. São Francisco de Paula: Taimbé, *Rambo* (US).

34. ***Vriesia delicatula*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 58, *pl. 76.* 1941.

Espírito Santo: Santa Teresa, *Foster* 295 (GH, type; R).

35. ***Vriesia morrenii*** Wawra, Oesterr. Bot. Zeitschr. 30: 219. 1880.
Vriesia morenii var. *disticha* Wawra, Oesterr. Bot. Zeitschr. 30: 220. 1880.
Tillandsia morrenii Baker, Journ. Bot. 26: 139. 1888.

Espírito Santo: Santa Teresa, *Foster* 280 (R).

Minas Gerais: Araponga, *Bailey* 1097 (BH).

Rio de Janeiro: Parque Nacional, Serra dos Orgãos, *Smith & Brade* 5643 (US). Itatiaia, *Brade* 20185 (RB). Petrópolis, *Wawra* II-72 (W, type). Teresópolis, *Wawra* II-350 (W).

36. ***Vriesia ruschii*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 59, *pl. 78.* 1941.

Espírito Santo: Santa Teresa, *Foster & Ruschi* 311 (GH, type (US neg. 4067), R); 799 (GH).

37. ***Vriesia hoehneana*** L. B. Smith, Proc. Amer. Acad. 68: 150, *pl. 1, figs. 11–13.* 1933. Figure 37.
Vriesia tessellata sensu Hoehne, Album da Secção de Botanica do Museu Paulista 97, *fig.* 1925. Not E. Morr.

São Paulo: Alto da Serra, *Foster* 369 (GH); *Hoehne* (GH, SP); *Hoehne & Gehrt* (SP); *L. B. Smith* 1945 (GH, type; US). Campo Grande, *Hoehne* (GH, SP).

38. ***Vriesia amazonica*** (Baker) Mez in Mart. Fl. Bras. 3, pt. 3: 554. 1894. Figure 38.
Tillandsia gigantea Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1224. 1830.
Tillandsia amazonica Baker, Journ. Bot. 26: 108. 1888.
Vriesia gigantea Mez in Mart. Fl. Bras. 3, pt. 3: 566. 1894. Not Gaud. 1846.

Amazonas: Rio Negro, *Martius* (M, type of *Tillandsia gigantea* Mart., F neg. 18751).

Pará: Belém, *Burchell* 9440 (K, type, GH neg. 2658); cultivated, *Huber* 2903 (MG). Rio Guamá, Belém, *Smith, Pires & Black* 7120 (US).

MATO GROSSO: Cascata do Angelim, Serra do Itapirapuã, *Lindman* A-3517 (S).
ALSO: GUIANA, TRINIDAD.

39. ***Vriesia longicaulis*** (Baker) Mez in Mart. Fl. Bras. 3, pt. 3: 542. 1894.
Tillandsia longicaulis Baker, Journ. Bot. 26: 80. 1888.
Vriesia longicaulis var. *secunda* Mez in Mart. Fl. Bras. 3, pt. 3: 543. 1894.
ESPÍRITO SANTO: Santa Teresa, *Foster* 111-A (GH); 833 (GH). Mun. Castelo: Forno Grande, *Brade* 19854 (RB, US neg. 3347).
MINAS GERAIS: Vaccaria, Serra do Cipó, *Foster* 604 (GH).

FIG. 37.

FIG. 38.

FIG. 37.—*Vriesia hoehneana:* *a*, Habit, × 1/40; *b*, section of spike, × ½; *c*, sepal, × 1.
FIG. 38.—*Vriesia amazonica:* *a*, Habit, × 1/40; *b*, section of spike, × ½; *c*, sepal, × 1.

RIO DE JANEIRO: Itatiaia, *Foster* 111 (GH, R). Serra dos Orgãos, *Wawra* II-359 (W, type of *Vriesia longicaulis* var. *secunda* Mez). Petrópolis, *Foster* 506 (GH). Morro do Retiro, near Petrópolis, *Glaziou* 8988 (K, type, US neg. 3986). Teresópolis, *Foster* 978 (GH, US); 1026 (GH).
SÃO PAULO: Serra da Bocaina, *Brade* 21152 (RB).
SANTA CATARINA: Mun. Itajaí: Morro do Baú, *Reitz* 4185 (HBR); 5179 (! Reitz).

40. ***Vriesia itatiaiae*** Wawra, Oesterr. Bot. Zeitschr. 30: 221. 1880.
Tillandsia itatiaiae Baker, Journ. Bot. 26: 110. 1888.
Vriesia schenckiana Wittm. Bot. Jahrb. 13, Beibl. 29: 20. 1891.
RIO DE JANEIRO: Alto dos Orgãos, near Petrópolis, *Glaziou* 3631 (P); 4264 (P); 16470 (P). Itatiaia, *Dusén* 2199 (S); *Foster* 115 (GH, R); *Luederwaldt* (SP, GH neg. 7108); *L. B. Smith* 1502 (GH); 1703 (B, BA, BM,

F, GH, K, P, S, US); 1738 (GH); *Ule* 289 (R); *Wawra* II-463 (W, type).

41. ***Vriesia longiscapa*** Ule, Bericht. Deutsch. Bot. Gesellsch. 18: 323. 1900.
Espírito Santo: Santa Teresa, *Foster* 259 (GH, R).
Rio de Janeiro: Meio da Serra, *L. B. Smith & Brade* 2293 (GH). Nova Friburgo, *Ule* 4956 (B, type, F neg. 11464). Petrópolis, *Foster* 338 (GH, R). Teresópolis, *Foster* 979 (GH).
Distrito Federal: Rio de Janeiro, *Wilkes Expedition* (GH).

42. ***Vriesia hieroglyphica*** (Carr.) E. Morr. Ill. Hortic. 31: 41, *pl. 514.* 1884. Figure 39.
Massangea hieroglyphica Carr. Rev. Hortic. 50: 175, *figs. 33, 34.* 1878.
Tillandsia hieroglyphica Baker, Journ. Bot. 26: 110. 1888.
Brazil: Cultivated, *Liége* (LG).
Espírito Santo: Santa Teresa, *Foster* 300 (GH, R, US).
Rio de Janeiro: Alto Macaé near Petrópolis, *Glaziou* 16468 (P).
Distrito Federal: Quinta, cultivated, *Glaziou* 14343 (P).
São Paulo: Alto da Serra, *Hoehne* (GH, SP); *L. B. Smith* 2019 (B, GH, S). Ramal Mairink to Santos, *Lamber* (SP).
Paraná: Rio do Meio, *Dusén* (S).

43. ***Vriesia penduliflora*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 120, *pl. 129.* 1943.
Rio de Janeiro: Itatiaia, *Foster* 135 (GH, type, US neg. 4072).

44. ***Vriesia segadas-viannae*** L. B. Smith, p. 35, fig. 40.
Minas Gerais: Mun. Jaboticatubas: Palacio, Serra do Cipó, *Smith & Mus. R* 6755 (US, type).

45. ***Vriesia hydrophora*** Ule, Arch. Mus. Nac. Rio de Janeiro 10: 189. 1899; Bericht. Deutsch. Bot. Gesellsch. 17: 2. 1899.
Rio de Janeiro: Nova Friburgo, *Ule* 4652 (B, type, F neg. 11463). Serra Cavallo, Teresópolis, *Brade* 9849 (R, US).

46. ***Vriesia pastuchoffiana*** Glaziou ex Mez in Mart. Fl. Bras. 3, pt. 3: 564. 1894.
Distrito Federal: Morro Queimado, *Glaziou* 11684 (B, type; C (F neg. 22338), NY). Quinta, *Glaziou* (GH).

47. ***Vriesia biguassuensis*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 8, *pl. 1.* 1952.
Santa Catarina: Mun. Biguaçú: Fachinal, *Reitz* 4134 (HBR, type).

48. ***Vriesia triangularis*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 15, *pl. 4.* 1952.
Santa Catarina: Mun. Imaruí: Vargem do Cedro, *Reitz* 4279 (HBR, type).

49. ***Vriesia gradata*** (Baker) Mez in Mart. Fl. Bras. 3, pt. 3: 523. 1894.
Tillandsia gradata Baker, Journ. Bot. 26: 105. 1888.
Rio de Janeiro: Itatiaia, *Ferreira* 1799 (GH). Petrópolis, *Glaziou* 15473 (K, type (US neg. 3984), C (F neg. 22336)).
São Paulo: Santos, *Mosén* 3712 (S).

50. ***Vriesia modesta*** Mez, Bot. Jahrb. 30, Beibl. 67: 7. 1901.
Espírito Santo: Santa Teresa, *Foster* 302 (GH).

MINAS GERAIS: Serra da Mantiqueira, *Magelhaes* 1020 (B, type, F neg. 11466).
RIO DE JANEIRO: Santa Maria Madalena, *Voll* (RB, US neg. 3261).

51. ***Vriesia pauciflora*** Mez, Repert. Sp. Nov. Fedde 16:72. 1919.
DISTRITO FEDERAL: Tijuca, Rio de Janeiro, *Ule* 4048 (B, type).

52. ***Vriesia erythrodactylon*** E. Morr. ex Mez in DC. Monogr. Phan. 9:569. 1896. FIGURE 41.
Vriesia psittacina var. *erythrodactylon* E. Morr. Belg. Hortic. 32:287. 1882.
In the Pflanzenreich (IV. 32:373. 1935), Mez assigned *Vriesia decipiens*

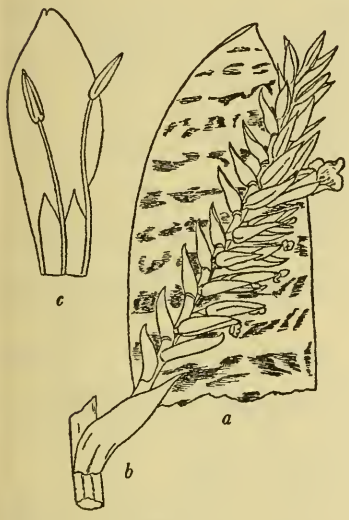

FIG. 39.

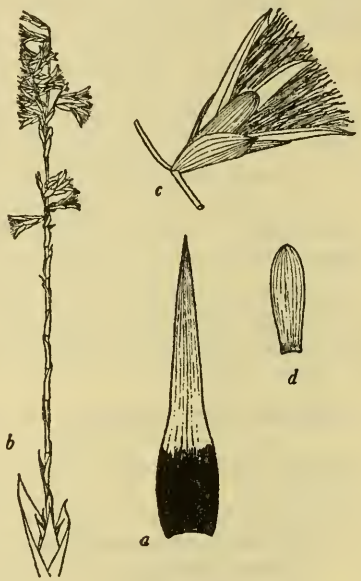

FIG. 40.

FIG. 39.—*Vriesia hieroglyphica: a,* Apex of leaf, × ¼; *b,* spike, × ¼; *c,* petal and stamens, × 1.
FIG. 40.—*Vriesia segadas-viannae: a,* Leaf, × 1/10; *b,* scape and inflorescence, × 1/10; *c,* flower and capsule, × ½; *d,* sepal, × ½.

F. Mueller (Gartenflora 42:737. 1893) to the synonymy of *V. erythrodactylon* although its valid publication clearly has priority. However, as the description is inadequate and all evidence apparently lost, it seems best to consider *V. decipiens* a nomen dubium.
ESPÍRITO SANTO: Santa Teresa, *Foster* 273 (GH, R).
RIO DE JANEIRO: Serra dos Orgãos, *Miers* 4080 (BM, US neg. 3988).
SÃO PAULO: Alto da Serra, *Foster* 363 (GH, R); *Lemos* (GH, SP); *L. B. Smith* 1923 (GH); *Smith, Hoehne & Kuhlmann* 1830 (GH, S). Ramal Mairink to Santos, *Lamber* (GH, SP). Sorocaba, Santos, *Mosén* 3493 (S).
PARANÁ: Rio Demora, Antonina, *Dusén* 14696 (GH, S). Guaratuba, *Reitz* 4250 (HBR); *Smith & Reitz* 5728 (R, US). Ipiranga, Serra do Mar, *Dusén* 3973 (R, S). Desvio Ipiranga, Serra do Mar, *Dusén* 9561 (S, US).

Jacareí, *Dusén* 15557 (S, US); 16105 (S). Volta Grande, Serra do Mar, *Dusén* 14531 (S).

Santa Catarina: Joinvile, *Reitz* 3715 (HBR). São Francisco do Sul, *Reitz* 3758-f (HBR). Mun. Araranguá: Timbe, *Reitz* C-414 (GH, HBR). Mun. Biguaçú: Fachinal, *Reitz* C-987 (HBR). Mun. Blumenau: Spitzkopf, *Reitz* 4657 (HBR). Mun. Brusque: Santa Luzia, *Reitz* 3596 (HBR); 3597 (HBR). Mun. Itajaí: Morro do Baú, *Reitz* C-2070 (HBR, US). Mun. Jaraguá do Sul: Corupá, *Seidel* 8 (HBR). Mun. Orleães: Rio Mirador, *Reitz* 3381 (HBR). Mun. Palhoça: Pilões, *L. B. Smith* 6212 (R, US).

52a. × ***Vriesia erythrodactylon*** × ***incurvata.***

São Paulo: Alto da Serra, *Foster* 374 (GH, R).

53. ***Vriesia heliconioides*** (H. B. K.) Hook. ex Walp. Ann. Bot. 3: 623. 1852.

Tillandsia heliconioides H. B. K. Nov. Gen. & Sp. 1: 293. 1816.

Tillandsia disticha Willd. ex Schult. in R. & S. Syst. 7, pt. 2: 1226. 1830. In synonymy, not *Renealmia disticha* L. 1759.

Vriesia disticha Kuntze, Rev. Gen. 3, pt. 2: 304. 1898.

Guzmania obtusa Rusby, Mem. N. Y. Bot. Gard. 7: 212. 1927.

Mato Grosso: Angelim, *Lindman* A-3329 (S).

Also: Guatemala to Panamá, Colombia, Perú, Bolivia.

54. ***Vriesia vulpinoidea*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 122, *pl. 134.* 1943.

São Paulo: Estação Florestal, São Paulo, *Foster* 356 (GH, type (US neg. 4068), R).

55. ***Vriesia rhodostachys*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 121, *pl. 132.* 1943.

Espírito Santo: Santa Teresa, *Foster* 807 (GH, type, US neg. 4066).

56. ***Vriesia incurvata*** Gaud. Atl. Voy. Bonite *pl. 68.* 1846.

Tillandsia incurvata Baker, Journ. Bot. 26: 49. 1888.

Vriesia rostrum-aquilae Mez in Mart. Fl. Bras. 3, pt. 3: 518, *pl. 107.* 1894.

Vriesia duvaliana sensu Alexander, Addisonia 19: 47, *pl. 632.* 1936. Not E. Morr.

Brazil: *D'Urville* (P); *Gaudichaud* 120 (P, type, GH neg. 3018); *Sellow* bromel. 67 (P).

São Paulo: Alto da Serra, *Foster* 381 (GH); *L. B. Smith* 2111 (F, GH, S). Boracéa, *Blanco* (GH, IAC). Boracéa to Salesópolis, *M. Kuhlmann* 2340 (SP); *Kuhlmann & Kühn* 1763 (SP). Rio Buturoca, Santos, *Mosén* 2981 (S). Cidade Jardim, *Smith & Kuhlmann* 1817-a (GH). Headwaters of the Rio Cotia, *Gehrt* (GH, SP). Paiol do Meio, *Gehrt* (GH, SP). Ramal Mairink to Santos, *Lamber* (GH, SP). Santos, *Foster* 1041 (GH). São Bento, *Burchell* 3488 (BR, type of *Vriesia rostrum-aquilae* Mez, GH neg. 2799). São Paulo, *Handro* (SP). São Paulo to Curitiba, km. 279, (near Apiai), *Foster* 381-A (GH, R). Ubatuba, *Viegas, Franco & Lima* (GH, IAC).

Paraná: Alexandra, *Dusén* 9016 (S). Curitiba to Joinvile near the Santa Catarina line, *Reitz* 3887 (HBR); 5755 (! Reitz). Curitiba to Morrêtes, *M. Kuhlmann* (SP, US). East of Curitiba, *Foster* 418 (GH, R). Rio Demora, Antonina, *Dusén* 14691 (S). Ipiranga, *Dusén* 3569 (GH, R).

Jacareí, *Dusén* (S); 8117 in part (GH, S). Monte Alegre, Serra do Mar, *Dusén* 14089 (S). Morrêtes, *Dusén* 14421 (S, US). Volta Grande, Serra do Mar, *Dusén* 14529 (GH, S).

Santa Catarina: Ribeirão Grande, Taió, *Reitz* 3995 (HBR, sterile). Mun. Araranguá: Araranguá, *Rambo* (LIL). Meleiro, *Reitz* C-1 (GH, HBR). Peroba, *Reitz* C-473 (GH, HBR). Sombrio, *Reitz* C-1033 (HBR). Timbe, *Reitz* C-420 (HBR). Turvo, *Reitz* C-52 (HBR). Mun. Brusque: Azambuja, *Reitz* C-1834 (HBR, US). Brusque, *Smith & Veloso* 5659 (R, RB, US). Mun. Florianópolis: Ribeirão da Ilha, *Reitz* 3927 (HBR). Sertão da Lagoa, *Rohr* 636 (LIL). Mun. Itajaí: Morro do Baú, *Reitz* 2065 (HBR, US). Mun. São Francisco do Sul: Pôrto das Canoas, *Smith & Reitz* 5699 (US). São Francisco do Sul, *Reitz* 3894 (HBR).

57. ***Vriesia inflata*** (Wawra) Wawra, It. Sax.-Cob. 161. 1883.

Vriesia carinata var. *inflata* Wawra, Oesterr. Bot. Zeitschr. 30: 183. 1880.

Tillandsia inflata Baker, Bot. Mag. 112: *pl. 6882.* 1886. As to basonym.

Vriesia incurvata var. *inflata* Mez in Mart. Fl. Bras. 3, pt. 3: 522. 1894.

Espírito Santo: Domingos Martins, *Foster* 237 (GH).

Rio de Janeiro: Petrópolis, *Sampaio* 7793 (R).

Distrito Federal: Bico do Papagaio, *Ule* 4046 (R). Gavea, *Smith & Mus. R* 6426 (R, US). Tijuca, *Wawra* II-219-a (W, type).

São Paulo: Alto da Serra, *Foster* 380 (GH, R, US); *Hoehne* (GH, SP); *L. B. Smith* 2110 (GH, S); *Smith, Hoehne & Kuhlmann* 1832-a (GH). Boracéa to Salesópolis, *Blanco* (GH, IAC); *Kuhlmann & Kühn* 1764 (SP).

Paraná: Alto da Serra, Serra do Mar, *Tessmann* (Paran., US). Monte Alegre, Serra do Mar, *Dusén* (S).

58. ***Vriesia petropolitana*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 120, *pl. 130.* 1943.

Vriesia incurvata sensu E. Morr. Belg. Hortic. 32: 52, *pl. 2.* 1882. Not Gaud. 1846.

Tillandsia inflata Baker, Bot. Mag. 112: *pl. 6882.* 1886. As to material and plate but not as to basonym of Wawra.

Espírito Santo: Santa Teresa, *Foster* 1214 (GH); 1248 (GH). Vargem Alta, Morro do Sal, *Foster* 952 (GH). Pôrto Novo, *Frambach* (F).

Minas Gerais: Itabira do Campo, *Matos* (R, US).

Rio de Janeiro: Parque Nacional Serra dos Orgãos, Teresópolis, *Smith & Brade* 5645 (US). Petrópolis, *Foster* 32 (GH, type (US neg. 4073), R); 40 (GH, R). Teresópolis, *Brade* 9680 (R); *Sampaio* 2149 (R).

59. ***Vriesia splendens*** (Brongn.) Lem. Fl. des Serres 6, Misc.: 162, *fig.* 1850–51.

1. Leaf-blades with broad dark irregular cross-bands..... Var. a. **splendens**
1. Leaf-blades concolorous ..... Var. b. **longibracteata**

59a. ***Vriesia splendens*** var. ***splendens.***

Tillandsia splendens Brongn. Ann. Fl. Pomone 18: 311. 1845.

Vriesia speciosa Hook. Bot. Mag. 74: *pl. 4382.* 1848.

Brazil: Probable, but not yet recorded.

British Guiana: Kaieteur, *Maguire & Fanshawe* 23331 (GH, NY).

59b. ***Vriesia splendens*** var. ***longibracteata*** (Baker) L. B. Smith, p. 126.
Tillandsia longibracteata Baker, Journ. Bot. 26: 81. 1888.
Vriesia longibracteata (Baker) Mez in DC. Monogr. Phan. 9: 568. 1896.
BRAZIL: Probable, but not yet recorded.
BRITISH GUIANA: Kaieteur, *Appun* (BM).

60. ***Vriesia carinata*** Wawra, Oesterr. Bot. Zeitschr. 12: 349. 1862. FIGURE 42.
Vriesia brachystachys Regel, Gartenflora 15: 258, *pl. 518.* 1866.
Vriesia psittacina var. *brachystachys* E. Morr. Belg. Hortic. 20: 161. 1870.
Vriesia psittacina var. *carinata* E. Morr. Belg. Hortic. 32: 287, *pls. 10–12, fig. 1.* 1882.
Tillandsia carinata Baker, Journ. Bot. 26: 49. 1888.
Tillandsia psittacina sensu E. Morton, Brazil Fl. 2: *pl. 43.* 1893.
ESPÍRITO SANTO: Rio Jucu, *Foster* 209 (GH). Santa Teresa, *Foster* 804 (GH); 1215 (GH, US). Mun. Cachoeira de Itapemirim: Pedra Branca, *Brade* 19373 (RB, US).
RIO DE JANEIRO: Petrópolis, *Foster* 34 (GH, R, US); *Glaziou* 8026 (P). Serra da Estrella, Petrópolis, *Diogo* 700 (R). Teresópolis, *Bailey* 1245 (BH); *Sampaio* 1848 (R).
DISTRITO FEDERAL: Morro Queimado, *Occhioni* 45 (RB). Rio de Janeiro, *Wilkes Expedition* (GH).
SÃO PAULO: Florestal, *Foster* 353 (GH). Jaraguá, *Gehrt* (SP). Monte Alegre, Amparo, *Kuhlmann & Kühn* 1039 (SP). Ribeirão Pires, *Edwall* (GH, SP). Santos, *Mosén* 3715 (R). São Paulo, *Sellow* bromel. 66 (P). Serra Negra, *Hochne* (SP).
PARANÁ: Alexandra, *Dusén* 8086 (S, US). North of Caiobá 30 km., *Foster* 428 (GH, R). Curitiba to Joinvile near the Santa Catarina line, *Reitz* 4137 (HBR); 5757 (HBR, US). Jacareí, *Dusén* 15221 (S, US); 15404 (GH, S); 15541 (S); 17073 (S). Matinhos, *M. Kuhlmann* (SP). Morrêtes, *Dusén* 4358 (R, S). Pôrto de Cima, *Jönsson in Dusén* 810-a (GH, S). Pôrto Dom Pedro II, *Dusén* 9876 (S). Serra da Prata, *Dusén* 15306 (S). Volta Grande, Serra do Mar, *Dusén* (S).
SANTA CATARINA: *D'Urville* (P) Blumenau, *Schwacke* 57 (R). Ribeirão Grande, Taió, *Reitz* 3996 (HBR, sterile). Mun. Araquari: Barra do Sul, *Reitz & Klein* 921 (! Reitz). Mun. Araranguá: Maracajá, *Reitz* C-601 (GH, HBR). Meleiro, *Reitz* C-28 (GH, HBR). Sombrio, *Reitz* C-484 (HBR). Turvo, *Reitz* C-565 (HBR). Mun. Brusque: Azambuja, *Reitz* C-1831 (HBR, US); 2387 (R); 4046 (HBR). Mun. Jaraguá do Sul: Corupá, *Seidel 2* (HBR); 23 (HBR). Mun. Palhoça: Pilões, *L. B. Smith* 6206 (R, RB, US).
RIO GRANDE DO SUL: Tôrres, *Golland in Lindman* (S).

60a. × ***Vriesia carinata*** × ***ensiformis.***
ESPÍRITO SANTO: Vitória, *Foster* 213 (GH, R).
RIO DE JANEIRO: Petrópolis, *Foster* 336 (GH, R).

60b. × ***Vriesia carinata*** × ***incurvata.***
PARANÁ: Caiobá, *Foster* 438 (GH).
SANTA CATARINA: Mun. Blumenau: Spitzkopf, *Reitz* 4659 (HBR).

60c. × ***Vriesia carinata*** × ***inflata.***
SÃO PAULO: Campos da Bocainha, *Loefgren & Edwall* (SP).

60d. × ***Vriesia carinata*** × ***scalaris*** or ***simplex.***
ESPÍRITO SANTO: Santa Teresa, *Foster* 1177 (GH).

60e. × ***Vriesia carinata*** ×? (species with laxer inflorescence).
SANTA CATARINA: Mun. Palhoça: Pilões, *L. B. Smith* 6208 (US).

Vriesia carinata is probably the most prolific producer of hybrids in the genus. For further crosses see under *V. morreniana.*

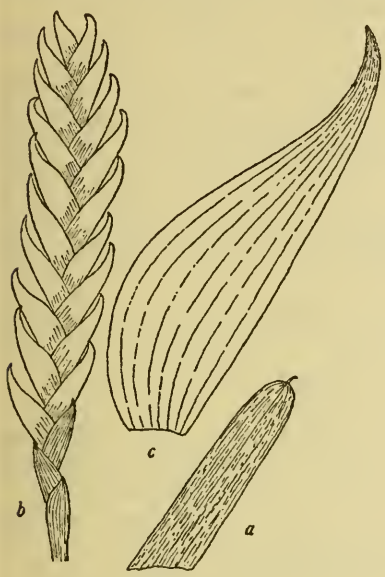

FIG. 41.

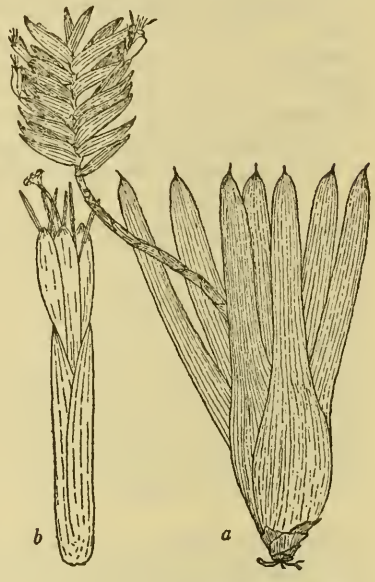

FIG. 42.

FIG. 41.—*Vriesia erythrodactylon: a,* Leaf-blade, × ¼; *b,* inflorescence, × ¼; *c,* floral bract, × 1.
FIG. 42.—*Vriesia carinata: a,* Habit, × ¼; *b,* flower, × 1.

61. ***Vriesia duvaliana*** E. Morr. Belg. Hortic. 34: 105, *pls. 7, 8.* 1884.
Vriesia psittacina var. *duvaliana* André, Rev. Hortic. 56: 559. 1884.
Tillandsia duvaliana Baker, Journ. Bot. 26: 48. 1888.
BRAZIL: *Pohl* (! Mez).
RIO DE JANEIRO: Petrópolis (?), cultivated *Binot* (LG, type). Suruí, *Foster* 327 (GH, R).

62. ***Vriesia paraïbica*** Wawra, It. Sax.-Cob. 160, *pl. 33, fig. B, pl. 36, fig. B.* 1883.
Vriesia carinata var. *constricta* Wawra, Oesterr. Bot. Zeitschr. 30: 183. 1880.
Tillandsia paraibica Baker, Journ. Bot. 26: 82. 1888. As "parabaica."
Tillandsia carinata var. *constricta* Baker, Handb. Bromel. 212. 1889.
MINAS GERAIS: Castelnovo, *Riedel* (! Mez). Juiz da Fora, *Wawra* II-184 (W, type). Villa do Principe, near Guarhães, *Saint-Hilaire* (! Mez).

63. ***Vriesia goniorachis*** (Baker) Mez in Mart. Fl. Bras. 3, pt. 3: 545. 1894.
Tillandsia goniorachis Baker, Journ. Bot. 25: 303. 1887.

DISTRITO FEDERAL: Gavea, *Smith & Mus. R* 6430 (R, US). ? Pedra do Ilheu, Andaraí Grande, near Rio de Janeiro, *Glaziou* 15471 (K, type (US neg. 3975) GH, P; C (F neg. 22335)). Pão d'Assucar, *Glaziou* 16462 (! Mez). Tijuca, *Ule* (! Mez).

64. ***Vriesia amethystina*** E. Morr. Belg. Hortic. 34: 330, *pls. 15, 16.* 1884.
Tillandsia amethystina Baker, Journ. Bot. 26: 104. 1888.

BRAZIL: Cultivated, *Kew* (K, GH neg. 2656); cultivated, *E. Morren* (LG, type).

ESPÍRITO SANTO: Collatina, *Foster* 219 (GH). Itapemirim, *Foster* 149 (GH).

65. ***Vriesia lancifolia*** (Baker) L. B. Smith, Lilloa 6: 386, *pl. 2, figs. 3, 4.* 1941.
Tillandsia lancifolia Baker, Handb. Bromel. 202. 1889.
Vriesia platzmannii Mez in Mart. Fl. Bras. 3, pt. 3: 546. 1894. In part, not as to type.

BAÍA: (Igreja Velha) *Blanchet* 3458 (BM, type (US neg. 4004), MO, US).

66. ***Vriesia parviflora*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 119, *pl. 125, fig. 2.* 1943.

ESPÍRITO SANTO: Santa Teresa, *Foster* 289 (GH); 839 (GH, type, US neg. 4074).

67. ***Vriesia psittacina*** (Hook.) Lindl. Bot. Reg. 29: *pl. 10.* 1843.

1. Floral bracts red or red and yellow, ecarinate.
   2. Floral bracts red with yellow apices..... Var. a. **psittacina**
   2. Floral bracts wholly red..... Var. b. **rubro-bracteata**
1. Floral bracts wholly green, some of them more or less carinate.
   Var. c. **decolor**

67a. ***Vriesia psittacina*** var. ***psittacina.*** FIGURE 43.
Tillandsia psittacina Hook. Bot. Mag. 55: *pl. 2841.* 1828.

BAÍA: *Blanchet* 2293 (! Mez).

ESPÍRITO SANTO: Mun. Cachoeiro de Itapemirim: Vargem Alta, *Brade* 19963 (RB, US).

RIO DE JANEIRO: Niteroi, *Foster* 1033 (GH). Serra dos Orgãos, *Wilkes Expedition* (US). Petrópolis, *Sampaio* 7623 (R). Old road below Petrópolis, *Smith & Mus. R* 6456 (R, US).

DISTRITO FEDERAL: Alto da Boa Vista, *Reitz* 3916 (HBR). Corcovado, *Lindman* A-39 (S). Gavea, *Smith & Mus. R* 6433 (R, US). Quinta da Bôa Vista, *Glaziou* 16464 in part (P). Rio de Janeiro, *Weddell* 673 (P). Sumare, Serra da Carioca, *Smith & Vieira* 1296 (GH).

67b. ***Vriesia psittacina*** var. ***rubro-bracteata*** Hook. Bot. Mag. 85: *pl. 5108.* 1859.

BRAZIL: Known only from cultivation. No material preserved.

67c. ***Vriesia psittacina*** var. ***decolor*** Wawra, Oesterr. Bot. Zeitschr. 30: 183. 1880.

RIO DE JANEIRO: Cantagallo, *Wawra* II-226 (W, type).

RIO GRANDE DO SUL: Pôrto Alegre, *Eugenio* 445 (NY). Morro da Policia, Pôrto Alegre, *Eugenio* 2488 (GH); *Palacios & Cuezzo* 661 (LIL). Mun. Tôrres: Campo Bonito, *Reitz* 4747 (! Reitz); 5001 (! Reitz).

ALSO: PARAGUAY.

68. ***Vriesia recurvata*** Gaud. Atl. Voy. Bonite *pl. 69.* 1843.
Tillandsia recurvata Baker, Journ. Bot. 26: 106. 1888. Not L. 1762.
Tillandsia decurvata Baker, Handb. Bromel. 216. 1889.
BAÍA: *Blanchet* (BM).
DISTRITO FEDERAL: Rio de Janeiro, *Gaudichaud* (P, type, GH neg. 3044).

69. X ***Vriesia morreniana*** Hort. ex E. Morr. Belg. Hortic. 32: 289. 1882.
X *Vriesia psittacina* X *brachystachys* E. Morr. Belg. Hortic. 29: 300. 1879.
Vriesia psittacina var. *morreniana* E. Morr. Belg. Hortic. 32: 287, *pls. 10–12, fig. 3.* 1882.
X *Vriesia carinata* X *psittacina* Mez in Mart. Fl. Bras. 3, pt. 3: 528. 1894.
The type of *Vriesia morreniana* was produced by an artificial cross between *V. carinata* and *V. psittacina.* However, it is probable that the second parent is sometimes another species, because *V. carinata* is so dominant that the elongation of the rhachis is about the only observable effect of the other species. Also *V. morreniana* occurs in regions where *V. psittacina* is not recorded.
BRAZIL: Cultivated, *E. Morren* (LG, type).
MINAS GERAIS: Rio Retiro, Passa Quatro, *Brade & Silva Araujo* 1900 (RB, US).
RIO DE JANEIRO: Itatiaia, *Foster* 113 (GH, R); *Ule* 302 (R).
SÃO PAULO: Atibaia, *Foster* 472 (GH, R); 474 (GH). Serra da Bocaina, *Brade* 20983 (RB, US). Headwaters of Rio Cotia, *Gehrt* (GH, SP) Invernada do Pinhal, *Loefgren & Edwall* (SP). Fonte Sanitaria, *Foster* 391-A (GH). Rio Tijuca, *Foster* 462 (GH, R). Rio Tijuco, Apiai, *M. Kuhlmann* (SP). Una to Piedade, *M. Kuhlmann* (SP). Mun. São Paulo: Cidade Jardim, *Smith & Kuhlmann* 1815 (GH, S); 1816 (GH). Florestal, *Foster* 355 (GH, R); 391 (GH, R, US). Pirajussára, *Gehrt* (SP); *Ostermeyer* (SP). São Paulo, *Handro* (SP).
PARANÁ: Curitiba to Joinvile near the Santa Catarina line, *Reitz* 4136 (HBR); 5740 (HBR, US). Jacareí, *Dusén* 6765 (S, US). Pôrto da Cima, *Jönsson in Dusén* 811-A (S). Roça Nova, *Dusén* 8137 (S). Volta Grande, *Dusén* 12060 (S). Mun. Piraquara: Base of Morro Anhangava, *Hatschbach* 987 (US).
SANTA CATARINA: Blumenau, *Reitz* 4135 (HBR).

70. ***Vriesia ensiformis*** (Vell.) Beer, Bromel. 92. 1857.
1. Floral bracts coriaceous throughout.
2. Floral bracts bright red..... Var. a. **ensiformis**
2. Floral bracts yellow with green apices..... Var. b. **warmingii**
1. Floral bracts with red coriaceous bases and soft yellow apices that soon disintegrate..... Var. c. **bicolor**

70a. ***Vriesia ensiformis*** var. ***ensiformis.*** FIGURE 44.
Tillandsia ensiformis Vell. Fl. Fluminensis 133. 1825; Icon. 3: *pl. 129.* 1835.
Vriesia conferta Gaud. Atl. Voy. Bonite *pl. 65.* 1843.
Vriesia conferta var. *recurvata* Wawra, Oesterr. Bot. Zeitschr. 30: 184. 1880. In part, as to Wawra collections.
Tillandsia selloana Baker, Journ. Bot. 26: 104. 1888.
Tillandsia heterostachys Baker, Journ. Bot. 26: 106. 1888.
Vriesia selloana Mez in Mart. Fl. Bras. 3, pt. 3: 547. 1894.
BRAZIL: *Glaziou* 13263 (P). *Sellow* bromel. 63 (P).
BAÍA: Bom Gosto to Olivença, *Fróes* 19938 (IAN, NY); 19939 (IAN, NY).

Espírito Santo: Santa Teresa, *Foster* 143-A (GH); 1249 (GH, US). Vitória, *Foster* D (GH).

Minas Gerais: Coronel Pacheco, *Heringer* 1165 (SP). Mun. Antonio Dias: Parque Nacional, *Foster* 762 (GH).

Rio de Janeiro: Entre Rios, *Wawra* II-126-a (W); II-126-b (W). Itatiaia, *Foster* 143 (GH, R); 144 (GH); 146 (GH, R).

Distrito Federal: Serra da Bica, *Ule* 4615 (R). Quinta, *Glaziou* 16463 (P). Rio de Janeiro, *Gaudichaud* 366 (P, type of *Vriesia conferta* Gaud., GH neg. 3014).

Fig. 43.

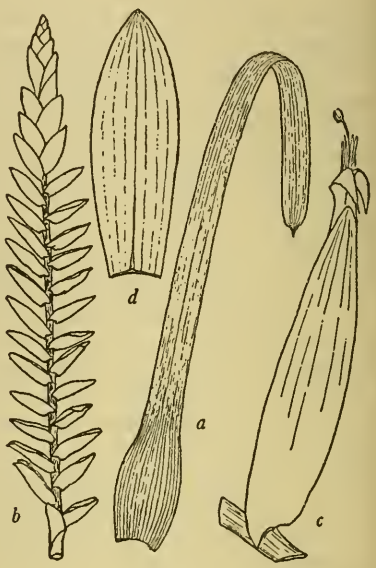

Fig. 44.

Fig. 43.—*Vriesia psittacina* var. *psittacina*: *a*, Apex of leaf, × ¼; *b*, inflorescence, × ¼; *c*, floral bract and flower, × 1.

Fig. 44.—*Vriesia ensiformis* var. *ensiformis*: *a*, Leaf, × ⅛; *b*, inflorescence, × ⅛; *c*, floral bract and flower, × 1; *d*, sepal, × 1.

São Paulo: Alto da Serra, *Mosén* 3251 (S). Serra da Bocaina, *Castellanos* (GH). Cubatão, *L. B. Smith* 2044 (GH). Raiz da Serra, *Hemmendorff* (SP). Mun. São Paulo: Cidade Jardim, *Smith & Kuhlmann* 1817-b (B, GH, S). Ipiranga, *Luederwaldt* (SP).

Paraná: Alexandra, *Dusén* 9015 (S, US). Caiobá, *Foster* 426 (GH). Jacareí, *Dusén* 17028 (S); 18008-a (GH, S). Morrêtes, *Dusén* 4347 (R).

Santa Catarina: Blumenau, *Reitz* 3659 (HBR); 3674 (HBR); *Inst. Malariologia in Reitz* 3659 (HBR). São Francisco do Sul, *Reitz* 3680 (HBR); 3883 (HBR). Mun. Araquari: Itapocu, *Smith & Reitz* 5760 (R, RB, US). Mun. Florianópolis: Barra do Sul, *Reitz & Klein* 920 (! Reitz). Mun. Indaial: Encano, *Reitz* 3989 (HBR). Mun. Jaraguá do Sul: Corupá, *Seidel* 9 (HBR).

70b. ***Vriesia ensiformis*** var. ***warmingii*** (E. Morr.) L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 116. 1943.

Vriesia warmingii E. Morr. in Belg. Hortic. 34: 260, *pls. 12, 13.* 1884.

Tillandsia warmingii Baker, Journ. Bot. 26: 104. 1888.

BRAZIL: Cultivated in Liége, Belgium, *E. Morren* (LG, type).

70c. ***Vriesia ensiformis*** var. ***bicolor*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 116. 1943.

SÃO PAULO: Alto da Serra, *Foster* 362 (GH, R); *Hoehne* (SP, type; GH); *M. Kuhlmann* (SP); *Smith, Hoehne & Kuhlmann* 1831 (GH). Ipiranga, *Luederwaldt* (SP). São Caetano, *J. G. Kuhlmann* (RB). São Vicente, Santos, *Gehrt* (GH, SP).

70d. × ***Vriesia ensiformis*** × ***incurvata.***

SANTA CATARINA: São Francisco do Sul, *Reitz* 4248 (! Reitz).

71. ***Vriesia fenestralis*** Linden & André, Ill. Hortic. 22: 124, *pl. 215.* 1875.

Tillandsia fenestralis Hook. f. Bot. Mag. 112: *pl. 6898.* 1886.

Vriesia hamata L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 59, *pl. 77.* 1941.

ESPÍRITO SANTO: Santa Teresa, *Foster* 247 (GH, type of *Vriesia hamata* L. B. Smith; R).

DISTRITO FEDERAL: Barra da Tijuca, *Reitz* 4203 (HBR).

PARANÁ: Cultivated, *E. Morren* (LG, type?).

72. ***Vriesia atra*** Mez in Mart. Fl. Bras. 3, pt. 3: 543, *pl. 101.* 1894.

RIO DE JANEIRO: Petrópolis, *Glaziou* 8989 (B, type). Teresópolis, *Foster* 993 (GH, US); 1017 (GH, US).

73. ***Vriesia jonghii*** (Libon ex C. Koch) E. Morr. Belg. Hortic. 28: 257. 1878. FIGURE 45.

Encholirion jonghii Libon ex C. Koch, Allg. Gartenz. 22. 1857.

Tillandsia jonghei C. Koch, Wochenschr. 11: 91. 1868.

Vriesia gamba F. Mueller, Flora 83: 460. 1897.

BRAZIL: Cultivated (LG, type?).

ESPÍRITO SANTO: Araguai, *Foster* 171 (GH, R, US).

DISTRITO FEDERAL: Serra da Carioca, *L. B. Smith* 1281 (GH).

SÃO PAULO: Alto da Serra, *Foster* 365 (GH); *L. B. Smith* 1951 (GH). Rio Buturoca, Santos, *Mosén* 3250 in part (S).

PARANÁ: Curitiba to Joinvile near the Santa Catarina line, *Reitz* 3888 (HBR). Guaratuba, *Reitz* 4270 (HBR); 4666 (HBR); *Smith & Reitz* 5731 (US). Jacareí, *Dusén* 8133 (S); 17019 (GH, S, US). Paranaguá toward Curitiba 30 km., *Foster* 425 (GH). Pôrto Dom Pedro II, *Dusén* 8133-A (S, US); 9870 (S).

SANTA CATARINA: Brusque, *Reitz* (HBR, US); 3644 (HBR). Mun. São Francisco do Sul: Pôrto das Canoas, *Smith & Reitz* 5701 (US).

74. ***Vriesia fosteriana*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 116, *pl. 121.* 1943.

ESPÍRITO SANTO: Mun. Cachoeiro de Itapemirim: Vargem Alta, Morro do Sal, *Foster* 947 (GH, type; US).

75. ***Vriesia platynema*** Gaud. Atl. Voy. Bonite *pl. 66.* 1843.

1. Leaf-blades essentially concolorous.
   2. Leaves rounded and apiculate.
      3. Sepals obtuse.

4. Scape stout; rhachis 5 mm. in diameter or more.
5. Floral bracts red..... Var. a. **platynema**
5. Floral bracts yellow..... Var. b. **flava**
4. Scape slender; rhachis scarcely more than 2 mm. in diameter. Var. c. **gracilior**
3. Sepals acute..... Var. d. **libonii**
2. Leaves acuminate..... Var. e. **rosea**
1. Leaf-blades not concolorous.
6. Leaf-blades pale-striate..... Var. f. **striata**
6. Leaf-blades red-violet beneath, green above, pale striate near the apex. Var. g. **variegata**

75a. ***Vriesia platynema*** var. ***platynema***. FIGURE 46.

Tillandsia platynema Griseb. Nachr. Ges. Wiss. Goett. for 1864: 19. 1865.
Vriesia corallina Regel, Gartenflora 19: 354, *pl. 671*. 1870.
Encholirium corallinum Linden ex André, Ill. Hortic. 18: 136, *pl. 70*. 1871.
Tillandsia corallina C. Koch, Ind. Sem. Hort. Berol. for 1873, App. 4: 5. 1874.

CEARÁ: (Bico Alto), Serra de Baturite, *Ducke* (MG).

DISTRITO FEDERAL: Rio de Janeiro, *Gaudichaud* (P, type, GH neg. 3025). Morro Queimado, *Occhioni* 43 (RB). Tijuca, *Foster* 321 (GH, R). Tijuca, Excelsior, *Lutz* 1443 (R).

SÃO PAULO: Alto da Serra, *Foster* 364 (GH); *Gehrt* (SP); *L. B. Smith* 1952 (GH). Monte Alegre, *M. Kuhlmann* 409 (SP). Santos, *Mosén* 3250 in part (US). Ilha dos Alcatrazes, Santos, *Luederwaldt & Fonseca* (SP). Piaçaguera, Santos, *J. G. Kuhlmann* (RB). Ramal Mairink to Santos, *Lamber* (SP). Sorocaba, Santos, *Mosén* 2985 (S); 3711 (S). São Paulo, *J. G. Kuhlmann* (RB). São Paulo to Curitiba km. 279, *Foster* 395 (GH).

PARANÁ: Campo Largo, *Foster* 407 (GH). Curitiba, *Dusén* 17453 (GH, S). Ipiranga, *Dusén* 3553 in part (R); 9006 (S, US); 14381 (S, US). Jacareí, *Dusén* 9009 (S); 17452 (GH, S). Coast 30 km. from Paranaguá, *Foster* 422 (GH). Serra São Luiz, *M. Kuhlmann* (SP). Mun. Ponta Grossa: Ponta Grossa, *Foster* 2528 (R, US). Vila Velha, *Foster* 415 (GH).

SANTA CATARINA: Estrada Dona Francisca, Joinvile, *Reitz* 3724 (HBR). Ribeirão Grande, Taió, *Reitz* 3991 (HBR). Mun. Araranguá: Garuva, *Reitz* C-778 (GH, HBR). Mun. Biguaçú: Fachinal, *Reitz* C-950 (GH); 1399 (R). Mun. Brusque: Ribeirão do Ouro, *Reitz* 3637 (HBR). Mun. Chapecó: Itapiranga, Rio Peperí-Gauçú, *Reitz* 3859 (HBR). Mun. Florianópolis: Ribeirão da Ilha, *Reitz* 3925 (HBR). Rio Tavares, *Smith & Reitz* 6187 (R, US). Mun. Itajaí: Morro do Baú, *Reitz* C-2075 (HBR, US). Mun. Orleães: Rio Mirador, *Reitz* 3377 (HBR).

RIO GRANDE DO SUL: São Salvador, *Eugenio* 2160 (GH). Silveira Martins, *Lindman* A-1373 (S). Mun. Pôrto Alegre: Belém, *Golland in Lindman* (S). Mun. São Francisco de Paula: Taimbé, *Rambo* (US).

ALSO: MÉXICO, WEST INDIES, VENEZUELA.

75b. ***Vriesia platynema*** var. ***flava*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 15. 1952.

SANTA CATARINA: Morro do Baú, Itajaí, *Reitz* 4665 (HBR, type).

75c. ***Vriesia platynema*** var. ***gracilior*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 121. 1943.

ESPÍRITO SANTO: Santa Teresa, *Foster* 267 (GH, type (US neg. 4082), R).

75d. ***Vriesia platynema*** var. ***libonii*** Mez in Mart. Fl. Bras. 3, pt. 3: 553. 1894.
BRAZIL: Cultivated (LG, type).

75e. ***Vriesia platynema*** var. ***rosea*** (Hort. ex Antoine) Mez in Mart. Fl. Bras. 3, pt. 3: 552. 1894.
Encholirion roseum Hort. ex Antoine, Phyto-Iconogr. 26. 1884.
BRAZIL: Cultivated (LG, type).

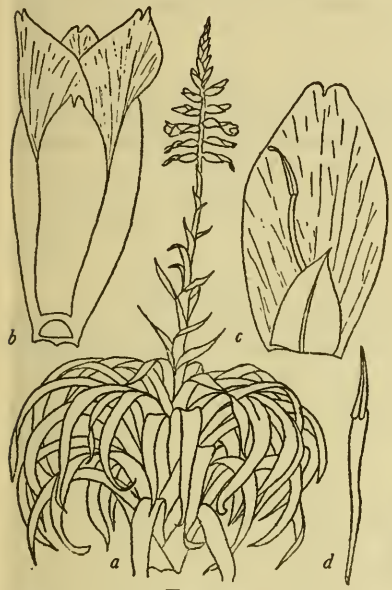

FIG. 45.

FIG. 46.

FIG. 45.—*Vriesia jonghii: a,* Habit, × 1/20; *b,* flower, × 1; *c,* petal and stamen, × 1; *d,* stamen, × 1. (All after Belgique Horticole.)
FIG. 46.—*Vriesia platynema* var. *platynema: a,* Leaf-blade, × ¼; *b,* inflorescence, × ⅛; *c,* floral bract and flower, × 1. (All after Gaudichaud.)

75f. ***Vriesia platynema*** var. ***striata*** (Wittm.) Wittm. ex Mez in Mart. Fl. Bras. 3, pt. 3: 553. 1894.
Vriesia corallina var. *striata* Wittm. Bot. Jahrb. 13, Beibl. 29: 6. 1891.
SANTA CATARINA: Joinvile to São Bento, *Schimper* 265 (Herb.?, type).

75g. ***Vriesia platynema*** var. ***variegata*** (Guillon) Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 15. 1952.
Encholirion roseum variegatum Guillon, Rev. Hortic. 55: 470. 1883.
PARANÁ: Curitiba to Paranaguá, *Reitz* 5765 (! Reitz).

76. ***Vriesia wawranea*** Antoine, Phyto-Iconogr. 1, *pls. 1, 2.* 1884.
Tillandsia wawranea Baker, Journ. Bot. 26: 105. 1888.
BRAZIL: Described from living material, none now remaining.
RIO DE JANEIRO: Petrópolis, *Glaziou* 14342 (K, US neg. 3983).

77. ***Vriesia bituminosa*** Wawra, Oesterr. Bot. Zeitschr. 12:347. 1862.
Tillandsia platynema sensu Baker, Journ. Bot. 26:106. 1888. In part.
Vriesia platynema sensu Wittm. Bot. Jahrb. 13, Beibl. 29:21. 1891.

BRAZIL: *Foster* 37 (R).

BAÍA: Ilheus, *Wawra & Maly* (! Mez).

MINAS GERAIS: Mun. Caeté: Pico de Piedade, *Foster* 565 (GH).

RIO DE JANEIRO: Itatiaia, *L. B. Smith* 1625 (B, F, GH, S). Serra dos Orgãos, *Burchell* 2321 (K, US neg. 3982). Petrópolis, *Glaziou* 15466 (P); *Wawra* II-25 (W, type). Teresópolis, *Bailey* 1248 (BH, GH); *L. B. Smith* 1519 (GH).

SÃO PAULO: Serra da Bocaina, *Brade* 21153 (RB, US). Campos do Jordão, *Eugenio* 3370 (GH). Umuarama, Campos do Jordão, *M. Kuhlmann* (SP). Monte Alegre, Amparo, *Kuhlmann & Kühn* 409 (SP). São Paulo, *Doering* (SP); *Loefgren* (SP); cultivated, *Hoehne* (GH, SP).

78. ***Vriesia regnellii*** Mez in Mart. Fl. Bras. 3, pt. 3:548, *pl. 102.* 1894.

MINAS GERAIS: Mun. Antonio Dias, *Foster* 731 (GH). Caldas, *Regnell* III-1799 (B, type; US).

79. ***Vriesia pardalina*** Mez in Mart. Fl. Bras. 3, pt. 3:523. 1894.

MINAS GERAIS: Sapucai Mirim, *M. Kuhlmann* 2604 (SP). Serra do Cipó, *Duarte* 2233 (RB, US). Serra da Piedade, *Schwacke* (! Mez); *Warming* (! Mez). Pico da Piedade, Belo Horizonte, *Foster* 586 (GH).

RIO DE JANEIRO: Petrópolis, *Lutz* 1251 (R).

DISTRITO FEDERAL (?): Morro de São Vicente, *Glaziou* 15474 (B, type, F neg. 11468).

80. ***Vriesia guttata*** Linden & André, Ill. Hortic. 22:43, *pl. 200.* 1875.
Tillandsia guttata Baker, Journ. Bot. 26:108. 1888.
Tillandsia duvaliana Baker, Handb. Bromel. 212. 1889. In part.

MINAS GERAIS: Serra da Piedade, *Barreto* (SP).

RIO DE JANEIRO: Itatiaia, *Brade* 17477 (RB); *Foster* 134 (GH). Morin, Petrópolis *Glaziou* 14344 (P). Teresópolis, *Foster* 999 (GH, US). Pedra do Frade, Teresópolis, *Brade* 10409 (R).

SÃO PAULO: Alto da Serra, *Foster* 134-A (GH). Campo Grande, *Pires* (SP). Guapiara, *M. Kuhlmann* (SP, US). São Paulo, *Ostermeyer* (SP). São Paulo to Curitiba km. 279, *Foster* 393 (GH, R).

PARANÁ: Carvalho, *Dusén* 9014 (S, US). Desvio Ipiranga, Serra do Mar, *Dusén* (S, US); 3570 (R).

SANTA CATARINA: Estrada Dona Francisca, Joinvile, *Reitz* 3714 (HBR). Serra do Mirador, Taió, *Reitz* 3956 (! Reitz). Mun. Araranguá: Serra da Pedra, *Reitz* C-316 (GH, HBR). Mun. Biguaçú: Fachinal, *Reitz* C-930 (GH, HBR). Mun. Brusque: Morro do Spitzkopf, *Reitz* 2304 (! Reitz); 3461 (HBR); 3900 (HBR). Mun. Orleães: Rio Mirador, *Reitz* 3429 (HBR).

80a. × ***Vriesia guttata*** ×?

SÃO PAULO: São Paulo, *Loefgren* (SP, GH neg. 7127, atypical, scape short and only slightly curved).

81. × ***Vriesia obliqua*** Quintus ex Wittm. Gartenflora 41:201, *pl. 1369.* 1892.

BRAZIL: Described from cultivation. No herbarium material preserved apparently.

82. × ***Vriesia retroflexa*** E. Morr. Belg. Hortic. 34: 185, *pl. 10.* 1884.
× Vriesia psittacina × simplex Mez in Mart. Fl. Bras. 3, pt. 3: 525. 1894.
× Vriesia psittacina × scalaris E. Morr. ex Mez in DC. Monogr. Phan. 9: 578. 1896.
São Paulo: Mun. São Paulo: Florestal, *Foster* 354-a (GH).

83. ***Vriesia simplex*** (Vell.) Beer, Bromel. 97. 1857.
Tillandsia simplex Vell. Fl. Fluminensis 133. 1825; Icon. 3: *pl. 130.* 1835.
Vriesia scalaris sensu Antoine, Phyto-Iconogr. 30, *pl. 19.* 1884. Not E. Morr. 1879.
Espírito Santo: Santa Teresa, *Foster* 296 (GH, R).
Rio de Janeiro: Serra dos Orgãos, *Wilkes Expedition* (GH). Barreira, Serra dos Orgãos, *Duarte & Pereira* (RB).
São Paulo: Mun. São Paulo: Cidade Jardim, *Gehrt & Kuhlmann* (SP); *Smith & Kuhlmann* 1818 (GH). Florestal, *Foster* 354 (GH, R). Parque Jabaquára, *Hoehne* (GH, SP). Pinheiros, *Edwall* (GH, SP).
Also: Trinidad, Colombia.

84. ***Vriesia scalaris*** E. Morr. Belg. Hortic. 29: 301. 1879. Figure 47.
Tillandsia scalaris Baker, Journ. Bot. 26: 108. 1888.
Espírito Santo: Collatina, *Foster* 227 (GH). Santa Teresa, *Foster* 297 (GH, US); 298 (GH). Mun. Cachoeiro de Itapemirim: Vargem Alta, *Brade* 19965 (RB, US neg. 3351).
Minas Gerais: Mun. Antônio Dias: Coronel Fabriciano, *Foster* 734 (US).
Distrito Federal: Tijuca, *L. B. Smith & Brade* 2238 (GH).
Santa Catarina: Blumenau, *Reitz* (HBR); 3623 in part (HBR); 3673 (HBR). Brusque, *Reitz* 3817 (HBR); *L. B. Smith* 5770 (US). Mun. Florianópolis: Ribeirão da Ilha, *Reitz* 3923 (HBR). Santo Antonio, *Reitz* 3921 (HBR).

85. ***Vriesia interrogatoria*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 117, *pl. 124.* 1943.
Rio de Janeiro: Itatiaia, *Foster* 1039 (GH, type, US neg. 4071).

86. ***Vriesia clausseniana*** (Baker) Mez in Mart. Fl. Bras. 3, pt. 3: 545. 1894.
Tillandsia clausseniana Baker, Handb. Bromel. 213. 1889.
Minas Gerais: Mun. Santa Barbara: Caraça, *Claussen* (P, type, GH neg. 3017); *Foster* 688 (GH).

87. ***Vriesia viridiflora*** (Regel) Wittm. ex Mez, Engl. Pflanzenreich IV. 32: 387. 1935.
Pitcairnia viridiflora Regel, Ind. Sem. Hort. Petrop. for 1866: 81. 1867.
Vriesia viminalis E. Morr. Belg. Hortic. 28: 257, *pls. 14, 15.* 1878.
Tillandsia viminalis Hemsl. Biol. Centr.-Am. Bot. 3: 323. 1884.
Brazil: Probable, but not yet recorded.
British Guiana: Kaieteur, *Maguire & Fanshawe* 23332 (GH, NY).

88. ***Vriesia unilateralis*** (Baker) Mez in Mart. Fl. Bras. 3, pt. 3: 545. 1894.
Tillandsia unilateralis Baker, Journ. Bot. 26: 105. 1888.
Espírito Santo: Vargem Alto, Morro do Sal, *Foster* 950 (GH).
Rio de Janeiro: Teresópolis, *Sampaio* 2493 (R).
São Paulo: Campina Grande, *Handro* 415 (SP, US). São Bento, near Santos, *Burchell* 3347 (K, type, US neg. 3985).

PARANÁ: Curitiba to Joinvile near the Santa Catarina line, *Reitz* 3876 (HBR). Ipiranga and Volta Grande, *Dusén* 3566 (R). Pôrto de Cima, Serra do Mar, *Dusén* 16663 (S, US).

SANTA CATARINA: Blumenau, *F. Mueller* (! Mez). Spitzkopf, Blumenau, *Reitz* 4650 (HBR); *Smith & Reitz* 6294 (US). Estrada Dona Francisca, Joinvile, *Reitz* 3725 (HBR, US).

89. ***Vriesia brassicoides*** (Baker) Mez in DC. Monogr. Phan. 9: 598. 1896.
Tillandsia brassicoides Baker, Journ. Bot. 26: 12. 1888.

DISTRITO FEDERAL: Corcovado, *Burchell* 1393 (K, type, US neg. 3976).

90. ***Vriesia platzmannii*** E. Morr. Belg. Hortic. 25: 349, *pl. 23*. 1875.
Tillandsia platzmannii Baker, Journ. Bot. 26: 104. 1888.

PARANÁ: Guaratuba, *Reitz* 3630 (HBR); 4271 (HBR); *Smith & Reitz* 5745 (R, US). Paranaguá, *Foster* 445 (GH); *M. Kuhlmann* (SP).

SANTA CATARINA: São Francisco do Sul, *Reitz* 3705 (HBR). Mun. Araranguá: Ilhas, *Reitz* C-253 (GH (US neg. 4081), HBR). Sombrio, *Reitz* C-901 (HBR). Mun. Palhoça: Campo de Massiambú, *Reitz* 4839 (! Reitz); 4967 (! Reitz). Palhoça, *Reitz* 5518 (! Reitz).

91. ***Vriesia oligantha*** (Baker) Mez in Mart. Fl. Bras. 3, pt. 3: 544. 1894.
Tillandsia oligantha Baker, Journ. Bot. 25: 345. 1887.

MINAS GERAIS: Ouro Preto, *Glaziou* 15472 (K, type (US neg. 3987), C); *Schenck* 3507 (! Mez). Serra de Capanema, *Schwacke* 9315 (! Mez). Serra de Cipó, *Duarte* 1982 (RB, US); *Foster* 621 (GH). Mun. Joboticatubas: Serra do Cipó, 5 km. north of Chapeu de Sol, *Smith & Mus. R* 6696 (R, US).

92. ***Vriesia racinae*** L. B. Smith, Lilloa 6: 387, 413, *pl. 3, figs. 5, 6*. 1941.

ESPÍRITO SANTO: Santa Teresa, *Foster* 270 (GH, type, US neg. 3935).

93. ***Vriesia poenulata*** (Baker) E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3: 573, *pl. 106*. 1894.
Tillandsia glaziovii E. Morr. ex Baker, Handb. Bromel. 229. 1889.
Tillandsia poenulata Baker, Handb. Bromel. 230. 1889.

BRAZIL: Cultivated (K, Morren Icon., type).

ESPÍRITO SANTO: Santa Teresa, *Foster* 268 (GH, R).

RIO DE JANEIRO: Serra dos Orgãos, *Glaziou* 3627 (BR (GH neg. 2800), P).

DISTRITO FEDERAL: Morro do Archer, *Brade* 10414 (R); *Brade & Duarte* 18588 (RB). Morro Queimado, *Occhioni* 44 (RB); 46 (RB).

94. ***Vriesia flammea*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 59, *pl. 79*. 1941.

SÃO PAULO: Rio Quilombo, *Doering* (SP). Rio Buturoca, Santos, *Mosén* 2982 (S). São Vicente, Santos, *Gehrt* (SP).

PARANÁ: Jacareí, *Dusén* 9012 (S, US); 17486 (GH, type; S, SP). Mun. Paranaguá: Caiobá, *Foster* 430 (GH, R).

SANTA CATARINA: Blumenau, *F. Mueller* (K, US neg. 4137); *Reitz* 3877 (HBR); 3899 (HBR). Joinvile, *Reitz* 3832 (HBR). Mun. Araranguá: Meleiro, *Reitz* C-36 (GH, HBR). Sombrio, *Reitz* C-907 (HBR, US); 1368 (R). Timbe, *Reitz* C-416 (HBR). Mun. Biguaçu: Fachinal, C-935 (HBR). Mun. Brusque: Azambuja, *Smith & Reitz* 6046 (R, RB, US). Brusque, *Smith & Reitz* 5661 (US). Morro Spitzkopf, *Reitz* 3454 (HBR). Mun. Jaraguá do Sul: Corupá, *Seidel in Reitz* 4154 (HBR). Mun.

Palhoça: Campo de Massiambú, *Reitz* 5033 (! Reitz). Pilões, *L. B. Smith* 6209 (US).

95. ***Vriesia corcovadensis*** (Britten) Mez in Mart. Fl. Bras. 3, pt. 3: 532. 1894. FIGURE 48.

Tillandsia ventricosa Wawra, Oesterr. Bot. Zeitschr. 30: 222. 1880. Not Griseb. 1865.

Tillandsia corcovadensis Britten, Journ. Bot. 26: 172. 1888.

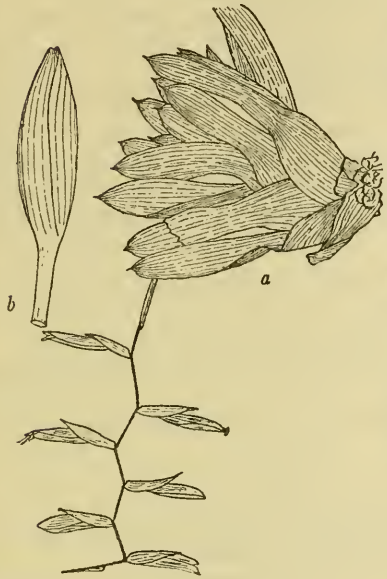

FIG. 47.

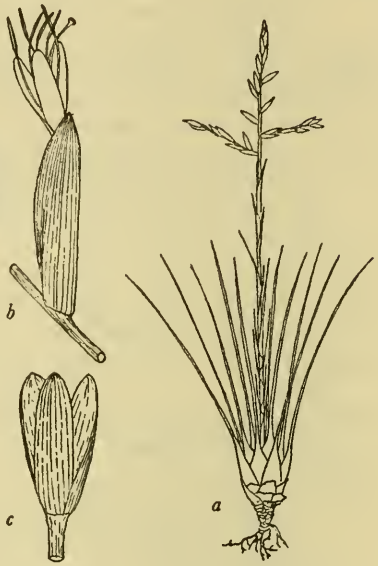

FIG. 48.

FIG. 47.—*Vriesia scalaris: a,* Habit, × ¼; *b,* sepals, × 1.
FIG. 48.—*Vriesia corcovadensis: a,* Habit, × 1/10; *b,* flower × 1; *c,* sepals, × 1.

Tillandsia oligantha Baker, Handb. Bromel. 215. 1889. In part, not as to type.

Vriesia rubida E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3: 574. 1894.

Vriesia ventricosa Mez in DC. Monogr. Phan. 9: 583. 1896.

BRAZIL: Cultivated, *E. Morren* (LG, type of *Vriesia rubida* E. Morr.); *Widgren* 1077 (S).

DISTRITO FEDERAL: Serra da Carioca, *Brade* 11345 (R). Corcovado, *Glaziou* 11683 (C (F neg. 22333), K (US neg. 3977)). Estrada Dona Castorina, *L. B. Smith* 1364 (GH). Gavea, *Smith & Mus. R* 6432 (R, US). Represa dos Macacos, *Pereira* 650 (RB, US). Matas do Pae Ricardo, *Occhioni* 41 (RB, US neg. 3263). Morro Queimado, *Brade* 11273 (R). Tijuca, *Lutz* 1452 (GH); *L. B. Smith* 2128 (GH); *Ule* 4128 (R); *Wawra* II-224 (W, type).

SANTA CATARINA: Blumenau, *Reitz* 4676 (HBR).

Subgenus *Alcantarea* E. Morr. ex Mez

96. ***Vriesia geniculata*** (Wawra) Wawra, It. Max. 156, *pl. 25* (except the serrate leaves). 1866.

Platystachys geniculata Wawra, Oesterr. Bot. Zeitschr. 12: 345. 1862.

Vriesia gigantea sensu Lem. Ill. Hortic. 14: *pl. 516.* 1867. Not as to description.

Vriesia glaziouana Lem. Ill. Hortic. 14, Misc.: 43, *fig. 2.* 1867.

Vriesia regina sensu Gard. Chron. nov. ser. 3: 234, *fig. 41.* 1875.

Tillandsia regina sensu Baker, Journ. Bot. 26: 139. 1888. In part.

Vriesia vasta Mez in Mart. Fl. Bras. 3, pt. 3: 572. 1894.

Minas Gerais: Itabira do Campo, *Melo Matos* (R).

Rio de Janeiro: Petrópolis to Raiz da Serra, *L. B. Smith* 1326 (GH). Santa Maria Madalena, *Santos Lima & Brade* 14178 (RB, US).

Distrito Federal: Cultivated, Jardim Botânico, *Dionysio* (RB, US neg. 3266); *J. G. Kuhlmann* 6179 (RB). Rio de Janeiro, *Wilkes Expedition* (GH). São Cristovão, *Glaziou* 15468 (B, type of *Vriesia vasta* Mez; C (F neg. 22340), K (US neg. 4130), US). Tijuca, *Glaziou,* 8016 (K, US neg. 4134).

97. ***Vriesia extensa*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 116, *pl. 120.* 1943.

Vriesia regina sensu Wittm. Gartenflora 40: 160, *fig. 46, 47.* 1891.

Espírito Santo: Cachoeiro do Itapemirim, *Foster* 163 (GH, type, US neg. 4080).

Rio de Janeiro–Minas Gerais: (Serra do Picu), cultivated (Herb.?, *Vriesia regina* sensu Wittm.).

98. ***Vriesia regina*** (Vell.) Beer, Bromel. 97. 1857.

Tillandsia regina Vell. Fl. Fluminensis 136. 1825; Icon. 3: *pl. 142.* 1835.

Tillandsia blokii Hemsl. Bot. Mag. 134: *pl. 8192.* 1908.

Alcantarea regina Harms, Engl. & Prantl, Pflanzenfam. ed. 2. 15a: 126. 1930.

Vriesia blokii Mez, Engl. Pflanzenreich IV. 32: 405. 1935.

Brazil: *Tillandsia blokii* was described from cultivated material of unknown origin.

Rio de Janeiro: "Pharmacopolis" (Parati) given in original description, no material known.

Distrito Federal: Cliff by western end of Praia Sernambetiba, *Smith & Mus. R* 6829 (R, US).

99. ***Vriesia brasiliana*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 115, *pl. 119.* 1943.

Vriesia regina sensu Mez in Mart. Fl. Bras. 3, pt. 3: 569. 1894. In part.

Rio de Janeiro: Meio da Serra, *L. B. Smith & Brade* 2295 (GH, type, US neg. 3959). Teresópolis, *Glaziou* 11685 (GH, K, US neg. 4133).

100. ***Vriesia imperialis*** Carr. Rev. Hortic. 60: 58. 1888.

Vriesia gigantea sensu Lem. Ill. Hortic. 14: sub *pl. 516.* 1867. As to description, not as to plate. Not Gaud. Also as to Misc. 43, *fig. 1.*

Vriesia glaziouiana Carr. Rev. Hortic. 53: 50, *fig. 15, pl.* 1881.

Tillandsia regina sensu Baker, Handb. Bromel. 227. 1889. In part.
Alcantarea imperialis Harms. Engl. & Prantl, Pflanzenfam. ed. 2. 15a: 126. 1930.

BRAZIL: Cultivated, *Manda* (GH).

RIO DE JANEIRO: Serra dos Orgãos, *Glaziou* 13262 (US); 15469 (K, US neg. 4132). Parque Nacional, Serra dos Orgãos, *Smith & Brade* 5653 (US).

13. *Guzmania* R. & P.

Guzmania R. & P. Fl. Peruv. 3:37, *pl. 261.* 1802.

A genus predominantly of the Andean rain forest with a few species in Central America, the West Indies, Venezuela, Guiana, and northern and western Brazil.

1. Bracts below the inflorescence inconspicuous, not forming an involucre.
   2. Floral bracts distinctly shorter than the sepals.
      3. Inflorescence lax and with laxly flowered branches or rarely simple, nearly 2 dm. long; sepals lanceolate, mucronulate, 20–25 mm. long; leaf-blades concolorous, green..... 1. **G. brasiliensis**
      3. Inflorescence densely digitate with dense spikes 4 cm. long; sepals elliptic, obtuse, 15 mm. long; leaf-blades ornamented with dark purple cross-bands..... 2. **G. vittata**
   2. Floral bracts equaling or exceeding the sepals.
      4. Inflorescence compound, lax, its dense ellipsoid spikes fertile throughout; floral bracts coriaceous, broadly elliptic, obtuse, concolorous; sepals elliptic, acute, 15 mm. long..... 3. **G. pleiosticha**
      4. Inflorescence simple, cylindric, sterile toward the apex; floral bracts membranaceous, ovate, acute, the fertile ones conspicuously brown-striped; sepals obovate, broadly obtuse, 18 mm. long. 4. **G. monostachia**
1. Bracts below the simple corymbiform inflorescence forming a showy involucre that overtops the flowers; sepals free, linear or linear-oblong.
   5. Leaf-blades 30–40 mm. wide; floral bracts strongly cucullate. 5. **G. lingulata**
   5. Leaf-blades not more than 25 mm. wide; floral bracts slightly or not at all cucullate. (Fig. 49.)..... 6. **G. minor**

1. ***Guzmania brasiliensis*** Ule, Verh. Bot. Ver. Brand. 48:147. 1907.
Schlumbergeria brasiliensis Harms, Engl. & Prantl, Pflanzenfam. ed. 2. 15a:129. 1930.

AMAZONAS: Manaus, *Ule* 5427 (B, type, (F neg. 11543), MG). Taraquá, Rio Uaupés, *Pires* 1004 (IAN). São Marcelino, opposite Rio Xié, Cocui to Rio Içana, Rio Negro, *Schultes & López* 9567 (US).

ALSO: COLOMBIA.

2. ***Guzmania vittata*** (Mart. ex Schult.) Mez in DC. Monogr. Phan. 9:946. 1896.
Bonapartea vittata Mart. ex Schult. in R. & S. Syst. 7, pt. 2:1198. 1830.
Caraguata vittata Baker, Handb. Bromel. 146. 1889.

AMAZONAS: Muguentaua, Rio Tefé, *Fróes* 26288 (IAN).

ALSO: COLOMBIA.

3. ***Guzmania pleiosticha*** (Griseb.) Mez in DC. Monogr. Phan. 9: 930. 1896.
Tillandsia pleiosticha Griseb. Nachr. Ges. Wiss. Goett. for 1864: 19. 1865.
Guzmania altsonii L. B. Smith, Contr. Gray Herb. 89: 7, 78, *pl. 1, fig. 1.* 1930.

BRAZIL: Probable, but not yet recorded.

BRITISH GUIANA: Kaieteur, *Maguire & Fanshawe* 23410 (GH, NY).

4. ***Guzmania monostachia*** (L.) Rusby ex Mez in DC. Monogr. Phan. 9: 905. 1896.
Renealmia monostachia L. Sp. Pl. 287. 1753.
Guzmania tricolor R. & P. Fl. Peruv. 3: 38, *pl. 261.* 1802.

CEARÁ: (Riacho do Capim), *Huber* (MG). Serra de Baturité, *Ducke* (MG).

ALSO: SOUTHERN FLORIDA, WEST INDIES and NICARAGUA to VENEZUELA and BOLIVIA.

5. ***Guzmania lingulata*** (L.) Mez in DC. Monogr. Phan. 9: 899. 1896.
Tillandsia lingulata L. Sp. Pl. 286. 1753.
Caraguata lingulata Lindl. Bot. Reg. 13: sub *pl. 1068.* 1827.

PARÁ: Belém, *Archer* 7974 (IAN, US).

MATO GROSSO: Capão Sêco, *Lindman* A-2359 (S).

ALSO: CENTRAL AMERICA and the WEST INDIES to GUIANA and BOLIVIA.

6. ***Guzmania minor*** Mez in DC. Monogr. Phan. 9: 901. 1896. FIGURE 49.

AMAPÁ: Igarapé Nataia, Rio Oiapoque, *Froes* 25879 (IAN).

PARÁ: Belém, *Archer* 7831 (IAN). Aurá, Belém, *Pires & Ledoux* 3202 (IAN); *L. B. Smith* 7123 (US). Tapana, Belém, *Killip & Smith* 30349 (US). Utinga, Belém, *Pires* 1938 (IAN).

BAÍA: Agua Preta, *Foster* 49 (GH).

ALSO: NICARAGUA, COSTA RICA, PANAMÁ, COLOMBIA, and a variety in ECUADOR.

14. *Catopsis* Griseb.

Catopsis Griseb. Fl. Brit. West Ind. 599. 1864.

West Indies and southern México to Perú.

1. Sepals to 12 mm. long; lower scape-bracts imbricate; flowering plant 4–9 dm. high; leaves acute. (Fig. 50.) ..... 1. **C. berteroniana**
1. Sepals 7–8 mm. long; scape-bracts all shorter than the internodes; flowering plant 1–3 dm. high; leaves rounded and apiculate..... 2. **C. sessiliflora**

1. ***Catopsis berteroniana*** (Schult.) Mez in DC. Monogr. Phan. 9: 621. 1896. FIGURE 50.
Tillandsia berteroniana Schult. in R. & S. Syst. 7, pt. 2: 1221. 1830.
Catopsis mosenii Mez in DC. Monogr. Phan. 9: 622. 1896.

SÃO PAULO: Caraguatatuba, *Foster* 502 (GH); *Hoehne & Gehrt* (SP). Rio Buturoca, Santos, *Mosén* 3495 (R, S). Iguapé, Santos, *Hoehne* (SP).

PARANÁ: Guaratuba, *Inst. Malariologia* (! Reitz); *Reitz* 4239 (HBR); *L. B. Smith* 5732 (R, US). Jacareí, *Dusén* (S); 17027 (S). Paranaguá, *Dusén* 9799 (S); *Foster* 446 (GH); *M. Kuhlmann* (SP).

SANTA CATARINA: Joinvile, *Reitz* 3762 (HBR).

ALSO: FLORIDA, GREATER ANTILLES, CENTRAL AMERICA, VENEZUELA, TRINIDAD, BRITISH GUIANA.

2. ***Catopsis sessiliflora*** (R. & P.) Mez in DC. Monogr. Phan. 9: 625. 1896.
Tillandsia sessiliflora R. & P. Fl. Peruv. 3: 42, *pl. 271, fig. b.* 1802.
Catopsis nutans sensu Baker, Journ. Bot. 25: 176. 1887.
Catopsis nutans var. *erecta* Wittm. Bot. Jahrb. 11: 71. 1889.
Catopsis modesta F. Mueller, Gartenflora 42: 717. 1893.

PARÁ: Belém, *Burchell* 9394 (! Mez); *Martius* (! Mez); *Spruce* 112 (! Mez); *L. B. Smith* 7121 (US).

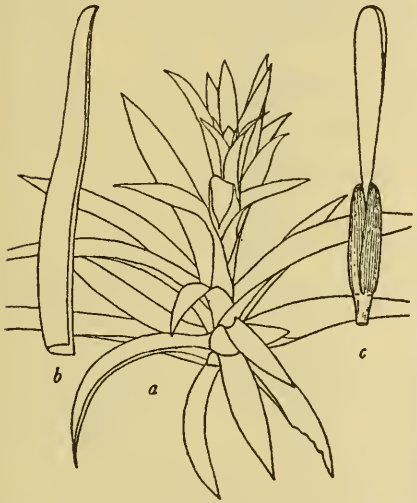

FIG. 49.

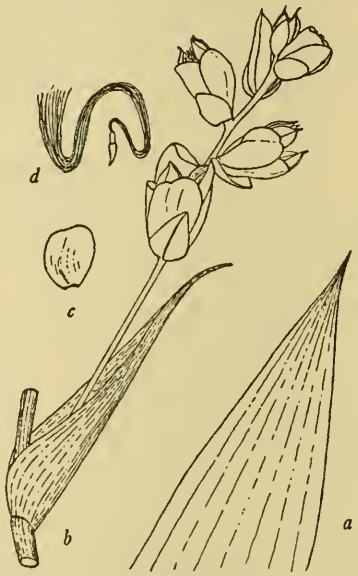

FIG. 50.

FIG. 49.—*Guzmania minor: a,* Habit, × ⅙; *b,* floral bract, × 1; *c,* flower, × 1.
FIG. 50.—*Catopsis berteroniana: a,* Apex of leaf, × 1; *b,* branch of inflorescence, × 1; *c,* sepal, × 1; *d,* seed, × 1.

BAÍA: Agua Preta, *Foster* 54 (GH, R).
SÃO PAULO: Santos, *Mosén* 3496 (S).
PARANÁ: Guaratuba, *L. B. Smith* 5727 (R, US). Paranaguá, *Foster* 447 (GH, R); *M. Kuhlmann* (SP). Jacareí, *Dusén* 6574 (S); 14697 (S).
SANTA CATARINA: Blumenau, *Reitz* 3625 in part (HBR). Brusque, *Reitz* 3688 (HBR). Joinvile, *Reitz* 4160 (HBR). Parati, *Hoehne* (SP). São Francisco do Sul, *Reitz* 3764 (HBR). Mun. Araranguá: Sombrio, *Reitz* C-1075 (GH, HBR).
ALSO: WEST INDIES and SOUTHERN MÉXICO to PERÚ.

15. *Fernseea* Baker

Fernseea Baker, Handb. Bromel. 19. 1889.

A monotypic Brazilian endemic.

1. ***Fernseea itatiaiae*** (Wawra) Baker, Handb. Bromel. 20. 1889. FIGURE 51.
Bromelia itatiaiae Wawra, Oesterr. Bot. Zeitschr. 30: 114. 1880.
Aechmea stenophylla Baker, Handb. Bromel. 64. 1889.

MINAS GERAIS: Mun. Passa Quatro: Pico Itaguaré, *Brade* (! A. C. Brade, Rodriguesia 11 & 12: 140. 1949).

RIO DE JANEIRO: Itatiaia, *Brade* (RB); 12725 (GH); 20216 (RB); *Dusén* 537 (R); *Foster* 116 (GH, R); *Gaunelle* (G); *Ginzberger & Zerny* 57 (F, WU); *Glaziou* 5464 (P); *Hemmendorff* (LIL); 558 (R); *Luederwaldt* (SP); *L. B. Smith* 1480 (B, BA, BM, F, GH, K, P, S, US); *Tamandare & Brade* 6379 (S); *Toledo & Brade* 730 (RB); *Ule* 291 (R); 291-A (R); *Wawra* II-442 (W, type).

16. *Araeococcus* Brongn.

Araeococcus Brongn. Ann. Sci. Nat. II. 15: 370. 1841.

Costa Rica, Tobago, Trinidad, Guiana, Venezuela.

1. Flowers sessile.
2. Branches of the inflorescence spreading, much divided, geniculate. 1. **A. micranthus**
2. Branches of the inflorescence ascending, simple or slightly divided, slightly flexuous..... 2. **A. goeldianus**

1. Flowers slenderly pedicellate.
3. Blades of the inner leaves linear-triangular, caudate-acuminate, serrulate. 3. **A. flagellifolius**
3. Blades of all the leaves ligulate, acute, entire..... 4. **A. parviflorus**

1. ***Araeococcus micranthus*** Brongn. Ann. Sci. Nat. II. 15: 370. 1841.

AMAZONAS: Manaus, *Ule* 5423 (MG); 8824 (MG). São Raimundo, Manaus, *Luetzelburg* 22098 (M). Maués, *Pires* 121 (IAN). Mun. Humaitá: Livramento, *Krukoff* 6952 (GH). Rio Livramento to Rio Ipixuna, *Krukoff* 7156 (GH, NY).

ACRE: Rio Macauã on the Rio Iaco, *Krukoff* 5810 (NY).

AMAPÁ: Oiapoque, *Black* 49–8386 (IAN). Igarapé Pontamarrí, Oiapoque, *Fróes* 26003 (IAN).

PARÁ: Belém, *Museu Goeldi staff* (MG). Taperinha, near Santarém, *Ginzberger & Zerny* 391 (F).

MATO GROSSO: Utiariti, Rio Papagaio, *Hochne in Rondon* 2026 (R).

ALSO: TOBAGO, TRINIDAD, GUIANA.

2. ***Araeococcus goeldianus*** L. B. Smith, p. 20, fig. 52.

AMAPÁ: Cunani, *Huber* 983 (MG, type).

3. ***Araeococcus flagellifolius*** Harms, Notizblatt 10: 784. 1929.

AMAZONAS: (Rio Apauu), region of Rio Negro, *Huebner* 58? (B, type, F neg. 11300).

ALSO: VENEZUELA, COLOMBIA.

4. ***Araeococcus parviflorus*** (Mart.) Lindm. Svensk. Akad. Handl. 24, no. 8: 12. 1891.

Billbergia parviflora Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1270. 1830.
Lamprococcus chlorocarpus Wawra, It. Max. 162, *pl. 28*. 1866.
Aechmea parviflora Baker, Journ. Bot. 17: 167. 1879.

BAÍA: Almada, *Martius* (M, type). Ilheus, *Wawra & Maly* I-232 (! Mez). Rio Grungogi, *Curran* 216 (GH, US). Salvador, *Foster* 2432 (US).

RIO DE JANEIRO (?): Esperança, *Riedel* (! Mez; locality doubtful, more likely from Ilheus).

FIG. 51.

FIG. 52.

FIG. 51.—*Fernseea itatiaiae: a,* Leaf, × ½; *b,* inflorescence, × ½; *c,* flower, × 2. (All after Flora Brasiliensis.)

FIG. 52.—*Araeococcus goeldianus: a,* Habit, × 1/10; *b,* section of spike, × 1; *c,* sepal, × 5.

17. *Streptocalyx* Beer

Streptocalyx Beer, Flora 37: 348. 1854.

French Guiana, Colombia, Ecuador, Perú, Bolivia.

1. Inflorescence amply tripinnate; spikes very laxly 1–7-flowered; rhachis very slender; sepals 8–13 mm. long including the 3 mm. long mucro; pollen-grains with 4 pores; ovules caudate-appendaged. (Fig. 53.)
1. S. floribundus

1. Inflorescence bipinnate or rarely somewhat tripinnate at the base.
2. Floral bracts serrulate; sepals often serrulate as well, 14–20 mm. long, slightly exceeding the floral bracts; scape short; inflorescence not much

longer than broad, dense and sunk in the center of the leaf-rosette. 2. **S. longifolius**

2. Floral bracts entire.
3. Flowers fasciculate on abbreviated branches; floral bracts broadly ovate, apiculate, exceeding the ovary; sepals 16–22 mm. long... 3. **S. poitaei**
3. Flowers spicate on distinct branches.
4. Spikes distichous-flowered; sepals 16–19 mm. long.
5. Floral bracts reniform, apiculate, much shorter than the ovary. (Fig. 54.)..... 4. **S. poeppigii**
5. Floral bracts ovate, acuminate, equaling or exceeding the ovary.
6. Inflorescence pyramidal, subsessile in the center of the leaf-rosette. 5. **S. fuerstenburgii**
6. Inflorescence cylindric, distinctly scapose..... 6. **S. williamsii**
4. Spikes polystichous-flowered.
7. Inflorescence densely lanate; sepals much connate, 7 mm. long exclusive of the stout mucro..... 7. **S. lanatus**
7. Inflorescence sparsely furfuraceous, soon glabrous; sepals free, 8 mm. long, merely apiculate..... 8. **S. curranii**

1. ***Streptocalyx floribundus*** (Mart. ex Schult.) Mez in Mart. Fl. Bras. 3, pt. 3: 284. 1892. FIGURE 53.

Aechmea floribunda Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1271. 1830.
Pironneava platynema Gaud. Atl. Voy. Bonite *pl. 64.* 1843.
Aechmea platynema Baker, Journ. Bot. 17: 166. 1879.
Pironneava floribunda Wittm. Bot. Jahrb. 13, Beibl. 29: 14. 1891.

BRAZIL: *Foster* 378 (R).

ESPÍRITO SANTO: Vitória, *Foster* 200 (GH, R, US). Mun. Collatina: Monte Claro, *Foster* 223 (GH).

RIO DE JANEIRO: Caxias, *Passareli* (R). Mauá, *Hemmendorff* 440 (R, S). Niteroi, *Smith & Brade* 2348 (B, BA, BM, F, GH, K, P, S, US). Pôrto da Caixa, *Brade* 15025 (RB, US). Restinga da Piratininga, *J. G. Kuhlmann* (RB). Suruí, *Foster* 328 (GH).

DISTRITO FEDERAL: Morro da Babilonia, *Hoehne* (GH, SP). Copacabana, *Ule* 4053-A (R). Corcovado, *Duarte* (RB). Rio de Janeiro, *Burchell* 76-a (GH); *Glaziou* 8027 (BM, S); *Hombron* (P); *Martius* (M, type, F neg. 18762); *Miers* 3211 (BM); *Mosén* 4662 (S); *Ule* 4053 (R). São Cristovão, *Glaziou* 5465 (P).

2. ***Streptocalyx longifolius*** (Rudge) Baker, Handb. Bromel. 31. 1889.

Bromelia longifolia Rudge, Guyan. 1: 31, *pl. 49.* 1805.
Streptocalyx angustifolius Mez in Mart. Fl. Bras. 3, pt. 3: 283, *pl. 62.* 1892.

AMAZONAS: Ega (Tefé), *Poeppig* 2599 (W, type of *Streptocalyx angustifolius* Mez). Cachoeirinha, Manaus, *Luetzelburg* 22106 (GH, M, R). Rio Negro, Manaus, *Ule* 5280 (MG).

ALSO: COLOMBIA, PERÚ.

3. ***Streptocalyx poitaei*** Baker, Handb. Bromel. 31. 1889.

Streptocalyx tessmannii Harms, Notizblatt 9: 1151. 1927.

AMAZONAS: (Boa Sorte), Rio Jurua, *J. G. Kuhlmann* 1587 (RB).

ALSO: PERÚ, COLOMBIA, FRENCH GUIANA.

4. ***Streptocalyx poeppigii*** Beer, Bromel. 141. 1857. FIGURE 54.
Lamprococcus vallerandii Carr. Rev. Hortic. 49: 129, *fig. 23, 24, pl.* 1877.
Streptocalyx vallerandii E. Morr. Belg. Hortic. 33: 13, *pl. 1, 2.* 1883.
Streptocalyx juruanus Ule, Verh. Bot. Ver. Brand. 48: 133. 1907.

AMAZONAS: Ipanoré to Rio Negro on Rio Uaupés, *Schultes & López* 9148 (US); 9150 (IAN, US). Juruá-Mirim, upper Rio Juruá, *Ule* 5616 (B). Manaus, *Killip & Smith* 30166 (US); *Tate* 48 (NY). Marari, *Ule* 5366-a (B, F neg. 11291). Mun. Humaïtá: Tres Casas, *Krukoff* 6275 (GH, NY).

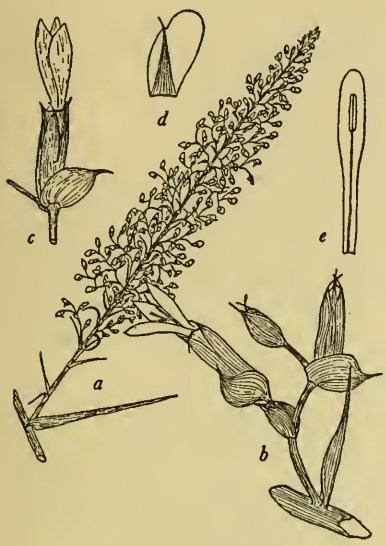

FIG. 53.

FIG. 54.

FIG. 53.—*Streptocalyx floribundus: a,* Branch of inflorescence, × 1/8; *b,* spike, × 1; *c,* flower, × 1; *d,* sepal, × 1; *e,* petal and stamen, × 1.

FIG. 54.—*Streptocalyx poeppigii: a,* Primary bract and spike, × 1; *b,* flower, × 1; *c,* sepal, × 1; *d,* petal and stamen, × 1.

PARÁ: Cultivated, *Chantin* (LG, ? type of *Lamprococcus vallerandii* Carr.). Rio Cuminá, Varadouro, Pirarara, *Sampaio* 5250 (R).

ALSO: COLOMBIA, PERÚ, BOLIVIA.

5. ***Streptocalyx fuerstenbergii*** (E. Morr. & Wittm.) E. Morr. Belg. Hortic. 33: 16. 1883.
Aechmea fuerstenbergii E. Morr. & Wittm. Belg. Hortic. 29: 42, *pl. 2.* 1879.

BAÍA: Cultivated, *Kirchhoff* (LG, type). Serra das Almas, *Luetzelburg* (! Mez). Upper Rio de Contas, *Luetzelburg* (! Mez). Upper Rio Preto, northwestern Baía, *Luetzelburg* (! Mez).

6. ***Streptocalyx williamsii*** L. B. Smith, Contr. Gray Herb. 98: 14, *pl. 4, fig. 7.* 1932.

AMAZONAS: Mouth of Rio Içana, *Schultes & López* 9785 (US). São Paulo de Olivença, *Krukoff* 8597 (NY).

ALSO: PERÚ.

7. ***Streptocalyx lanatus*** L. B. Smith, Contr. Gray Herb. 95: 45, *pl. 11, figs. 4, 5.* 1931.

BAÍA: Rio Grungogi, *Curran* 138 (US, type).

8. **Streptocalyx curranii** L. B. Smith, Contr. Gray Herb. 95: 44, *pl. 11, figs. 7–9.* 1931.

BAÍA: Rio Grungogi, *Curran* 143 (US, type). Agua Preta, *Foster* 51 (GH).

18. *Neoregelia* L. B. Smith

Neoregelia L. B. Smith, Contr. Gray Herb. 104: 78. 1934.

Largely natives of eastern Brazil with a few Amazonian and one species extending into eastern Colombia and Peru.

1. Inflorescence compound.
   2. Petals free; axes glabrous; leaves thick, coriaceous.
      3. Inflorescence many-flowered, 6–8 cm. in diameter; leaf-spines 5–7 mm. long; sepals 21–26 mm. long..... 1. **N. eleutheropetala**
      3. Inflorescence 5–15-flowered, 3 cm. in diameter; leaf-spines 2 mm. long; sepals 12 mm. long..... 2. **N. myrmecophila**
   2. Petals connate at base; axes ferruginous-lepidote; leaves not coriaceous; floral bracts about equaling the sepals, serrulate; sepals 15 mm. long. 3. **N. fosteriana**

1. Inflorescence simple; petals connate at base so far as known.
   4. Inner leaves of the rosette bright red.
      5. Leaves marked with strong transverse bands on the underside and with a red spot at the apex; sepals uncinate, strongly asymmetric, 18–23 mm. long..... 4. **N. spectabilis**
      5. Leaves concolorous or rarely with longitudinal bands; sepals straight.
         6. Underside of the leaves covered with coarse appressed cinereous scales; sepals acute or acuminate.
            7. Leaf-blades about 15 mm. wide; floral bracts serrulate. 5. **N. pineliana**
            7. Leaf-blades to 40 mm. wide; floral bracts entire.
               8. Sepals 37 mm. long; (? inner leaves red). (28. **N. macrosepala**)
               8. Sepals 24–27 mm. long.
                  9. Pedicels 5 mm. long, exceeding the inner floral bracts. 6. **N. princeps**
                  9. Pedicels to 15 mm. long, shorter than the floral bracts. 7. **N. farinosa**
         6. Underside of the leaves bearing minute inconspicuous scales; floral bracts entire.
            10. Pedicels 10–20 mm. long; sepals to 34 mm. long; scape elongate; rosette tubular..... 8. **N. bahiana**
            10. Pedicels shorter; scape short.
               11. Inflorescence few-flowered.
                  12. Leaf-blades concolorous; floral bracts about equaling the sepals; sepals very short-connate..... 9. **N. olens**
                  12. Leaf-blades bearing a red spot at the apex; floral bracts about equaling the ovary; sepals connate for more than a third of their length..... 10. **N. indecora**

11. Inflorescence many-flowered, hemispherical.
13. Leaves strongly serrulate; sepals 21–28 mm. long, connate for about one-fourth of their length, obtuse.... 11. **N. carolinae**
13. Leaves subentire; sepals 19 mm. long, connate for more than half their length, acute..... 12. **N. compacta**

4. Inner leaves like the outer, green or purplish.
14. Sepals 13–18 mm. long; flowers about 30 mm. long or less; plants small.
15. Leaves entire or subentire, to 35 mm. wide; sepals obtuse, 15–18 mm. long. (Fig. 55.)..... 13. **N. laevis**
15. Leaves distinctly serrulate, narrower.
16. The leaves rarely over 15 cm. long, forming a cylindric or ellipsoid tank constricted at the apex.
17. Sepals acute or acuminate, subsymmetric, 15 mm. long; petal-blades with broad dark blue margins..... 14. **N. ampullacea**
17. Sepals obtuse, strongly asymmetric, 12 mm. long; petal-blades wholly white. (Fig. 56.)..... 15. **N. hoehneana**
16. The leaves larger; tank more infundibuliform.
18. Leaves densely appressed-lepidote on both sides; pedicels 13–14 mm. long; sepals 14–15 mm. long.
19. Sepals nearly free, strongly asymmetric, the apex extending 3 mm. above the wings; leaves 22 cm. long. (Fig. 57.) 16. **N. leprosa**
19. Sepals connate for 3 mm., subsymmetric, apiculate; leaves 36 cm. long. (Fig. 58.)..... 17. **N. fluminensis**
18. Leaves minutely lepidote beneath or glabrous.
20. Pedicels 20 mm. long; sepals connate for 1.5 mm., much exceeding the floral bracts; leaves 4 cm. wide. 18. **N. macahensis**
20. Pedicels 5–10 mm. long.
21. Leaves strongly sulcate beneath with the scales wholly within the grooves, usually acuminate and cuspidate. 19. **N. cyanea**
21. Leaves nearly or quite even beneath, broadly acute or rounded.
22. Blades of the leaves wholly green with sparse inconspicuous scales; floral bracts slightly exceeding the ovary, obscurely serrulate toward the apex; petals white. 20. **N. albiflora**
22. Blades of the leaves bicolorous, densely pale-lepidote beneath; floral bracts equaling the mid-point of the sepals or higher.
23. Leaf-blades marked beneath with transverse bands; petals violet..... 21. **N. tristis**
23. Leaf-blades without bands but sometimes spotted; petals white..... 22. **N. sarmentosa**

14. Sepals 19–37 mm. long; flowers 40 mm. long or more; plants generally large.
24. Leaf-sheaths concolorous.
25. Blades of the leaves concolorous on each side or with a few spots.

26. Leaf-sheaths dark brown; sepals 33–34 mm. long, slightly to one-fourth exserted above the floral bracts.
27. Blades of the leaves 55 mm. wide, truncate with a soft apiculus that rapidly disintegrates; sepals free... 25. **N. leucophoea**
27. Blades of the leaves 30 mm. wide, acute with a persistent terminal subulus 5 mm. long; sepals connate for 5 mm. 24. **N. uleana**

26. Leaf-sheaths green or purplish.
28. Leaves subentire.
29. Blades of the leaves 75 mm. wide, green; petals white. 25. **N. johannis**
29. Blades of the leaves not more than 45 mm. wide.
30. Pedicels 5 mm. long; leaves wholly green; sepals slightly exserted; petals unknown. (Fig. 60.) 26. **N. kuhlmannii**
30. Pedicels elongate; leaves violet-tinged throughout; sepals half exserted; petals violet..... 27. **N. coriacea**
28. Leaves distinctly serrulate or serrate.
31. Scales of the leaves coarse and conspicuous.
32. Sepals 27 mm. long; pedicels to 15 mm. long. (7. **N. farinosa**)
32. Sepals 35–37 mm. long; pedicels to 30 mm. long. (Fig. 61.)..... 28. **N. macrosepala**
31. Scales of the leaves minute, completely covering the underside of the leaf.
33. Inflorescence few-flowered, about 2 cm. in diameter; leaf-blades only 23 mm. wide; sepals subsymmetric, lanceolate, acute. (Fig. 62.)..... 29. **N. oligantha**
33. Inflorescence many-flowered, ample.
34. Spines of the leaves red; sepals acute, straight; floral bracts cucullate. (Fig. 63.)..... 30. **N. cruenta**
34. Spines of the leaves dark, almost black; sepals subulate-acuminate, more or less uncinate; floral bracts straight. (Fig. 64.)..... 31. **N. concentrica**

25. Blades of the leaves cross-banded above or beneath.
35. Inflorescence few-flowered.
36. Leaf-blades with irregular purple bands on both sides, two to three times as long as the sheaths, 20–30 mm. wide; pedicels 13 mm. long; sepals symmetric, acute, 26 mm. long; inflorescence about 15-flowered; floral bracts barely exceeding the ovary, serrulate..... 32. **N. zonata**
36. Leaf-blades with regular fine white bands, little or no longer than the sheaths; pedicels 20–25 mm. long; sepals 20–23 mm. long.
37. Floral bracts shorter than the pedicels; leaf-sheaths dark purple above; leaf-blades 35 mm. wide; sepals acuminate. (Fig. 65.)..... 33. **N. pauciflora**
37. Floral bracts nearly equaling the sepals; leaf-sheaths only a little darker than the blades; leaf-blades 50 mm. wide; sepals involute-subulate. (Fig. 66.) 34. **N. melanodonta**

35. Inflorescence many-flowered; leaf-blades 5–7 cm. wide, banded beneath.
38. Leaf-spines more than 7 mm. long; sepals 37 mm. long; floral bracts about equaling the center of the sepals; petals white. 35. **N. carcharodon**
38. Leaf-spines not more than 3 mm. long; sepals smaller.
39. Floral bracts about equaling the center of the sepals; pedicels 12 mm. long; petals pale red..... 36. **N. makoyana**
39. Floral bracts equaling or exceeding the sepals.
40. Petals violet; floral bracts rounded, cucullate; sepals acute. 30. **N. cruenta**
40. Petals white; floral bracts acute; sepals involute-subulate. 37. **N. binotii**
24. Leaf-sheaths with pale spots; pedicels 10–15 mm. long; sepals acuminate; 20 mm. long..... 38. **N. marmorata**

1. ***Neoregelia eleutheropetala*** (Ule) L. B. Smith, Contr. Gray Herb. 104: 78. 1934.
Nidularium eleutheropetalum Ule, Verh. Bot. Ver. Brand. 48: 131. 1907.
Aregelia eleutheropetala Mez ex L. B. Smith, Contr. Gray Herb. 98: 5, *pl. 1, figs. 4–6.* 1932.
AMAZONAS: Marari, lower Rio Juruá, *Ule* 5364 (B, type).
ALSO: COLOMBIA, PERÚ.

2. ***Neoregelia myrmecophila*** (Ule) L. B. Smith, p. 30.
Nidularium myrmecophilum Ule, Verh. Bot. Ver. Brand. 48: 132. 1907.
Aregelia myrmecophila Mez, Engl. Pflanzenreich IV. 32: 52. 1934.
BRAZIL: *Ule* (MG).
AMAZONAS: Marari, lower Rio Juruá, *Ule* 5362 (B, F neg. 11263); 5365 (B, F neg. 11264).

3. ***Neoregelia fosteriana*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 2: 120, *pl. 50.* 1950.
RIO DE JANEIRO: Itatiaia, *Brade* 14553 (RB); *Foster* 119 (GH, R); 122 in part (GH, R); 123 (GH, type (US neg. 4085), US).

4. ***Neoregelia spectabilis*** (Moore) L. B. Smith, Contr. Gray Herb. 104: 79. 1934.
Nidularium spectabile Moore, Gard. Chron. 8. 1873.
Karatas spectabilis Antoine, Phyto-Iconogr. *pl. 33.* 1884.
Regelia spectabilis Lindm. Oefvers. Vet. Akad. Förhandl. 47: 543. 1890.
Aregelia spectabilis Mez in DC. Monogr. Phan. 9: 70. 1896.
BRAZIL: Cultivated, *Foster* 1231 (US); *Harvard Botanical Garden* (GH).
RIO DE JANEIRO: Mauá, *Ule* 4133 (R). Suruí, *Foster* 325 (GH).

5. ***Neoregelia pineliana*** (Lem.) L. B. Smith, Contr. Gray Herb. 114: 5. 1936.
Nidularium pinelianum Lem. Ill. Hortic. 7: 71. 1860.
Karatas morreniana Antoine, Phyto-Iconogr. *pl. 35.* 1884.
Regelia morreniana Lindm. Oefvers. Vet. Akad. Förhandl. 47: 543. 1890.
Aregelia morreniana Mez in DC. Monogr. Phan. 9: 72. 1896.
Neoregelia morreniana L. B. Smith, Contr. Gray Herb. 104: 79. 1934.
Aregelia pineliana Mez, Engl. Pflanzenreich IV. 32: 40, *fig. 12.* 1934.
BRAZIL: Cultivated, *Makoy* (LG, GH neg. 2933). Unpublished plate, *E. Morren* (K, GH neg. 1375).

6. ***Neoregelia princeps*** (Baker) L. B. Smith, Contr. Gray Herb. 114: 5. 1936.
1. Outer bracts of the inflorescence smaller than the inner leaves, bracteiform. Var. a. **princeps**
1. Outer bracts of the inflorescence enlarged and foliaceous but bright red. Var. b. **phyllanthidea**

6a. ***Neoregelia princeps*** var. ***princeps.***
Karatas meyendorffii Antoine, Phyto-Iconogr. 54, *pl. 32.* 1884. In part, not as to basonym.
Karatas princeps Baker, Handb. Bromel. 10. 1889.
Regelia princeps Lindm. Oefvers. Vet. Akad. Förhandl. 47: 543. 1890.
Aregelia princeps Mez in DC. Monogr. Phan. 9: 75. 1896.
BRAZIL: Cultivated, *Jard. Bot. Liége* (LG); *E. Morren* (LG).
RIO DE JANEIRO: Teresópolis, *Glaziou* 16446 (! Mez); Nova Friburgo, *Ule* 4961 (! Mez).
SANTA CATARINA: *D'Urville* (! Mez).

6b. ***Neoregelia princeps*** var. ***phyllanthidea*** (Mez) L. B. Smith, p. 31.
Aregelia princeps var. *phyllanthidea* Mez in DC. Monogr. Phan. 9: 76. 1896.
BRAZIL: Described from cultivation, no surviving material known.

7. ***Neoregelia farinosa*** (Ule) L. B. Smith, Contr. Gray Herb. 124: 9. 1939.
Nidularium farinosum Ule, Bericht. Deutsch. Bot. Gesselsch. 18: 319. 1900.
Aregelia farinosa Mez, Engl. Pflanzenreich IV. 32: 42. 1934.
ESPÍRITO SANTO: *Foster* B (GH, R). Santa Teresa, *Foster* 1183 (GH). Vargem Alta, Morro do Sal, *Foster* 928 (GH). Vitória, *Foster* 201 (GH, R, US).
RIO DE JANEIRO: Nova Friburgo, *Ule* 4961 (B, type).

8. ***Neoregelia bahiana*** (Ule) L. B. Smith, Proc. Amer. Acad. 70: 152. 1935.
1. All or at least the inner leaves red on the upper surface..... Var. a. **bahiana**
1. All the leaves completely green..... Var. b. **viridis**

8a. ***Neoregelia bahiana*** var. ***bahiana.***
Nidularium bahianum Ule, Bot. Jahrb. 42: 195. 1908.
Aregelia bahiana Mez, Engl. Pflanzenreich IV. 32: 42. 1934.
BAÍA: Serra do Sincorá, *Ule* 7105 (B, type, F neg. 11256).
MINAS GERAIS: Serra da Piedade, *Schwacke* (! Mez). Mun. Santa Barbara: Caraça, *Foster* 684 (GH).
SÃO PAULO: Alto da Serra, *Hoehne* (SP).

8b. ***Neoregelia bahiana*** var. ***viridis*** L. B. Smith, p. 27.
MINAS GERAIS: Serra da Piedade, near Belo Horizonte, *Foster* 573 (GH, type, US neg. 4273).

9. ***Neoregelia olens*** (Hook. f.) L. B. Smith, Contr. Gray Herb. 124: 10. 1939.
Billbergia olens Hook. f. Bot. Mag. 91: *pl. 5502.* 1865.
Karatas olens Nicholson, Dict. Gard. 2: 216. 1885.
Aregelia olens Mez, Engl. Pflanzenreich IV. 32: 42. 1934.
BRAZIL: Described from cultivated plants. No material known to survive.

10. ***Neoregelia indecora*** (Mez) L. B. Smith, Contr. Gray Herb. 124: 9. 1939.
Aregelia indecora Mez, Repert. Sp. Nov. Fedde 16: 3. 1919.
DISTRITO FEDERAL: Copacabana, *Ule* 4134 (B, type).

11. ***Neoregelia carolinae*** (Beer) L. B. Smith, Contr. Gray Herb. 124: 9. 1939.

1. Leaf-blades not striped..... Var. a. **carolinae**

1. Leaf-blades longitudinally striped white, rose, and green... Var. b. **tricolor**

11a. ***Neoregelia carolinae*** var. ***carolinae.***

Bromelia carolinae Beer, Bromel. 29. 1857.

Billbergia meyendorffii Regel, Bot. Zeitung 15: 713. 1857.

Nidularium meyendorffii Regel, Gartenflora 8: 266. 1859.

Karatas carolinae Antoine, Phyto-Iconogr. 52, *pl. 31.* 1884.

Bromelia rhodocincta Brongn. ex Baker, Handb. Bromel. 11. 1889 (! Mez).

Regelia meyendorffii Ind. Kew. 4: 694. 1895.

Aregelia carolinae Mez in DC. Monogr. Phan. 9: 74. 1896.

Aregelia marechalii Mez, Engl. Pflanzenreich IV. 32: 43. 1934.

Brazil: Cultivated, *Hort. Bot. Petrograd* (GH).

Rio de Janeiro: Mauá, *Ule* 4132 (R). Old road below Petrópolis, *Smith & Mus. R* 6458 (US). Suruí, *Foster* 31-A (GH (US neg. 3943), R). Barreira, Teresópolis, *Duarte & Pereira* (RB). Serra de Cavallo, Teresópolis, *Brade* 9845 (R, US).

Distrito Federal: Barra da Tijuca, *Reitz* 4742 (HBR).

11b. ***Neoregelia carolinae*** var. ***tricolor*** M. B. Foster, Bromel. Soc. Bull. 3: 29. 1953.

Brazil: Cultivated, *Foster* 2831 (US, type).

12. ***Neoregelia compacta*** (Mez) L. B. Smith, Contr. Gray Herb. 124: 9. 1939.

Nidularium compactum Mez in Mart. Fl. Bras. 3, pt. 3: 235. 1891.

Nidularium purpureum sensu Wittm. Bot. Jahrb. 13, Beibl. 29: 10. 1891. In part.

Aregelia compacta Mez in DC. Monogr. Phan. 9: 73. 1896.

Rio de Janeiro: Restinga de Mauá, *Schenck* 2090 (! Mez); *Ule* 4038 (R, US). Troxal (near Magé?), *Lhotsky* (G, F neg. 8481).

13. ***Neoregelia laevis*** (Mez) L. B. Smith, Contr. Gray Herb. 104: 78. 1934. Figure 55.

Aregelia laevis Mez, Ind. Sem. Hort. Regimont. for 1912: 8. 1912; Repert. Sp. Nov. Fedde 12: 411. 1913.

Brazil: Cultivated in Berlin, *Strauss* (B, F neg. 11260).

Paraná: Caiobá, *Foster* 440 (GH). Guaratuba, *Reitz* 4241 (HBR); *Smith & Reitz* 5733 (US). Jacareí, *Dusén* 15519 (GH, S); 15536 (S).

Santa Catarina: Cultivated in Koenigsberg, Germany, *F. Mueller* (type). São Francisco do Sul, *Reitz* 3697 (HBR); 3730 (HBR); 3895 (HBR); 4008 (HBR). Mun. Biguaçú: Fachinal, *Reitz* 4099 (HBR). Mun. Brusque: Azambuja, *Reitz & Foster* 2297 (HBR). Mun. Florianópolis: Cacupé, *Inst. Malariologia* (HBR). Florianópolis, *Hoehne* (SP). Mun. Itajaí: Praia Braba, *Reitz* 2294 (HBR, US); *Smith & Reitz* 6090 (US).

Rio Grande do Sul (?): Cultivated, Pôrto Alegre, *Lindman* A-799 (S).

14. ***Neoregelia ampullacea*** (E. Morr.) L. B. Smith, Contr. Gray Herb. 104: 78. 1934.

Nidularium ampullaceum E. Morr. Belg. Hortic. 30: 242. 1880.

Karatas ampullacea Baker, Handb. Bromel. 7. 1889.

Regelia ampullacea Lindm. Oefvers. Vet. Akad. Förhandl. 47: 543. 1890.

Aregelia ampullacea Mez in DC. Monogr. Phan. 9: 64. 1896.

Espírito Santo: Vitória, *Foster* 198 (GH, R, US). Mun. Collatina: Monte Claro, *Foster* 218 (GH, R, US).
Rio de Janeiro: Petrópolis, *Glaziou* 12231 (K, GH neg. 2730).
Distrito Federal: Cultivated, Hort. Museu Nacional, *Ule* (R).

15. ***Neoregelia hoehneana*** L. B. Smith, p. 28, fig. 56.
São Paulo: Caraguatatuba, *Gehrt* (SP, type, US neg. 4251).

16. ***Neoregelia leprosa*** L. B. Smith, p. 29, fig. 57.
Minas Gerais: Serra do Cipó, *Foster* 656 (GH, type).

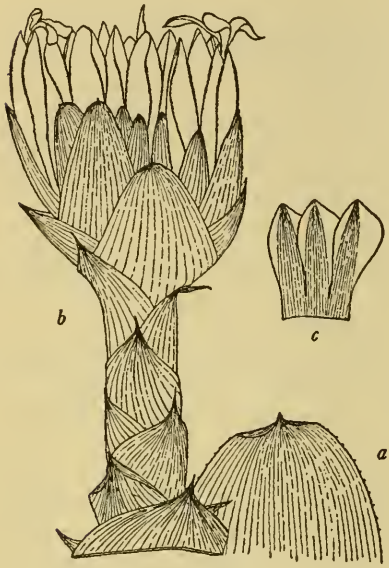

Fig. 55.

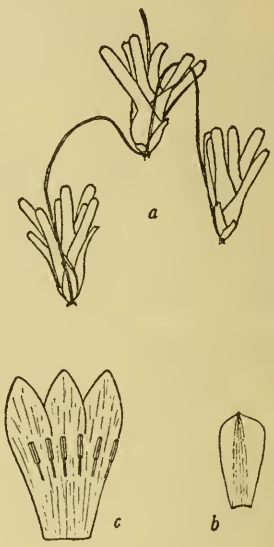

Fig. 56.

Fig. 55.—*Neoregelia laevis: a,* Apex of leaf, × 1; *b,* inflorescence, × 1; *c,* sepals, × 1.
Fig. 56.—*Neoregelia hoehneana: a,* Habit, × 1/10; *b,* sepal, × 1; *c,* petals, × 1.

17. ***Neoregelia fluminensis*** L. B. Smith, p. 27, fig. 58.
Rio de Janeiro: Teresópolis, *Foster* 982 (GH, type, US neg. 4272).

18. ***Neoregelia macahensis*** (Ule) L. B. Smith, Contr. Gray Herb. 124: 9. 1939.
Nidularium macahense Ule, Bericht. Deutsch. Bot. Gesellsch. 18: 318. 1900.
Aregelia macahensis Mez, Engl. Pflanzenreich IV. 32: 45. 1934.
Rio de Janeiro: Nova Friburgo, *Ule* 4960 (B, type, F neg. 11261).

19. ***Neoregelia cyanea*** (Beer) L. B. Smith, Contr. Gray Herb. 124: 9. 1939.
Hoplophytum cyaneum Beer, Bromel. 131. 1857.
Bromelia denticulata C. Koch, Wochenschr. 2: 151. 1859.
Nidularium denticulatum Regel, Gartenflora 19: 268. 1870.

Karatas denticulata Baker, Handb. Bromel. 4. 1889.
Regelia denticulata Lindm. Oefvers. Vet. Akad. Förhandl. 47: 542. 1890.
Aregelia cyanea Mez in DC. Monogr. Phan. 9: 67. 1896.

BRAZIL: Cultivated, *Atkinson* 94 (GH); *Bot. Gard. Berlin* (B, F neg. 11258); *Reitz* 5685 (HBR, US).

MINAS GERAIS: Bocaiú, Pomba, *Heringer* 2548 (SP). Mun. Antônio Dias: Coronel Fabriciana, *Foster* 732 (GH, US).

20. ***Neoregelia albiflora*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 109, *pl. 113.* 1943.

ESPÍRITO SANTO: Santa Teresa, *Foster* 309 (GH, type, US neg. 3945).

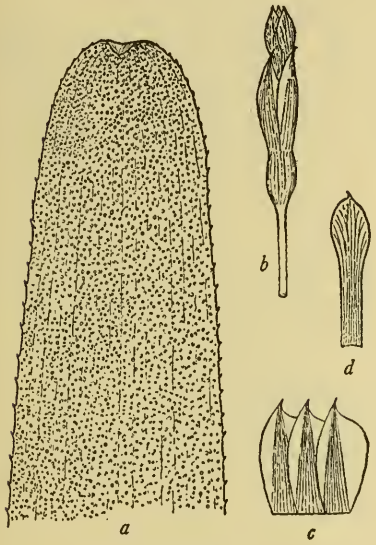

FIG. 57.

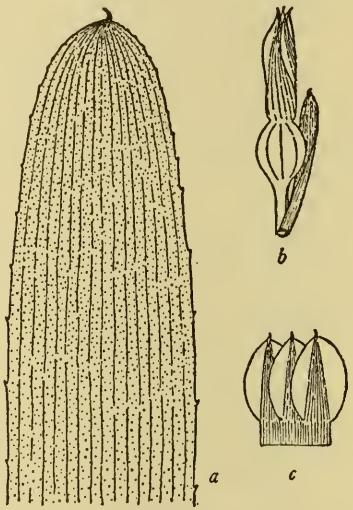

FIG. 58.

FIG. 57.—*Neoregelia leprosa: a,* Apex of leaf, × 1; *b,* flower, × 1; *c,* sepals, × 1; *d,* petal, × 1.

FIG. 58.—*Neoregelia fluminensis: a,* Apex of leaf, × 1; *b,* floral bract and flower, × 1; *c,* sepals, × 1.

21. ***Neoregelia tristis*** (Beer) L. B. Smith, Proc. Amer. Acad. 70: 153. 1935.
Bromelia tristis Beer, Bromel. 30. 1857.
Nidularium triste Regel, Gartenflora 15: 356. 1866.
Nidularium cyaneum Linden & André, Ill. Hortic. 20: 184. 1873. Not Hort. Berol.
Karatas tristis Baker, Handb. Bromel. 5. 1889.
Karatas cyanea Baker, Handb. Bromel. 5. 1889.
Regelia tristis Lindm. Oefvers. Vet. Akad. Förhandl. 47: 542. 1890.
Aregelia tristis Mez in DC. Monogr. Phan. 9: 68. 1896.
Aregelia elegans Mez in DC. Monogr. Phan. 9: 69. 1896.

BRAZIL: Cultivated, *Atkinson* 18 (GH); *E. Morren* (LG, type of *Aregelia elegans* Mez); *Strauss* (B, F neg. 11266).

Espírito Santo: Santa Teresa, *Foster* 255 (GH); 257 in part (GH). Vargem Alta, *Foster* 929 in part (GH).

Rio de Janeiro: Serra da Estrela, *Diogo* 717 (R). Itatiaia, *Foster* 139 (GH). Petrópolis, *Foster* 21 (GH); *Glaziou* 12232 (! Mez). Teresópolis, *Foster* 981 (GH). Parque Nacional Serra dos Orgãos, Teresópolis, *Smith & Brade* 5644 (US).

22. ***Neoregelia sarmentosa*** (Regel) L. B. Smith, Contr. Gray Herb. 104: 79. 1934.

1. Leaf-blades concolorous..... Var. a. **sarmentosa**
1. Leaf-blades marked with large pale spots..... Var. b. **chlorosticta**

22a. ***Neoregelia sarmentosa*** var. ***sarmentosa.***

Nidularium sarmentosum Regel, Gartenflora 19: 268. 1870.
Nidularium denticulatum var. *simplex* Wawra, Oester. Bot. Zeitschr. 30: 112. 1880; Bull. Fédér. Soc. Hortic. Belg. 35. 1880.
Karatas sarmentosa Baker, Handb. Bromel. 5. 1889.
Regelia sarmentosa Lindm. Oefvers. Vet. Akad. Förhandl. 47: 542. 1890.
Aregelia sarmentosa Mez in DC. Monogr. Phan. 9: 66. 1896.

Brazil: Cultivated (B, F neg. 11265).

Espírito Santo: Cuibiça, *Foster* 900 (GH, US). Santa Teresa, *Foster* 1229 (GH).

Distrito Federal: Restinga de Copacabana, *Ule* 4134 (R). Pedra Dois Irmãos, *L. B. Smith* 1358 (B, BA, BM, F, GH, K, P, S, US).

São Paulo: São Paulo, *Glaziou* 16448-a (B).

22b. ***Neoregelia sarmentosa*** var. ***chlorosticta*** (Baker) L. B. Smith, Contr. Gray Herb. 104: 79. 1934.

Karatas chlorosticta Baker, Handb. Bromel. 7. 1889.
Regelia chlorosticta Lindm. Oefvers. Vet. Akad. Förhandl. 47: 543. 1890.
Aregelia chlorosticta Mez in DC. Monogr. Phan. 9: 65. 1896.

Rio de Janeiro: *Dusén* (S). Itatiaia, *Foster* 129 (GH, R). Monte Serrat, Itatiaia, *Dusén* 2196 (S). Teresópolis, *Foster* 1012 (GH).

23. ***Neoregelia leucophoea*** (Baker) L. B. Smith, Contr. Gray Herb. 124: 9. 1939.

Karatas leucophoea Baker, Handb. Bromel. 7. 1889.
Aregelia leucophoea Mez in DC. Monogr. Phan. 9: 77. 1896.

Brazil: Cultivated, *E. Morren* (GH, US neg. 3944).

24. ***Neoregelia uleana*** L. B. Smith, p. 31, fig. 59.

Brazil: Cultivated, *Ule* (R, type, US neg. 4255).

25. ***Neoregelia johannis*** (Carr.) L. B. Smith, p. 28.

Nidularium johannis Carr. Rev. Hortic. 56: 432. 1884.
Karatas johannis Baker, Handb. Bromel. 11. 1889.
Regelia johannis Lindm. Oefvers. Vet. Akad. Förhandl. 47: 543. 1890.
Aregelia johannis Mez in DC. Monogr. Phan. 9: 84. 1896.

Brazil: Described from cultivation, no material known to survive.

26. ***Neoregelia kuhlmannii*** L. B. Smith, p. 28, fig. 60.

Rio de Janeiro: Angra dos Reis, *M. Kuhlmann* 2652 (SP, type, US neg. 4252).

27. ***Neoregelia coriacea*** (Antoine) L. B. Smith, p. 27.

Karatas coriacea Antoine, Phyto-Iconogr. 51, *pl. 30, fig. 1.* 1884.

Regelia coriacea Lindm. Oefvers. Vet. Akad. Förhandl. 47: 543. 1890.
Aregelia coriacea Mez in DC. Monogr. Phan. 9: 77. 1896.

BRAZIL: Cultivated at Schönbrun and Paris (! Mez in 1934); cultivated in Rio de Janeiro, *Ule* (R, US neg. 4257).

28. ***Neoregelia macrosepala*** L. B. Smith, p. 29, fig. 61.

ESPÍRITO SANTO: Cachoeira de Itapemirim, *Foster* 968 (GH, type; US). Vargem Alta, *Foster* 929 in part (GH).

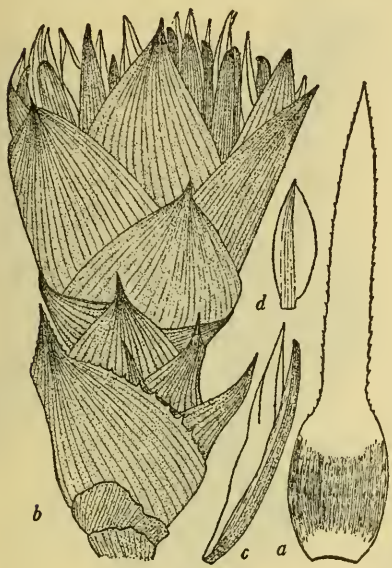

FIG. 59.

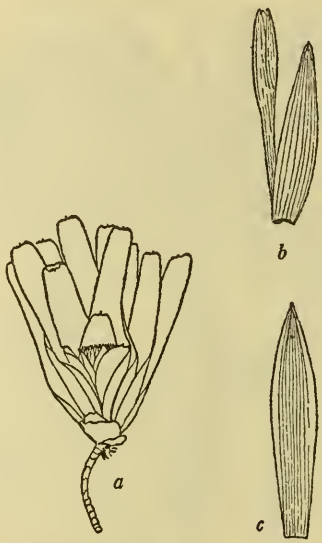

FIG. 60.

FIG. 59.—*Neoregelia uleana: a,* Leaf, × ¼; *b,* inflorescence, × ½; *c,* floral bract and flower, × ½; *d,* sepal, × ½.

FIG. 60.—*Neoregelia kuhlmannii: a,* Habit, × 1/10; *b,* floral bract and flower, × ½; *c,* sepal, × 1.

29. ***Neoregelia oligantha*** L. B. Smith, p. 30, fig. 62.

MINAS GERAIS: Mun. Antônio Dias: Parque Nacional, Ipatinga on the Rio Doce, *Foster* 742 (GH, type, US neg. 4271).

30. ***Neoregelia cruenta*** (R. Graham) L. B. Smith, Contr. Gray Herb. 124: 9. 1939. FIGURE 63.

Bromelia cruenta R. Graham, Edinburg Phil. Journ. 174. 1828.
Nidularium cruentum Regel, Gartenflora 8: 267. 1859.
Nidularium laurentii var. *immaculatum* Regel, Gartenflora 34: 243. 1885.
Karatas cruenta Nicholson, Dict. Gard. 2: 216. 1885.
Regelia cruenta Lindm. Oefvers. Vet. Akad. Förhandl. 47: 543. 1890.
Aregelia cruenta Mez in DC. Monogr. Phan. 9: 71. 1896.
Nidularium longebracteatum Mez in Mart. Fl. Bras. 3, pt. 3: 239. 1891.
Aregelia longebracteata Mez in DC. Monogr. Phan. 9: 79. 1896.

Aregelia rubrospinosa Mez, Repert. Sp. Nov. Fedde 12: 412. 1913.
Neoregelia rubrospinosa L. B. Smith, Contr. Gray Herb. 124: 10. 1939.
Neoregelia longebracteata L. B. Smith, Contr. Gray Herb. 124: 9. 1939.

Rio de Janeiro: *Foster* 8 (GH); *Rudio* 103 (LE, type of *Nidularium longebracteatum* Mez). Angra dos Reis, *M. Kuhlmann* 2683 (SP).

Distrito Federal: Praia do Arpoador, *Glaziou* 8501 (! Mez). Recreio dos Bandeirantes, *Lutz* 598 (GH, R). Restinga de Copacabana, *Glaziou* 8501-b (S). Praia da Gavea, *L. B. Smith* 2179 (GH, K, US). Restinga de

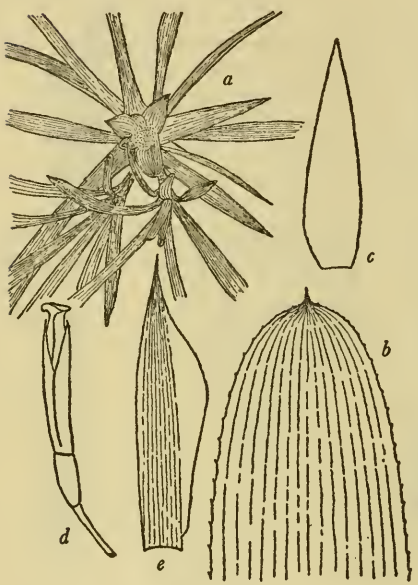

Fig. 61.

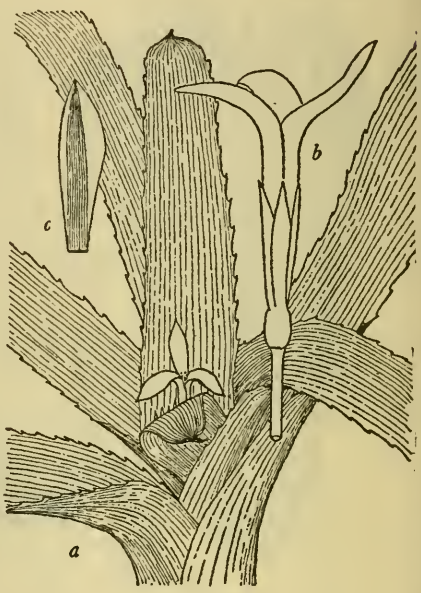

Fig. 62.

Fig. 61.—*Neoregelia macrosepala: a,* Habit (after M. B. Foster), × ca. ½; *b,* apex of leaf, × 1; *c,* floral bract, × ½; *d,* flower, × ½; *e,* sepal, × 1.
Fig. 62.—*Neoregelia oligantha: a,* Habit, × ½; *b,* flower, × 1; *c,* sepal, × 1. (*a* and *b* after M. B. Foster.)

Jacarepaguá, *Ule* (R, US). Lagoa Marapendi, *Brade & Apparicio* 20584 (RB). Praia de Sernambetiba, *Smith & Mus. R* 6814 (R, US), 6815 (R, US), 6816 (R, US), 6817 (R, US), 6828 (R, US). Barra da Tijuca, *J. G. Kuhlmann* 6036 (RB, US); *Inst. de Malária* 4 (HBR).

São Paulo: Cubatão, *L. B. Smith* 2047 (GH). Casqueiro, Santos, *Gehrt* (SP).

31. ***Neoregelia concentrica*** (Vell.) L. B. Smith, Contr. Gray Herb. 104: 78. 1934. Figure 64.

Tillandsia concentrica Vell. Fl. Fluminensis 134. 1825; Icon. 3: *pl. 133.* 1835.
Nidularium laurentii Regel, Ind. Sem. Hort. Petrop. for 1866. 80. 1867.
Nidularium acanthocrater E. Morr. Belg. Hortic. 34: 140, *pl. 9.* 1884.
Karatas laurentii Antoine, Phyto-Iconogr. 48, *pl. 28.* 1884.

Karatas acanthocrater Antoine, Phyto-Iconogr. 49, *pls. 29, 30, fig. 2.* 1884.
Regelia acanthocrater Lindm. Oefvers. Vet. Akad. Förhandl. 47: 543. 1890.
Regelia laurentii Lindm. Oefvers. Vet. Akad. Förhandl. 47: 543. 1890.
Nidularium concentricum Mez in Mart. Fl. Bras. 3, pt. 3: 239. 1891.
Aregelia laurentii Mez in DC. Monogr. Phan. 9: 80. 1896.
Aregelia concentrica Mez in DC. Monogr. Phan. 9: 81. 1896.

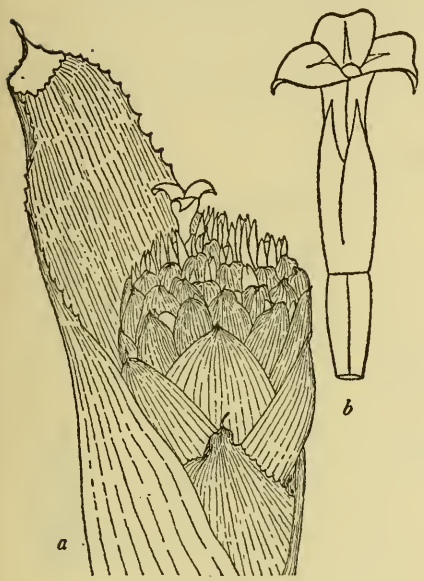

FIG. 63.

FIG. 64.

FIG. 63.—*Neoregelia cruenta: a,* Inner leaf and inflorescence, × ½; *b,* flower without pedicel, × 1. (Both after Botanical Magazine.)
FIG. 64.—*Neoregelia concentrica: a,* Apex of leaf, × ½; *b,* inflorescence, × ½; *c,* floral bract and flower, × 1.

RIO DE JANEIRO: Old road below Petrópolis, *Smith & Mus. R* 6492 (R, US). Serra dos Orgãos, *Ule* 1985 (R). Soberbo to Guapi, Serra dos Orgãos, *L. B. Smith* 1533 (B, F, GH, S). Teresópolis, *Sampaio* 2067 (R). Barreira to Teresópolis, *Pereira & Duarte* 1591 (RB, US).
DISTRITO FEDERAL: Cultivated, *Ule* (R). Restinga de Copacabana, *Glaziou* 15495 (BR, GH neg. 2798).

32. ***Neoregelia zonata*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 2: 120, *pl. 51.* 1950.
ESPÍRITO SANTO: Vitória, *Foster* 197 (GH, type (US neg. 4084), R, US).

33. ***Neoregelia pauciflora*** L. B. Smith, p. 31, fig. 65.
ESPÍRITO SANTO: Santa Teresa, *Foster* 265 (GH, type, US neg. 4270).

34. ***Neoregelia melanodonta*** L. B. Smith, p. 30, fig. 66.
ESPÍRITO SANTO: Cuibiça, *Foster* 897 (US, type).

35. ***Neoregelia carcharodon*** (Baker) L. B. Smith, Proc. Amer. Acad. 70: 152. 1935.

Karatas carcharodon Baker, Handb. Bromel. 12. 1889.

Aregelia carcharodon Mez in DC. Monogr. Phan. 9:78. 1896.

BRAZIL: Cultivated, *E. Morren* (LG, type ?).

ESPÍRITO SANTO: Itapemirim, *Foster* 155 (GH). Santa Teresa, *Foster* 245 (GH, R). Vitória, *Foster* 181 (GH, R, US).

DISTRITO FEDERAL: São Cristovão, *Glaziou* 15494 (B (F neg. 11257), K).

FIG. 65.

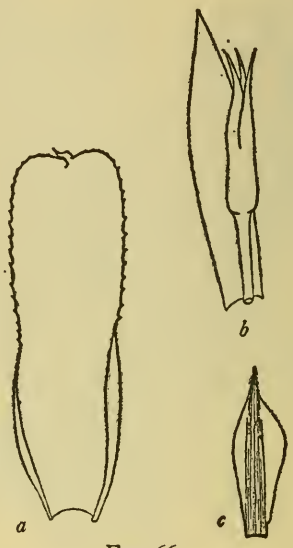

FIG. 66.

FIG. 65.—*Neoregelia pauciflora: a,* Leaf, × ½; *b,* flower, × 1; *c,* sepal, × 1.
FIG. 66.—*Neoregelia melanodonta: a,* Leaf, × ¼; *b,* floral bract and flower, × 1; *c,* sepal, × 1.

36. ***Neoregelia makoyana*** (Regel) L. B. Smith, Contr. Gray Herb. 124: 10. 1939.

Nidularium makoyanum Regel, Gartenflora 36: 656. 1887.

Karatas makoyana Baker, Handb. Bromel. 11. 1889.

Nidularium sanguinarium Hort. ex Baker, Handb. Bromel. 12. 1889 (! Mez).

Regelia makoyana Lindm. Oefvers. Vet. Akad. Förhandl. 47: 543. 1890.

Aregelia makoyana Mez, Engl. Pflanzenreich IV. 32: 50. 1934.

BRAZIL: Cultivated in Paris (! Mez in 1934).

37. ***Neoregelia binotii*** (Antoine) L. B. Smith, Contr. Gray Herb. 114: 5. 1936.

Karatas binotii Antoine, Phyto-Iconogr. *pl. 34.* 1884.

Regelia binotii Lindm. Oefvers. Vet. Akad. Förhandl. 47: 543. 1890.

Aregelia binotii Mez in DC. Monogr. Phan. 9: 82. 1896.

BRAZIL: Cultivated, Botanic Garden, Liége (LG, GH neg. 2920).
SÃO PAULO: Santos, *Foster* 485 (GH, US). Monte Japui, São Vicente, *L. B. Smith* 2097 (GH).

38. ***Neoregelia marmorata*** (Baker) L. B. Smith, Contr. Gray Herb. 124: 10. 1939.
Nidularium laurentii var. *elatius* Regel, Gartenflora 34: 243. 1885.
Karatas marmorata Baker, Handb. Bromel. 11. 1889.
Aregelia marmorata Mez in DC. Monogr. Phan. 9: 76. 1896.
SÃO PAULO: São Paulo, *Ostermeyer* (SP). Apiai, São Paulo to Curitiba, km. 279, *Foster* 397 (GH). Guapiara, São Paulo to Curitiba, km. 281, *M. Kuhlmann* (SP, US).
PARANÁ: Caiobá, *Foster* 449 (GH, US).

19. *Cryptanthus* Otto & Dietr.

Cryptanthus Otto & Dietr. Allg. Gartenzeit. 4: 297. 1836.

Endemic to eastern Brazil.

1. Leaves not noticeably constricted between the blade and the sheath; ovules usually numerous. (Fig. 67.)
2. Caudex elongate; sepals 10–12 mm. long.
3. The imbricate leaf-sheaths making the caudex appear 8–12 mm. in diameter; leaves 15 cm. long; leaf-blades 7–12 mm. wide; sepals connate almost to the middle..... 1. **C. glaziovii**
3. The imbricate leaf-sheaths making the caudex appear 10–15 mm. in diameter; leaves to 40 cm. long; leaf-blades 12–20 mm. wide; sepals connate at the base..... 2. **C. bahianus**
2. Caudex very short.
4. Petals orange-yellow; floral bracts linear, about equaling the sepals; sepals 13 mm. long, unequally connate for 4 to 5 mm.; leaves 35 cm. long, the blades 12 mm. wide. (Fig. 67.)..... 3. **C. duartei**
4. Petals white; floral bracts broad, much exceeded by the sepals.
5. Leaves 7–20 cm. long with spines 8–10 mm. long, the blades 8–10 mm. wide; sepals 6–7 mm. long..... 4. **C. schwackeanus**
5. Leaves to more than 50 cm. long with spines only 1 mm. long, the blades 15 mm. wide; sepals 12 mm. long..... 5. **C. maritimus**
1. Leaves, or most of them, constricted or petiolate between the blade and the sheath. (Figs. 68–72.)
6. The leaves all alike.
7. Leaf-blades without spots or lines.
8. Upper and lower sides of the leaf-blades contrasting.
9. Leaves brown-lepidote beneath; plants propagating by long naked stolons; floral bracts broadly ovate, slightly shorter than the sepals, lepidote; sepals 10 mm. long, connate for 4 mm., densely pale-lepidote at the apex. (Fig. 68.)..... 6. **C. pseudoscaposus**
9. Leaves white-lepidote beneath; plants without naked stolons.
10. Sepals strongly serrulate, connate for one-third to half of their length; flowers 23 mm. long..... 7. **C. sinuosus**
10. Sepals nearly or quite entire, connate for more than half of their length; flowers 40 mm. long..... 8. **C. acaulis**

8. Upper and lower sides of the leaf-blades alike, green, nearly glabrous; flowers to 41 mm. long; sepals acuminate, more than half connate. 9. **C. bromelioides**

7. Leaf-blades marked with spots or lines on the upper side.
11. Leaf-markings consisting of irregular dark transverse bands.
12. Sepals 19 mm. long, three-fourths connate, the free lobes acuminate, auriculate, entire; leaves relatively thin and flexible. 10. **C. zonatus**
12. Sepals 8 mm. long, connate for 5 mm., the free lobes broadly acute and apiculate, broadest at the base, serrulate; leaves thick and fleshy..... 11. **C. fosterianus**
11. Leaf-markings consisting of regular pale longitudinal bands.
13. Leaves glabrous above, their bands due to pigmentation.
14. Colored band single and median; sepals alate.
15. Leaves white-lepidote beneath; flowers less than 30 mm. long; sepals 11 mm. long..... 12. **C. praetextus**
15. Leaves brown-lepidote beneath; flowers to 51 mm. long; sepals 15 mm. long, connate for 8 mm. (Fig. 69.) 13. **C. minarum**
14. Colored bands two or more; sepals more than half connate.
16. The colored bands numerous and various; flowers to 41 mm. long..... 9. **C. bromelioides**
16. The colored bands two and of the same color; flowers 26 mm. long..... 14. **C. bivittatus**
13. Leaves partially lepidote above, contrasting with glabrous bands, the blades 30 mm. wide; sepals 11 mm. long.
17. Sepals concolorous, the free lobes narrow; leaves scarcely more than 8 cm. long..... 15. **C. lacerdae**
17. Sepals with the free lobes broad and much darker than the tube; leaves 20 cm. long. (Fig. 70.)..... 16. **C. marginatus**

6. The leaves dimorphic.
18. Leaf-blades petiolate and maculate. (Fig. 71.)..... 17. **C. beuckeri**
18. Leaf-blades gradually narrowed at the base but not petiolate, not maculate.
19. The leaf-blades with a pale median stripe above, 25 mm. wide; sepals acute. (Fig. 72.)..... 18. **C. pickelii**
19. The leaf-blades concolorous above.
20. Faces of the leaf of different colors; floral bracts shorter than the ovary; sepals rounded and apiculate; leaf-blades 15–20 mm. wide. 19. **C. incrassatus**
20. Faces of the leaf the same color; floral bracts to 17 mm. long, exceeding the ovary; sepals acuminate; leaf-blades 45 mm. wide. 20. **C. diversifolius**

1. ***Cryptanthus glaziovii*** Mez in Mart. Fl. Bras. 3, pt. 3: 202. 1891.
MINAS GERAIS: Caraça, *Glaziou* 15672a (B, type; P (GH neg. 2946)); *Foster* 706 (GH).

2. ***Cryptanthus bahianus*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 106, *pl. 104.* 1943.
Cryptanthus glaziovii sensu L. B. Smith in Addisonia 20: 9, *pl. 645.* 1937. Not Mez 1891.

Brazil: Cultivated, *Foster* 2449 (US).
Baía: Jacobina, *Foster* 98 (GH, type). Monte Cruzeiro, *Rose & Russell* 20033 (NY, US).

3. ***Cryptanthus duartei*** L. B. Smith, p. 23, fig. 67.
Minas Gerais: Serra do Cipó, *Duarte* (US, type; RB).

4. ***Cryptanthus schwackeanus*** Mez in Mart. Fl. Bras. 3, pt. 3: 203. 1891.
Minas Gerais: Serra de Caraça, *Ule* (R). Pico de Itabira do Campo, *Glaziou* 17823 (P, isotype, GH neg. 2945); *Schwacke* (R). Miguel Burnier, *Hoehne* (GH, SP). Mun. Belo Horizonte: Serra da Piedade, *Foster* 569 (GH). Morro Velho, *Gehrt* (SP, GH neg. 7168). Mun. Ouro Preto: Morro do Cruzeiro, *Macedo* 2731 (US). Ouro Preto, *Pires & Black* 3265 (IAN). Serra do Ouro Preto, *Ule* (R).

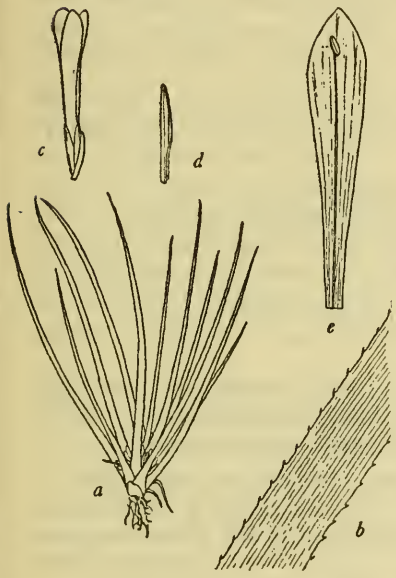

Fig. 67.

Fig. 68.

Fig. 67.—*Cryptanthus duartei: a,* Habit, × ⅛; *b,* section of leaf, × 1; *c,* floral bract and flower, × ½; *d,* sepal, × 1; *e,* petal and stamen, × 1.
Fig. 68.—*Cryptanthus pseudoscaposus: a,* Habit (after M. B. Foster), × ¼; *b,* sepal, × 5.

Distrito Federal: Cultivated, *Ule* (R).
São Paulo: Atibaia, *Gehrt* (SP).

5. ***Cryptanthus maritimus*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 106, *pl. 105.* 1943.
Espírito Santo: Vitória, *Foster* 179 (GH, type, US neg. 4094); 875 (GH, US).

6. ***Cryptanthus pseudoscaposus*** L. B. Smith, p. 25, fig. 68.
Espírito Santo: Domingos Martins to Vitória, *Foster* 208 (GH, type; R, US).

7. ***Cryptanthus sinuosus*** L. B. Smith, p. 26.

Cryptanthus undulatus Otto & Dietr. Allg. Gartenz. 4: 299. 1836. In part. Nomen illegitimum.

RIO DE JANEIRO: *Wawra* (W).

8. ***Cryptanthus acaulis*** (Lindl.) Beer, Bromel. 75. 1857.

1. Leaves green.
   2. The leaves lepidote above..... Var. a. **acaulis**
   2. The leaves glabrous above..... Var. b. **argenteus**
1. Leaves tinged with red..... Var. c. **ruber**

8a. ***Cryptanthus acaulis*** var. ***acaulis***

Tillandsia acaulis Lindl. Bot. Reg. 14: *pl. 1157.* 1828.

Cryptanthus acaulis var. *genuinus* Mez in DC. Monogr. Phan. 9: 54. 1896.

Cryptanthus pumilus Hort. ex Gentil, Pl. Cult. Serres Brux. 55. 1907. (! Mez).

BRAZIL: Cultivated, *Foster* (GH); *Hort. Petrograd* (GH); *Reitz* 4796 (HBR).

DISTRITO FEDERAL: *Glaziou* 9323 (K, GH neg. 2683). Gavea, *Reitz* 4680 (HBR). Quinta, *Glaziou* 16450 (P). Barra da Tijuca, *Reitz* 4797 (! Reitz).

8b. ***Cryptanthus acaulis*** var. ***argenteus*** Beer, Bromel. 75. 1857.

Cryptanthus discolor Otto & Dietr. Allg. Gartenz. 4: 299. 1836.

Cryptanthus acaulis var. *discolor* Mez in DC. Monogr. Phan. 9: 55. 1896.

BRAZIL: Cultivated, *Reitz* 4796 (HBR, US).

8c. ***Cryptanthus acaulis*** var. ***ruber*** Hort. ex Beer, Bromel. 76. 1857.

Cryptanthus acaulis var. *purpureus* Baker, Saund. Ref. Bot. 4: *pl. 287.* 1871.

Cryptanthus undulatus var. *ruber* Beer ex Baker, Handb. Bromel. 15. 1889.

Cryptanthus undulatus var. *purpureus* Baker, Handb. Bromel. 15. 1889.

BRAZIL: Described from cultivation, no herbarium material known.

9. ***Cryptanthus bromelioides*** Otto & Dietr. Allg. Gartenz. 4: 298. 1836.

1. Leaves concolorous..... Var. a. **bromelioides**
1. Leaves marked with multiple longitudinal bands of red, white, and green. Var. b. **tricolor**

9a. ***Cryptanthus bromelioides*** var. ***bromelioides***

Cryptanthus acaulis var. *bromelioides* Mez in DC. Monogr. Phan. 9: 55. 1896.

Cryptanthus carnosus Mez, Repert. Sp. Nov. Fedde 16: 2. 1919.

BRAZIL: Cultivated, *Bot Gard. Berlin* (B, type of *Cryptanthus carnosus* Mez).

ESPÍRITO SANTO: Vitória, *Foster* 172 (GH).

DISTRITO FEDERAL: Dois Irmãos, *Duarte* 176 (RB, US neg. 3264).

9b. ***Cryptanthus bromelioides*** var. ***tricolor*** M. B. Foster, Bromel. Soc. Bull. 3: 30. 1953.

BRAZIL: Cultivated, *Foster* 2832 (US, type).

10. ***Cryptanthus zonatus*** (Vis.) Beer, Bromel. 76. 1857.

1. Leaf-blades green or appearing white from the covering of scales.
   2. Leaf-blades densely pale-lepidote beneath, appearing white. Forma a. **zonatus**

2. Leaf-blades glabrous beneath, appearing green..... Forma b. **viridis**
1. Leaf-blades strongly tinged with red..... Forma c. **fusca**

10a. ***Cryptanthus zonatus*** forma ***zonatus***
Pholidophyllum zonatum Vis. Ind. Sem. Hort. Patav. 4. 1847.
BRAZIL: Cultivated, *Foster* (GH, US).
PERNAMBUCO: Berberibe (near Recife), *Ridley, Lea & Ramage* (BM). Cultivated in Rio de Janeiro, *Glaziou* 20523a (P, GH neg. 2944).

10b. ***Cryptanthus zonatus*** forma ***viridis*** Hort. ex Mez, Engl. Pflanzenreich IV. 32:19. 1934.
BRAZIL: Described from cultivation.

10c. ***Cryptanthus zonatus*** forma ***fuscus*** Mez in DC. Monogr. Phan. 9:58. 1896.
Pholidophyllum zonatum var. *fuscum* Vis. Ind. Sem. Hort. Patav. 4. 1847.
BRAZIL: Described from cultivation.

11. ***Cryptanthus fosterianus*** L. B. Smith, Bromel. Soc. Bull. 2:63. 1952.
PERNAMBUCO: Mata Camocim, São Bento, *Pickel* 3941 (IPA). Serra Negra near the Paraíba line, *Foster* 2431 (US, type).

12. ***Cryptanthus praetextus*** E. Morr. ex Baker, Handb. Bromel. 16. 1889.
BRAZIL: Described from cultivation.
ESPÍRITO SANTO: Domingos Martins, *Foster* 236 (GH, R). (Fazenda de Santa Adelaide), Rio Doce, *J. G. Kuhlmann* 6629 (RB).

13. ***Cryptanthus minarum*** L. B. Smith, p. 24, fig. 69.
MINAS GERAIS: Itabira do Campo, *Melo Matos* (R, type, US neg. 4256).

14. ***Cryptanthus bivittatus*** (Hook.) Regel, Ind. Sem. Hort. Petrop. for 1864. 15. 1865.
1. Leaves green except for the pale stripes of color..... Var. a. **bivittatus**
1. Leaves suffused with red in addition to the stripes... Var. b. **atropurpureus**

14a. ***Cryptanthus bivittatus*** var. ***bivittatus***
Billbergia bivittata Hook. Bot. Mag. 87: *pl. 5270.* 1861.
Cryptanthus bivittatus var. *luddemannii* Baker, Handb. Bromel. 16. 1889.
Cryptanthus bivittatus var. *moënsis* Hort. in Cat. Brom. Hort. Lugd.-Bat. 1894; Mez in DC. Monogr. Phan. 9:57. 1896.
Cryptanthus moensi Hort. ex Gentil, Pl. Cult. Serres Brux. 66. 1907.
BRAZIL: Cultivated, *Atkinson* 60 (GH, US); *Foster* 1192 (GH).

14b. ***Cryptanthus bivittatus*** var. ***atropurpureus*** Mez in Engl. Pflanzenreich IV. 32:18. 1934.
BRAZIL: Described from cultivation.

15. ***Cryptanthus lacerdae*** Antoine, Wien. Ill. Garten-Zeit. 7:254. 1882.
BRAZIL: Cultivated, *Foster* 1176 (GH, US).

16. ***Cryptanthus marginatus*** L. B. Smith, p. 24, fig. 70.
ESPÍRITO SANTO: Santa Teresa, *Foster* 243 (GH, type, US neg. 4268).

17. ***Cryptanthus beuckeri*** E. Morr. Belg. Hortic. 30:241. 1880. FIGURE 71.
BRAZIL: Cultivated, *Atkinson* 99 (GH, US); *E. Morren* (LG, type ?).

18. ***Cryptanthus pickelii*** L. B. Smith, p. 25, fig. 72.
PERNAMBUCO: Mun. São Lourenço da Mata: Toró, Escola de São Bento, near Tapera, *Pickel* 909 in part (IPA, type, US neg. 4230). Mata do Corrego da Bexiga, Escola de São Bento, *Pickel* 909 in part (IPA, US neg. 4232).

19. ***Cryptanthus incrassatus*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 2: 119, *pl. 49.* 1950.

Espírito Santo: Vitória, *Foster* 172 (GH, type US neg. 3278, 3279).

20. ***Cryptanthus diversifolius*** Beer, Bromel. 76. 1857.

Cryptanthus suaveolens E. Morr. ex Baker, Handb. Bromel. 15. 1889.

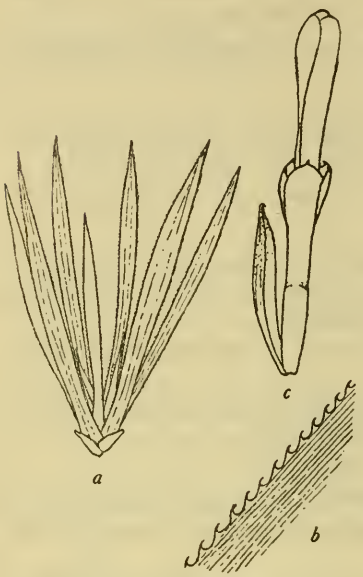

Fig. 69.

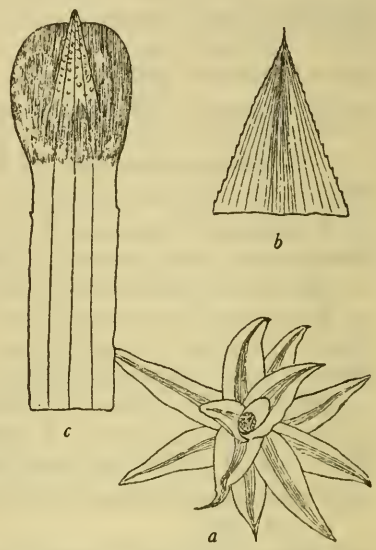

Fig. 70

Fig. 69.—*Cryptanthus minarum: a,* Habit, × 1/10; *b,* section of leaf, × 1; *c,* floral bract and flower, × 1.

Fig. 70.—*Cryptanthus marginatus: a,* Habit (after M. B. Foster), × ⅛; *b,* apex of leaf, × 1; *c,* sepal, × 5.

Cryptanthus acaulis var. *diversifolius* Mez in DC. Monogr. Phan. 9: 55. 1896.

Brazil: Described from cultivation. Still widely grown according to Mez in 1934.

20. *Nidularium* Lem.

Nidularium Lem. Jard. Fleur. 4, Misc.: 60. 1854.

Endemic to eastern Brazil.

Classification of herbarium specimens is difficult and uncertain, and a study of copious living material is necessary to an understanding of the species.

1. Petal-blades spreading, acute; inflorescence ferruginous-lanate; sepals 10–14 mm. long, connate for 2–3 mm. (Fig. 73.)

2. Floral bracts serrulate; petals short-connate; outer bracts of the inflorescence small and inconspicuous, not forming a notable involucre. (Fig. 73.) ..... 1. **N. burchellii**

2. Floral bracts entire; petals connate for half their length; outer bracts of the inflorescence forming an evident involucre..... 2. **N. microps**

1. Petal-blades erect, obtuse; inflorescence appressed-lepidote to glabrous. (Fig. 75.)

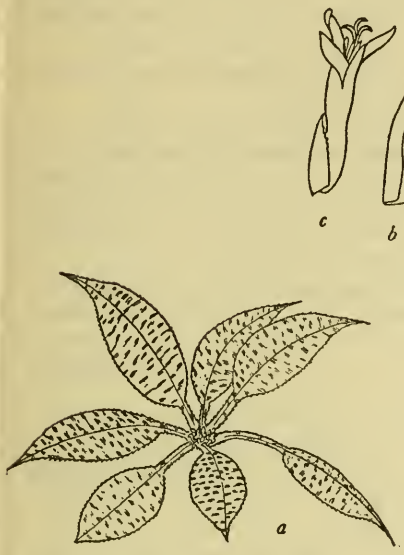

FIG. 71.

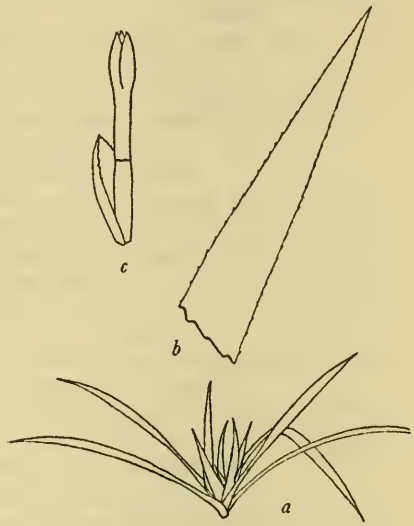

FIG. 72.

FIG. 71.—*Cryptanthus beuckeri:* *a*, Habit, × ¼; *b*, floral bract, × 1; *c*, flower, × 1. (*b* and *c* after Belgique Horticole.)

FIG. 72.—*Cryptanthus pickelii:* *a*, Habit, × 1/10; *b*, apex of leaf, × 1; *c*, floral bract and flower, × 1.

3. Flowers short-spicate, 20 mm. long; petals yellow; floral bracts ovate, acute, equaling the ovary; sepals 7 mm. long, half connate. 3. **N. loeseneri**

3. Flowers fasciculate; petals never yellow.

4. Scape naked for most of its length, slender; flowers 25–28 mm. long; sepals 12–15 mm. long, connate for 5 mm..... 4. **N. billbergioides**

4. Scape when evident completely covered by its bracts.

5. Inflorescence nidular, sunk in the center of the leaf-rosette; scape equaling the leaf-sheaths or shorter.

6. Leaf-spines 1.5–4 mm. long; leaf-blades acute, narrowed toward the base, only 1–2 times as long as the sheaths; sepals mucronulate, 20–24 mm. long; petals blue..... 5. **N. fulgens**

6. Leaf-spines not more than 1 mm. long.

7. Floral bracts entire.

8. Petals white; flowers 50–65 mm. long; sepals 22–29 mm. long. (Fig. 75.)..... 6. **N. innocentii**

8. Petals red; flowers 30–40 mm. long; sepals 18 mm. long. 7. **N. rutilans**

7. Floral bracts serrulate; flowers 45–55 mm. long; sepals 20–22 mm. long.

9. Leaf-blades acute, 3–4 cm. wide; petal-blades rose or white. 8. **N. purpureum**

9. Leaf-blades broadly rounded and apiculate, 4–6 cm. wide; petal-blades red..... 9. **N. regelioides**

5. Inflorescence raised above the leaf-rosette; scape exceeding the leaf-sheaths.

10. Blades of the primary bracts short and inconspicuous, giving the inflorescence a capitate form. (Fig. 76.)

11. Floral bracts densely serrulate; leaf-blades 2–4 cm. wide.

12. Sepals 16 mm. long, connate for about half their length, the free lobes ovate, mucronulate; leaves broadly acute and apiculate. (Fig. 76.)..... 10. **N. itatiaiae**

12. Sepals 26–28 mm. long, connate for about a third of their length, the free lobes acute or acuminate.

13. Sepals acuminate; inflorescence many-flowered; leaves acute and caudate-acuminate..... 11. **N. longiflorum**

13. Sepals acute; inflorescence few-flowered; leaves broadly acute..... 12. **N. pauciflorum**

11. Floral bracts entire.

14. Sepals mucronulate, about 11 mm. long, connate for 3 mm.; flowers 33 mm. long; petal-blades blue; leaf-blades 18–25 mm. wide..... 13. **N. antoineanum**

14. Sepals not mucronulate, acute or acuminate, 15–27 mm. long; leaf-blades 30–35 mm. wide.

15. Petal-blades white; sepals 15 mm. long, very short-connate, half exserted above the floral bracts; flowers 37 mm. long. 14. **N. neglectum**

15. Petal-blades blue or purple; sepals 22–27 mm. long, connate for 4–5 mm., more than half exserted above the floral bracts.

16. Sepals broadly acute, 27 mm. long; flowers to 48 mm. long. 15. **N. ferdinando-coburgii**

16. Sepals filiform-acuminate, 22 mm. long; flowers to 40 mm. long..... 16. **N. wettsteinii**

10. Blades of the primary bracts long,narrow, and conspicuous, giving the inflorescence a stellate form. (Fig. 77.)

17. Leaves broadly acute or rounded and apiculate; floral bracts serrulate.

18. Sepals broadly acute or obtuse, mucronulate or apiculate, connate for 7–8 mm.

19. Leaves 1 m. long, the blades 50–60 mm. wide; sepals 23 mm. long; petal-blades pale blue..... 17. **N. terminale**

19. Leaves to 33 cm. long, the blades 25 mm. wide; sepals 18 mm. long; petals unknown. (Fig. 77.) 18. **N. apiculatum**

18. Sepals acuminate, 20 mm. long, connate for 3–4 mm.; petal-blades blue..... 19. **N. utriculosum**

17. Leaves acuminate.
20. Blades of the leaves much narrowed toward the base.
21. Petal-blades white; leaves red-purple, caudate-acuminate, the blades 25–35 mm. wide..... 20. **N. rubens**
21. Petal-blades blue; leaves green, not caudate, the blades 8–27 mm. wide..... 21. **N. scheremetiewii**
20. Blades of the leaves little if at all narrowed toward the base, 20–32 mm. wide; petal-blades blue..... 22. **N. procerum**

1. ***Nidularium burchellii*** Mez in DC. Monogr. Phan. 9: 101. 1896. FIGURE 73.
Aechmea burchellii Baker, Journ. Bot. 17: 231. 1879.
Cryptanthus emergens Lindm. Svensk. Akad. Handl. 24: no. 8: 19, *pl. 2, figs. 1–12.* 1891.
Nidularium pubiscpalum. Mez in Mart. Fl. Bras. 3, pt. 3: 621. 1894.
Nidularium emergens Mez in Mart. Fl. Bras. 3, pt. 3: 621. 1894.
Aregelia burchellii Mez, Engl. Pflanzenreich IV. 32: 51. 1934.
ESPÍRITO SANTO: Santa Teresa, *Foster* 1182 (GH, US).
SÃO PAULO: Alto da Serra, *Luederwaldt* (SP). Boracéa to Salesópolis, *M. Kuhlmann & Kühn* 1765 (SP); 2343 (SP). Cubatão, near Santos, *Burchell* 3487 (K, type, GH neg. 2685). (Piaçaguera), *Loefgren* (SP). Santos, *Foster* 484 (GH); *Foster & Gehrt* (GH); *Loefgren* (SP); *Mosén* 2979 (S).

2. ***Nidularium microps*** E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3: 218. 1891.
1. Primary bracts dark purple.
2. Leaves green..... Var. a. **microps**
2. Leaves tinged with purple..... Var. b. **bicense**
1. Primary bracts pale..... Var. c. **pallidum**

2a. ***Nidularium microps*** var. ***microps***
Nidularium microcephalum Ule, Bericht. Deutsch. Bot. Gesellsch. 17: 4. 1899.
Aregelia microps Mez, Engl. Pflanzenreich IV. 32: 51, *fig. 14.* 1934.
BRAZIL: Cultivated, *E. Morren* (LG, type, GH neg. 2934).
RIO DE JANEIRO: [Nova] Friburgo, *J. G. Kuhlmann* (RB).
DISTRITO FEDERAL: Corcovado, *L. B. Smith* 1218 (GH); *Smith & Vieira* 1383 (B, F, GH, US). Fabrica das Chitas, Rio de Janeiro, *Schwacke* (R). Paineiras to Jardim Botanico, *L. B. Smith* 1400 (GH, S). Tijuca, *Ule* 4037 in part (B, type of *Nidularium microcephalum* Ule (F neg. 11262), R).

2b. ***Nidularium microps*** var. ***bicense*** (Ule) L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 57. 1941.
Nidularium microcephalum var. *bicensis* Ule, Bericht. Deutsch. Bot. Gesellsch. 17: 5. 1899.
DISTRITO FEDERAL: Serra da Bica, *Ule* (B, type).

2c. ***Nidularium microps*** var. ***pallidum*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 57. 1941.
RIO DE JANEIRO: Serra dos Orgãos, *Brade* 12084 (GH, type; R).

3. ***Nidularium loeseneri*** Mez, Repert. Sp. Nov. Fedde 16: 5. 1919.
Aechmea loeseneri Hort. ex Gentil, Pl. Cult. Jard. Bot. Brux. 9. 1907. Nomen.
BRAZIL: Cultivated, *Strauss* (B, type, F neg. 11272, 11281).

4. ***Nidularium billbergioides*** (Schult. f.) L. B. Smith, Contr. Gray Herb. 95: 42. 1931. FIGURE 74.

Tillandsia terminalis Vell. Fl. Fluminensis 137. 1825; Icon. 3: *pl. 143.* 1835. Not *Nidularium terminale* Ule 1898.

Hohenbergia billbergioides Schult. f. in R. & S. Syst. 7, pt. 2: 1253. 1830.

Tillandsia citrina Burchell ex Baker, Journ. Bot. 17: 235. 1879.

Aechmea billbergioides Baker, Handb. Bromel. 38. 1889.

Nidularium parviflorum Lindm. Svensk. Akad. Handl. 24: no. 8: 17, *pl. 1, figs. 8–18.* 1891.

FIG. 73.

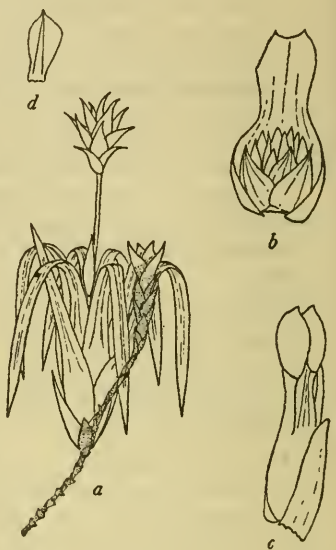

FIG. 74.

FIG. 73.—*Nidularium burchellii: a,* Scape and inflorescence, × ½; *b,* branch of inflorescence, × 1; *c,* flower, × 1. (All after Lindman.)

FIG. 74.—*Nidularium billbergioides: a,* Habit, × ⅛; *b,* primary bract and branch, × ½; *c,* floral bract and flower, × 1; *d,* sepal, × 1. (*b-d* after Lindman.)

Nidularium bracteatum Mez in Mart. Fl. Bras. 3, pt. 3: 224. 1891. In part, not as to *Tillandsia bracteata* Vell.

Nidularium citrinum Mez, Repert. Sp. Nov. Fedde 17: 113. 1921.

BRAZIL: Cultivated, *Hort. Berlin* (B, *Nidularium citrinum* Mez, F neg. 11269).

BAÍA: Agua Preta, *Foster* 56 (GH). Almada, Ilheus, *Martius* (M, type).

ESPÍRITO SANTO: Guiomar, *Foster* 938 (GH). Mun. Collatina: Monte Claro, *Foster* 216 (GH, R).

RIO DE JANEIRO: Suruí, *Foster* 216-A (GH, R).

DISTRITO FEDERAL: Cultivated, *Ule* 4035-A (R). Serra da Bica, near Cascadura, *Glaziou* 15488 (P). Gruta Paulo e Virginia, *Rente* 14 (R); *Rosa* 102 (R). Pedra Bonita, *Brade* 11913 (GH, R). Quinta, *Glaziou* 16441 (P). Tijuca, *Glaziou* 2734 (P). Floresta da Tijuca, *Ule* 4035 (R).

São Paulo: Alto da Serra, *Foster* 372 (GH, R). Cubatão, Santos, *Loefgren* (GH, SP). Sorocaba, Santos, *Mosén* 3253 (S, type of *Nidularium parviflorum* Lindm.). São João dos Barreiros, *Loefgren & Edwall* (SP, GH neg. 7145). Tremembe, *Doering* (SP).

Santa Catarina: Blumenau, *Inst. Malariologia* (HBR); *Reitz* (HBR); 3625 in part (HBR); 3819 (HBR, US). Joinvile, *Reitz* 3758-j (HBR). São Francisco do Sul, *Reitz* 3758 (HBR, US); 3893 (HBR); 3990 (HBR, US). Mun. Araquari: Itapocu, *Reitz* 4368 (HBR); *Smith & Reitz* 5761 (R, RB, US). Mun. Florianópolis: Rio Tavares, *Reitz* 4550 (HBR); *Smith & Reitz* 6184 (R, US). Mun. Itajaí: Rio Canoas, Luiz Alves, *Reitz* 5166 (! Reitz).

5. ***Nidularium fulgens*** Lem. Jard. Fleur. 4, Misc.: 60, *pl. 411.* 1854.
Karatas fulgens Antoine, Phyto-Iconogr. 41, *pl. 24.* 1884.
Nidularium rosulatum Ule, Bericht. Deutsch. Bot. Gesellsch. 18: 320. 1900.

Brazil: Cultivated, *Atkinson* 48 (MT); *Foster* (US).

Minas Gerais: Caraça, *Foster* 697 (GH, US).

Rio de Janeiro: Alto da Serra to Meio da Serra, *L. B. Smith* 2123 (F, GH (US neg. 3946)). Restinga de Mauá, *Ule* 4867 (B, type of *Nidularium rosulatum* Ule, F neg. 11277). Petrópolis, *Foster* 19 (GH, R); *Glaziou* 15489 (P). Petrópolis to Raiz da Serra, *L. B. Smith* 1327 (B, GH, S). Serra da Estrela, Petrópolis, *Diogo* 664 (R). Teresópolis, *Bailey* 1293 (BH).

São Paulo: Florestal, *Foster* 343 (GH, US). Rio Tijuco, *Foster* 470 (GH, R); *M. Kuhlmann* (SP).

Paraná: Alto da Serra, *Foster* 402 (GH).

6. ***Nidularium innocentii*** Lem. Ill. Hortic. 2, Misc.: 13. 1855.

1. Leaves dark red beneath or on both sides; primary bracts red or with the apex green..... Var. a. **innocentii**
1. Leaves, or at least their blades, green.
2. Primary bracts wholly or mostly red-purple.
3. Leaf-blades wholly green..... Var. b. **wittmackianum**
3. Leaf-blades marked with longitudinal white lines..... Var. c. **striatum**
2. Primary bracts red near the apex and green elsewhere.
4. Leaf-blades with numerous longitudinal white lines... Var. d. **lineatum**
4. Leaf-blades with a single large median white stripe... Var. e. **paxianum**

6a. ***Nidularium innocentii*** var. ***innocentii.*** Figure 75.
Karatas innocentii Antoine, Phyto-Iconogr. 44, *pl. 26.* 1884.
Regelia innocentii Ind. Kew 4: 694. 1895.

Brazil: Cultivated, *Foster* 1227 (GH).

Espírito Santo: Santa Teresa, *Foster* 303 (GH).

Rio de Janeiro: Serra dos Orgãos, *Ule* (R). Teresópolis, *Sampaio* 1725 (R); *L. B. Smith* 1520 (GH); *Ule* 4130 (R); *Velloso* (R).

Distrito Federal: Rio de Janeiro, *Reitz* 4804 (! Reitz).

São Paulo: Alto da Serra, *Foster* 366 (GH, R); *Hoehne* (SP, US); *L. B. Smith* 1924 (GH); 1970 (BM, GH). Ipiranga, *Luederwaldt* (GH, SP). Patrimônio, *Kuhlmann & Lemos* (SP).

Paraná: Ipiranga, *Dusén* 3554 (R); 17340 (S). Pôrto de Cima, *Dusén* 7002 (S).

Santa Catarina: Mun. Biguaçú: Fachinal, *Reitz* C-939 (HBR). Mun. São Francisco do Sul; Pôrto das Canoas, *Smith & Reitz* 5700 (R, US).

6b. ***Nidularium innocentii*** var. ***wittmackianum*** (Harms) L. B. Smith, Anais Bot. Herb. Barbosa Rodrigues 4:34. 1952.

Nidularium wittmackianum Harms, Notizblatt 10:220. 1928.

BRAZIL: Cultivated, *Hort. Berlin* (B, type, F neg. 11283).

SÃO PAULO: Alto da Serra, *Foster* 368 (GH, R). Rio Cotia headwaters, *Gehrt* (GH, SP). Cubatão, *L. B. Smith* 2046 (GH). Mun. São Paulo: Florestal, *Foster* 344 (GH, R, US).

PARANÁ: Curitiba to Joinvile (Santa Catarina), *Inst de Malária* (HBR). Curitiba to Paranaguá, *Reitz* 5739 (HBR, US). Serra do Mar, Volta Grande, *Dusén* 17206 (GH, S).

6c. ***Nidularium innocentii*** var. ***striatum*** Wittm. Gartenflora 37:422. 1888.

Nidularium striatum Hort. Bull. Cat. 1890.

BRAZIL: Described from cultivation. No material seen.

6d. ***Nidularium innocentii*** var. ***lineatum*** (Mez) L. B. Smith, p. 32.

Nidularium lineatum Mez, Repert. Sp. Nov. Fedde 12:412. 1913.

BRAZIL: Cultivated, *Hort. Koenigsberg* (B, type, F neg. 11271).

6e. ***Nidularium innocentii*** var. ***paxianum*** (Mez) L. B. Smith, Anais Bot. Herb. Barbosa Rodrigues 2:14. 1950.

Nidularium paxianum Mez, Gartenflora 44:297, *pl. 1415*. 1895.

SÃO PAULO: Alto da Serra, *Foster* 367 (GH, R); *L. B. Smith* 1842 (B, F, GH, K, US). Embú-Guassú, Serra do Mar, *Pires* (SP). São Paulo, *Ostermeyer* (SP).

PARANÁ: Alto da Serra do Mar, km. 48 from Curitiba, *Tessmann* (US). Curitiba, *Foster* 420 (GH, R). Curitiba to Joinvile near the Santa Catarina line, *Inst. Malárіologia* (! Reitz); *Reitz* 3758-a (HBR). Curitiba to Morrêtes, *M. Kuhlmann* (SP, US). Curitiba to Paranaguá, *Reitz* 5738 (! Reitz). Jacareí, *Dusén* 11428 (GH, S); 17076 (GH, S). Paranaguá, *Tessmann* (US). Pôrto da Cima, *Dusén* 14311 (S, US).

SANTA CATARINA: Cultivated, *H. Strauss* (B, type, F neg. 11280). Orleães, *Reitz* 1758 (HBR, US). Mun. Araquari: Itajubá, *Reitz* 3758-i (HBR). Mun. Araranguá: Maracanã, *Reitz* C-477 (GH, HBR, US). Mun. Biguaçú: Fachinal, *Reitz* 4083 (HBR). Mun. Brusque: Azambuja, *Reitz* C-1832 (HBR, US); 3571 (HBR, US). Brusque, *Reitz* 3182 (HBR); 3632 (HBR); *L. B. Smith* 5660 (R, RB, US). Mata São Pedro, *Reitz* (! Reitz). Mun. Itajaí: Rio Canoas, Luiz Alves, *Reitz* 5157 (! Reitz). Mun. Jaraguá do Sul: Corupá, *Seidel* 11 (HBR).

7. ***Nidularium rutilans*** E. Morr. Belg. Hortic. 35:81. 1885.

Karatas rutilans Baker, Handb. Bromel. 9. 1889.

BRAZIL: Cultivated, *Loefgren* (SP).

RIO DE JANEIRO: Itatiaia, *Brade* 15725 (RB, US); 17506 (RB). Petrópolis, *Glaziou* 16444 (B, F neg. 11279).

8. ***Nidularium purpureum*** Beer, Bromel. 75. 1857.

1. Petals rose toward the apex..... Var. a. **purpureum**
1. Petals wholly white..... Var. b. **albiflorum**

8a. ***Nidularium purpureum*** var. ***purpureum***

Karatas purpurea Antoine, Phyto-Iconogr. 42, *pl. 25*. 1884.

BRAZIL: Cultivated, *Hort. Berlin* (B, F neg. 11275).

ESPÍRITO SANTO: Santa Teresa, *Foster* 263 (GH, R).

Rio de Janeiro: Valério, Serra de Friburgo, *J. G. Kuhlmann* (RB).
Distrito Federal: Copacabana, *Glaziou* 15493 (B, F neg. 11275). Gavea, *Smith & Mus. R* 6454 (R, US). Tijuca, *Brade* 10413 (R).
São Paulo: Mogi das Cruzes, *Foster* 1232 (GH). Sorocaba, Santos, *Mosén* 2977 (S). Tremembé, *Everett* (GH).
Paraná: Curitiba, *Foster* 1201 (GH).

8b. ***Nidularium purpureum*** var. ***albiflorum*** L. B. Smith, Contr. Gray Herb. 127: 20. 1939.

Fig. 75.

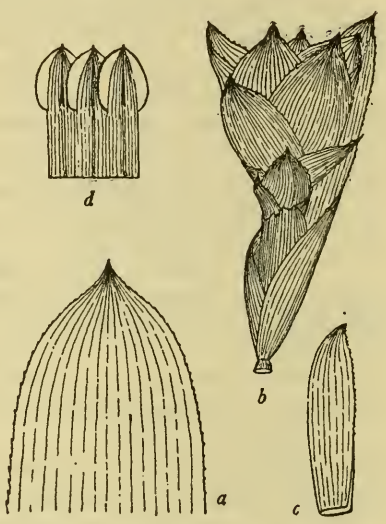

Fig. 76.

Fig. 75.—*Nidularium innocentii* var. *innocentii: a,* Primary bract and young branch, × ½; *b,* floral bract and flower, × 1. (Both after Antoine.)
Fig. 76.—*Nidularium itatiaiae: a,* Apex of leaf, × 1; *b,* inflorescence, × ¼; *c,* floral bract, × 1; *d,* sepals, × 1.

São Paulo: São Paulo, *Doering* (SP, type, GH neg. 3375).

9. ***Nidularium regelioides*** Ule, Bericht. Deutsch. Bot. Gesellsch. 16: 351, *pl. 22, fig. 9.* 1898.
Espírito Santo: Santa Teresa, *Foster* 317 (GH).
Rio de Janeiro: Itatiaia, *Ferreira* 1783 (GH, S); 1800 (B, FM, GH, US); *L. B. Smith* 1442 (GH); 1624 (GH); 1626 (GH); 1775 (GH, NY, US). Nova Friburgo, *Ule* 4666 (B, type); 4672 (B, F neg. 11276). Petrópolis, *Foster* 15 (GH).
São Paulo: Rio Quilombo, *Foster* 489 (GH).

10. ***Nidularium itatiaiae*** L. B. Smith, p. 32, fig. 76.
Rio de Janeiro: Itatiaia, *Foster* 118 (GH, type, US neg. 4264).

11. ***Nidularium longiflorum*** Ule, Bericht. Deutsch. Bot. Gesellsch. 14: 408. 1896.

DISTRITO FEDERAL: Tijuca, *Brade* 10744 (R); *Foster* 324 (GH, US); *Smith & Brade* 2242 (GH); 2243 (GH, S); *Ule* 4036 (B, type (F, neg. 11273), R); 4131-A (R, US).

12. ***Nidularium pauciflorum*** Ule, Bericht. Deutsch. Bot. Gesellsch. 16: 353. 1898.

1. Leaves green..... Var. a. **pauciflorum**
1. Leaves bright red..... Var. b. **sanguineum**

12a. ***Nidularium pauciflorum*** var. ***pauciflorum***

RIO DE JANEIRO: Nova Friburgo, *Ule* 4651 (B, type, F neg. 11274). Old road below Petrópolis, *Smith & Mus. R* 6498 (US).

DISTRITO FEDERAL: Tijuca, *Brade* 10411 (R).

12b. ***Nidularium pauciflorum*** var. ***sanguineum*** Ule, Bericht. Deutsch. Bot. Gesellsch. 16: 353. 1898.

BRAZIL: No material cited but probably from the same place as the typical variety.

13. ***Nidularium antoineanum*** Wawra, Oesterr. Bot. Zeitschr. 30: 113. 1880.
Nidularium antoineanum var. *angustifolium* Wawra, Oesterr. Bot. Zeitschr. 30: 114. 1880.
Karatas antoineana Baker, Handb. Bromel. 6. 1889.

MINAS GERAIS: Serra do Picú, *Glaziou* 13247 (! Mez).

RIO DE JANEIRO: Teresópolis, *Foster* 976 (GH); 998 (GH); *Wawra* II-321a (W, type).

SÃO PAULO: Serra da Bocaina, *Brade* 21154 (RB, US).

14. ***Nidularium neglectum*** (Baker) Hort. Makoy ex Mez in DC. Monogr. Phan. 9: 99. 1896.
Karatas neglecta Baker, Handb. Bromel. 6. 1889.

BRAZIL: Described from cultivation, no material seen.

15. ***Nidularium ferdinando-coburgii*** Wawra, Oesterr. Bot. Zeitschr. 30: 112. 1880.
Karatas ferdinando-coburgii Baker, Handb. Bromel. 6. 1889.

RIO DE JANEIRO: Petrópolis, *Wawra* II-101 (W, type). Teresópolis, *Sampaio* 2066 (R); *Wawra* II-370 (W).

16. ***Nidularium wettsteinii*** Mez, Repert. Sp. Nov. Fedde 16: 4. 1919.

SÃO PAULO: Described from material cultivated in Vienna.

17. ***Nidularium terminale*** Ule, Bericht. Deutsch. Bot. Gesellsch. 16: 348, *pl. 22, figs. 2–5.* 1898.

DISTRITO FEDERAL: Tijuca, *Ule* 4162 (B, type; R).

18. ***Nidularium apiculatum*** L. B. Smith, p. 32.

1. Sepals entire..... Var. a. **apiculatum**
1. Sepals serrulate..... Var. b. **serrulatum**

18a. ***Nidularium apiculatum*** var. ***apiculatum.*** Fig. 77.

RIO DE JANEIRO: Itatiaia, *Foster* 124 (GH, type, US neg. 4265); *Ule* 290 (R).

18b. ***Nidularium apiculatum*** var. ***serrulatum*** L. B. Smith, p. 32.

RIO DE JANEIRO: Itatiaia, *Foster* 121 (GH, type, US neg. 4266).

19. ***Nidularium utriculosum*** Ule, Bericht. Deutsch. Bot. Gesellsch. 16: 347, *pl. 22, fig. 1.* 1898.

Espírito Santo: Santa Teresa, *Foster* no. C (GH).
Distrito Federal: Copacabana, *Ule* 4163 (B, type (F neg. 11282), R).

20. ***Nidularium rubens*** Mez in Mart. Fl. Bras. 3, pt. 3: 220. 1891.
Rio de Janeiro: Serra do Picú, *Glaziou* 13248 (B, type, F neg. 11278).
São Paulo: Alto da Serra, *Foster* 377 (GH, R); *Hoehne* (SP, US); *J. Lemos* 1971 (GH). Boracéa, *Blanco* (SP).

21. ***Nidularium scheremetiewii*** Regel, Ind. Sem. Hort. Petrop. for 1857. 28. 1858; Gartenflora 7: 137, *pl. 224.* 1858.
Karatas scheremetiewii Antoine, Phyto-Iconogr. 46, *pl. 27.* 1884.
Nidularium corcovadense Ule, Bericht. Deutsch. Bot. Gesellsch. 18: 321. 1900.
Espírito Santo: Santa Teresa, *Foster* 260 (GH, R); 264 (GH); 1213 (GH).
Rio de Janeiro: Barreira, Teresópolis, *Duarte & Pereira* (RB, US).
Distrito Federal: Alto da Boa Vista, *Reitz* 3915 (HBR). Corcovado, *Duarte & Paulo* 420 (RB); *Ule* 4131 (R); 4962 (B, type of *Nidularium corcovadense* Ule, F neg. 11270). Estrada Dona Castorina, Jardim Botânico to Alto da Boa Vista, *L. B. Smith* 1373 (GH, S). Paineiras, Corcovado, *L. B. Smith* 1217 (BM, GH, K). Paineiras to Jardim Botânico, *L. B. Smith* 1399 (B, F, GH, S, US). Rio de Janeiro, *Lhotsky* (BM, US neg. 4006).
Santa Catarina: Ribeirão Grande, Taió, *Reitz* (HBR, US); 3836 (HBR); 3997 (HBR). Rio Maracujá, Anitápolis, *Reitz* 4538 (HBR). Mun. Biguaçú: Fachinal, *Reitz* 4129 (HBR).

22. ***Nidularium procerum*** Lindm. Svensk. Akad. Handl. 24: no. 8: 16, *pl. 1, figs. 1–7.* 1891.
1. Leaves 4–10 dm. long, the blades 2–5 cm. wide..... Var. **procerum**
1. Leaves up to 4 dm. long, not over 3 cm. wide..... Var. **kermesianum**

22a. ***Nidularium procerum*** var. ***procerum***
Aechmea purpurea Baker, Handb. Bromel. 69. 1889.
Nidularium porphyreum Mez in Mart. Fl. Bras. 3, pt. 3: 219. 1891.
Nidularium affine Mez, Repert. Sp. Nov. Fedde 16: 4. 1919.
Nidularium angustifolium Ule, Bericht. Deutsch. Bot. Gesellsch. 16: 351. 1898.
Brazil: Cultivated, *Hort. Dahlem* (B, type of *Nidularium affine* Mez, F neg. 11267); *Sander* (LG, *Nidularium porphyreum* Mez).
Espírito Santo: Rio Jucu, Vitória, *Foster* 212 (GH, R). Vargem Alta, *Foster* 927 (GH).
Rio de Janeiro: Cultivated, *Ule* 4037 in part (R).
Distrito Federal: Serra da Bica, near Cascadura, *Glaziou* 15490 (P, GH neg. 2952); *Ule* 4039 (B, type of *Nidularium angustifolium* Ule, F neg. 11268).
São Paulo: Ramal Mairink to Santos, *Lamber* (GH, SP). Rio Buturoca, Santos, *Mosén* 3706 (S, US). São Vicente, Santos, *Gehrt* (GH, SP).
Paraná: Caiobá, *Foster* 419-A (GH, R); *M. Kuhlmann* (SP). Curitiba, *Foster* 419 (GH, R). Near Santa Catarina line, Curitiba to Joinvile, *Reitz* 3889 (! Reitz). Serra, Curitiba to Joinvile, *Inst. Malariologia in Reitz* 3563 (HBR); *Reitz* 5759 (! Reitz). Serra, Curitiba to Morrêtes, *M. Kuhlmann* (SP, US). Jacareí, *Dusén* 17055 (GH, S). Morrêtes, *Dusén* 11933 (S); 14422 (S); 17064 (S). Paranaguá, *Foster* 432 (GH).

SANTA CATARINA: Blumenau, *Inst. Malariologia* (HBR); *Reitz* 3564 (HBR); 4141 (HBR). Joinvile, *Reitz* 3712 (! Reitz). Mun. Araranguá: Peroba, *Reitz* C-471 (GH, US). Mun. Florianópolis: Cacupé, *Inst. Malariologia* (HBR). Rio Tavares, *Smith & Reitz* 6186 (R, US). Mun. Itajaí: Praia Braba, *Foster* 2518 (R, US); *Reitz* 2292 (HBR, US). Mun. São Francisco do Sul: Porto das Canoas, *Smith & Reitz* 5698 (R, RB, US). São Francisco do Sul, *Reitz* 3728 (HBR, US); 3878 (HBR).

22b. ***Nidularium procerum*** var. ***kermesianum*** (Fritz Mueller ex Mez) Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 18. 1952.

Nidularium kermesianum Fritz Mueller ex Mez, Engl. Pflanzenreich IV. 32: 62. 1934.

PARANÁ: Curitiba to Paranaguá, *Reitz* 5754 (HBR, US).

SANTA CATARINA: Cultivated, *F. Mueller* (B, type). Joinvile, *Reitz* 4667 (HBR). Ribeirão Grande, Taió, *Reitz* 3994 (HBR). Mun. Araquari: Itapocu, *Reitz* 4597 (HBR). Mun. Blumenau: Morro do Cachorro, *Reitz* 4678 (! Reitz). Mun. Brusque: Ribeirão do Ouro, 3626 in part (HBR). Mun. Florianópolis: Ribeirão da Ilha, *Reitz* 3920 (HBR). Mun. Jaraguá do Sul: Corupá, *Seidel* 6 (HBR). Morro do Garrafão, Corupá, *Reitz* 4236 (HBR).

21. *Andrea* Mez

Andrea Mez in DC. Monogr. Phan. 9: 114. 1896.

A monotypic Brazilian endemic.

1. ***Andrea selloana*** (Baker) Mez in DC. Monogr. Phan. 9: 115. 1896. FIGURE 78.

Quesnelia selloana Baker, Handb. Bromel. 87. 1889.

BRAZIL: South-central Brazil, *Sellow* 1414 (B, type, F neg. 11301).

MINAS GERAIS: Serra de Ouro Preto, *Schwacke* 9157 (B, F neg. 11301). Mun. Jaboticatubas: Serra da Cipó, *Foster* 615 (GH).

22. *Bromelia* L.

Bromelia L. Sp. Pl. 285. 1753.

México and the West Indies to Paraguay and Argentina.

1. Scape evident although sometimes short; inflorescence rounded or acute; leaf-blades never petiolate. (Figs. 79, 80.)
   2. Sepals narrowed from near the base, acute or acuminate, carinate, 10–15 mm. long.
      3. Petals to 35 mm. long, twice as long as the sepals; inflorescence cylindric, 15–45 cm. long. (Fig. 79.) ..... 1. **B. laciniosa**
      3. Petals 15–16 mm. long, only a little longer than the sepals.
         4. Sepals acuminate; inflorescence subglobose..... 2. **B. reversacantha**
         4. Sepals broadly acute; inflorescence laxly cylindric.... 3. **B. arenaria**
   2. Sepals narrowed above the middle only, or oblong or spatulate.
      5. Floral bracts and sepals obtusely or not at all carinate, entire; ovaries exceeding the floral bracts; sepals straight.
         6. Branches of the inflorescence and flowers spreading; pedicels 15 mm. long or more; sepals 10 mm. long..... 4. **B. binotii**

6. Branches of the inflorescence and flowers erect or suberect; pedicels not over 10 mm. long; sepals 6–15 mm. long.
   7. Floral bracts 6–10 mm. long; sepals mostly oblong and obtuse; indument of the inflorescence white..... 5. **B. antiacantha**
   7. Floral bracts 15–20 mm. long; sepals elliptic, subacute; indument of the inflorescence ferruginous..... 6. **B. regnellii**
5. Floral bracts and sepals sharply carinate, conduplicate; sepals mostly cucullate.
   8. Branches of the inflorescence spreading; inflorescence sublax, pyramidal..... 7. **B. sylvicola**

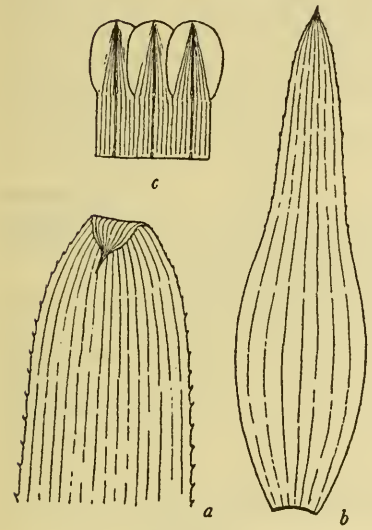

FIG. 77.

FIG. 78.

FIG. 77.—*Nidularium apiculatum* var. *apiculatum:* *a*, Apex of leaf, × 1; *b*, outer bract of inflorescence, × ½; *c*, sepals, × 1.

FIG. 78.—*Andrea selloana:* *a*, Habit, × ⅛; *b*, flower, × 1.

(Both after Pflanzenreich.)

8. Branches of the inflorescence erect; inflorescence very dense, cylindric to globose.
   9. Floral bracts not dilated at the apex.
      10. Sepals and floral bracts soon glabrous; filament-tube 10 mm. long; scape and inflorescence elongate..... 8. **B. balansae**
      10. Sepals and floral bracts densely and persistently pale-lepidote; filament-tube 5–6 mm. long.
         11. Floral bracts equaling or exceeding the sepals; inflorescence subcorymbose..... 9. **B. glaziovii**
         11. Floral bracts distinctly exceeded by the sepals.
            12. Inflorescence globose; flowers 50 mm. long; scape not more than 1 dm. long..... 10. **B. lindmanii**

12. Inflorescence ellipsoid or short-cylindric, distinctly longer than broad; flowers 32–39 mm. long; scape elongate. (Fig. 80.) ..... 11. **B. interior**

9. Floral bracts elliptic-dilated at the apex.

13. Sepals elliptic, 12 mm. long..... 12. **B. exigua**

13. Sepals narrowly oblong, to 22 mm. long, serrulate. 13. **B. rondoniana**

1. Scape completely lacking; inflorescence corymbose, sunk in the center of the leaf-rosette. (Fig. 81.)

14. Leaf-blades not at all petiolate.

15. Filament-tube only 3 mm. long; sepals serrulate at the apex, 25–30 mm. long; indument of the inflorescence whitish..... 14. **B. legrellae**

15. Filament-tube 12–20 mm. long or more.

16. Scales of the inflorescence pale, slender and almost filiform; sepals obtuse, 17 mm. long; filament-tube only 12 mm. long. (Fig. 81.) 15. **B. villosa**

16. Scales of the inflorescence dark brown, broad; sepals acute or subacute.

17. Ovary 2 cm. long; sepals 25–27 mm. long..... 16. **B. lagopus**

17. Ovary to 8 cm. long; sepals 30–40 mm. long..... 17. **B. karatas**

14. Leaf-blades (or at least the outer ones) distinctly petiolate; sepals wholly or in greater part exserted above the floral bracts.

18. Petals dark-lepidote, connate for three-fourths of their length; sepals oblong, obtuse, cucullate, 21 mm. long, 7 mm. wide. 18. **B. morreniana**

18. Petals glabrous, short-connate; sepals linear, apiculate, 15 mm. long, 3 mm. wide..... 19. **B. scarlatina**

1. ***Bromelia laciniosa*** Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1278. 1830. FIGURE 79.

PIAUÍ: Buriti, *Dahlgren* 971 (GH, US). São João do Piauí, *Luetzelburg* (! Mez).

PARAÍBA: Soledade, *Luetzelburg* (! Mez).

BAÍA: Cultivated, *Occhioni* (RB). Jacobina, *Foster* 100 (GH, R). Joazeiro, *Luetzelburg* (! Mez). Machado Portelo, *Rose & Russell* 19904 (NY, US). Queimadas to Vila Nova da Rainha, *Martius 2228* (M, type, F neg. 8641).

ESPÍRITO SANTO: Cachoeiro do Itapemirim, *Foster* 168 (GH, R). Vitória, *Foster* 195 (GH, R).

2. ***Bromelia reversacantha*** Mez in Mart. Fl. Bras. 3, pt. 3: 198. 1891.

GOIÁS: Rio Bagagem, *Pohl* 2205 (W, type).

3. ***Bromelia arenaria*** Ule, Bot. Jahrb. 42: 194. 1908.

BAÍA: Remanso, *Ule* 7151 (B, type, F neg. 11249).

4. ***Bromelia binotii*** E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3: 192. 1891.

ESPÍRITO SANTO: Santa Teresa, *Foster* 857 (GH, US). Mun. Collatina: Collatina, *Foster 226* (GH, R). Linhares, *Foster* 787 (GH, US).

RIO DE JANEIRO: Cultivated, *Jard. Bot. Liége* (LG, type).

5. ***Bromelia antiacantha*** Bertol. Virid. Bonon. 4. 1824; 4, Misc.: 6, *pl. 1.* 1844. *Bromelia acanga* sensu Willd. Enum. Hort. Berol. 346. 1809. Not. L. 1767. *Bromelia fastuosa* sensu Regel, Gartenflora 15: 1. 1866. Not Lindl. 1821.

BRAZIL: *Sellow* 3344 (GH, R, US).

RIO DE JANEIRO: Jurujuba, *Schwacke* (R). Monte Serrat, Itatiaia, *L. B. Smith* 1610 (GH).

DISTRITO FEDERAL: Corcovado, *Duarte & Paulo* 421 (RB). Lagoa Rodrigo de Freitas, *Ule* 4613 (R). Praia Leblon, *Hoehne* 23 (GH, SP). Rio de Janeiro, *Foster* 497 (GH).

SÃO PAULO: Guarujá, *L. B. Smith* 2031 (GH). Ipiranga, *Luederwaldt* (SP, GH neg. 7167). Jaraguá, *M. Hoehne* (GH, SP). Lorena, *Delforge* (RB). São Roque, *Everett* (GH). Mun. Campinas: Indaiatuba, *Viegas* (SP).

PARANÁ: Jaguariaíva, *Dusén* 13286 (S, US).

SANTA CATARINA: Mafra, *Reitz* 3961 (! Reitz). Mun. Araquari: Itajuba, *Reitz* 3758-h (HBR). Mun. Araranguá: Sombrio, *Reitz* C-1188 (GH); 3897 (HBR). Mun. Criciúma: Sanga do Engenho, *Reitz* C-209 (GH, HBR). Mun. Florianópolis: Rio Vermelho, *Reitz* (HBR, US). Mun. Pôrto Belo: Canto Grande, *Reitz* (HBR).

RIO GRANDE DO SUL: Pôrto Alegre, *Lindman* A-645 (S); *Reineck* (GH). São Leopoldo, *Eugenio* (GH); 129 (R, RB); 132 (NY). Esteio near São Leopoldo, *Rambo* (US).

ALSO: URUGUAY.

6. ***Bromelia regnellii*** Mez in Mart. Fl. Bras. 3, pt. 3: 194, *pl. 53*. 1891.
Bromelia pinguin sensu Lindm. Svensk. Akad. Handl. 24: no. 8: 22, *pl. 8, figs. 1–8*. 1891. Not L. 1753.

MINAS GERAIS: Caldas, *Regnell* III-285 (S, type; US).

7. ***Bromelia sylvicola*** S. Moore, Trans. Linn. Soc. Bot. II. 4: 490. 1895.

MATO GROSSO: Cuiabá, *Lindman* A-2349 (S). Diamantino to Santa Cruz, Rio Paraguai, *S. Moore* 489 (BM, type). Santa Ana da Chapada, *Lindman* A-2357 (S).

8. ***Bromelia balansae*** Mez in Mart. Fl. Bras. 3, pt. 3: 191. 1891.
Bromelia argentina Baker, Kew Bull. 194. 1892. In part, as to the plant from Paraguay.
Bromelia pinguin sensu Morong & Britton, Ann. N. Y. Acad. Sci. 7: 235. 1892. Not L. 1753.
Bromelia serra sensu Mez, Bull. Herb. Boiss. II. 3: 1035. 1903. Not Griseb. 1879.
Bromelia goyazensis Mez, Bot. Jahrb. 30, Beibl. 67: 2. 1901.

MINAS GERAIS: Contendas, *Saint-Hilaire* (P). Lagoa Santa, *Barreto* 2115 (R).

GOIÁS: (Meio Ponte), *Glaziou* 22190 (B, type of *Bromelia goyazensis* Mez, F neg. 11252).

PARANÁ: Jacareí, *Dusén* 14606 (GH, S). Jaguariaíva, *Dusén* 17439 (BM, GH, S, US).

RIO GRANDE DO SUL: Palmeira, *Rambo* (! Rambo).

ALSO: PARAGUAY, ARGENTINA.

9. ***Bromelia glaziovii*** Mez, Bot. Jahrb. 30, Beibl. 67: 1. 1901.

GOIÁS: Campos do Rio Gama, *Glaziou* 22189 (B, type, F neg. 11251; GH).

10. ***Bromelia lindmanii*** Mez in Mart. Fl. Bras. 3, pt. 3: 621. 1894.
Karatas laciniosa Lindm. Svensk. Akad. Handl. 24: no. 8: 18, *pl. 2, figs. 22–25*. 1891. Not *Bromelia lacinosa* Mart. 1830.

MINAS GERAIS: Cultivated, *Handro* 291 (SP, US). Caldas, *Regnell* III-1259 in part (US). Passos to Serra da Ventania, *Regnell* III-1258 in part (S, type; US).
SÃO PAULO: Tanabí, *Gehrt* (SP, US).

11. ***Bromelia interior*** L. B. Smith, p. 23, fig. 80.
GOIÁS: Mun. Goiás: Quintas, *Macedo* 3260 (US, type).

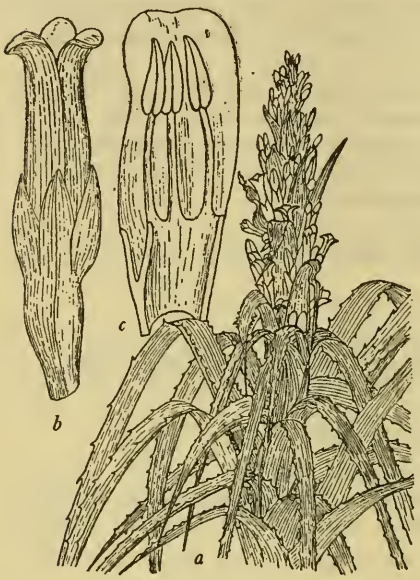

FIG. 79.

FIG. 80.

FIG. 79.—*Bromelia laciniosa: a,* Habit, × 1/6; *b,* flower, × 1.5; *c,* petal and stamens, × 1.5. (All after Antoine.)
FIG. 80.—*Bromelia interior: a,* Inflorescence, × 1/2; *b,* flower, × 1; *c,* sepal, × 1; petals and stamens, × 1.

MATO GROSSO: Aquiduana, Noreste R. R., *Foster* 1075 (GH). Braco, Rio Arinos, *Baldwin* 3103 (GH, US). Campo Grande, *Archer & Gehrt* 168 (SP, US). Coxipó da Ponte to Cuiabá, *Hoehne in Rondon* 4518 (R); *J. G. Kuhlmann* 86 (R).
SÃO PAULO: Itapura, *Foster* 1101 (GH).

12. ***Bromelia exigua*** Mez, Bot. Jahrb. 30, Beibl. 67: 2. 1901.
GOIÁS: Capelinha de Santo Antonio, *Glaziou* 22192 (B, type, F neg. 11250).

13. ***Bromelia rondoniana*** L. B. Smith, Bol. Mus. Nac. Rio de Janeiro nov. ser. no. 15: 1, *pl. 1, figs. a, b.* 1952.
RIO BRANCO: Caruá-açu, Serra da Lua, *Luetzelburg in Rondon* 21278 (R, type (US neg. 4199), M).

14. ***Bromelia legrellae*** (E. Morr.) Mez in Mart. Fl. Bras. 3, pt. 3: 189. 1891. *Karatas legrellae* E. Morr. Belg. Hortic. 22: 129, *pls. 11–13.* 1872.
PARÁ: Cultivated from material sent by Linden, *Legrelle* (LG).

15. ***Bromelia villosa*** Mez, Bot. Jahrb. 30, Beibl. 67: 3. 1901. FIGURE 81.
GOIÁS: (Sitio de Baracão to Areias), *Glaziou* 22191 (B, type, F neg. 11255).
MATO GROSSO: Baú, *Lindman* A-2951 (S). Cuiabá, *Lindman* A-2431 (S).

16. ***Bromelia lagopus*** Mez in Mart. Fl. Bras. 3, pt. 3: 188. 1891.
BRAZIL: Cultivated, *E. Morren* (LG, type).
BAÍA: Agua Preta, *Foster* 80 (GH).

17. ***Bromelia karatas*** L. Sp. Pl. 285. 1753.
Karatas plumieri E. Morr. Belg. Hortic. 22: 131. 1872.
MARANHÃO: Ilha de São Luiz, *Fróes* 11967 (NY).
CEARÁ: Cultivated, *Brade* 13989 (RB).
BAÍA: Jacobina, *Foster* 99 (GH).
GOIÁS: *Weddell* 2663 (P, GH neg. 3037).
ALSO: MÉXICO and the WEST INDIES to COLOMBIA.

18. ***Bromelia morreniana*** (Regel) Mez in Mart. Fl. Bras. 3, pt. 3: 186. 1891.
Cryptanthus morrenianus Regel, Gartenflora 37: 157. 1888.
Distiacanthus morrenianus Baker, Handb. Bromel. 14. 1889.
PARÁ: Campos de Ariramba, Rio Jaramacarú, *Ducke* (MG). Cultivated, *E. Morren* (LG, type ?).

19. ***Bromelia scarlatina*** (Hort. ex Herincq) E. Morr. Belg. Hortic. 31: 164. 1881.
Distiacanthus scarlatinus Hort. ex Herincq, Hort. Français 246. 1869.
Disteganthus scarlatinus Nicholson, Dict. Gard. 1: 485. 1885.
Karatas scarlatina Harms, Engl. & Prantl, Pflanzenfam. ed. 2, 15a: 135. 1930.
PARÁ: Cultivated, *Jard. Bot. Liége* (LG, type ?).

23. *Acanthostachys* Kl.

Acanthostachys Kl. in Lk., Kl. & Otto, Ill. Pl. Rar. Hort. Berol. 1: 21, *pl. 9.* 1841.

Monotypic.

1. ***Acanthostachys strobilacea*** (Schult. f.) Kl. in Lk., Kl. & Otto, Ill. Pl. Rar. Hort. Berol. 1: 21, *pl. 9.* 1841. FIGURE 82.
Hohenbergia strobilacea Schult. f. in R. & S. Syst. 7, pt. 2: 1252. 1830.
Acanthostachys exilis Bertoni, An. Cient. Parag. II. no. 4: 301. 1919.
BRAZIL: Cultivated, *Atkinson* 16 (MT). *Borgmayer* (SP); *J. G. Kuhlmann* (HBR); *Saint-Hilaire* B1-1076 (P); *Sellow* bromel. 58-b (P).
ESPÍRITO SANTO: Domingos Martins, *Foster* 240 (GH, R). Itapemirim, *Foster* 167 (GH, R). Vitória, *Foster* 499 (GH).
MINAS GERAIS: Serra de Caracol, *Regnell* III-1260 in part (S). Fazenda do Diamante near Corinto, *Mexia* 5615-a (GH). Coronel Pacheco, *Heringer* 943 (SP). Lapinha, Lagoa Santa, *Hoehne in Rondon* 6660 (R); *Palacios* 3438 (LIL). Paraíba, *Claussen* 361 (P). (Fazenda do Pinhal), *Sellow* 5215 (R). Mun. Belo Horizonte: Belo Horizonte, *Melo Barreto* 2485 (R). Serra de Taquaril, *Oliveira* (IAN). Mun. Leopoldina: Domingos Pisoni, *Melo Barreto* 4424 (US).
RIO DE JANEIRO: Carmo, Vale do Paquequer, *Neves Armond* 318 (R). Formosa to Bananal, *Bowie & Cunningham* (BM).

DISTRITO FEDERAL: Andarí Grande, *Glaziou* 9327 (BM). Caminho da Canoa, Gavea, *Frazão* (RB).

SÃO PAULO: Cabreúva, *Hoehne* (SP). Campinas, *Novaes* 1208 (US). (Heitor Legrú), *G. Gehrt* (GH, SP). Ipiranga, *Luederwaldt* (SP). Itirapina, *G. Gehrt* (GH, SP). Monte Alegre, Amparo, *M. Kuhlmann* 407 (SP). Morro Pellado, *Edwall* (GH, SP). Pinhal, *M. Kuhlmann* 1559 (SP). Piraçununga, *Meira* (SP). Santos, *Mosén* 171 (R). São João de Bôa Vista, *Loefgren & Edwall* (GH, SP); *Mosén* 1731 (S); 4433 (S). São Simão, Casa Branca, *Regnell* III-1260 in part (S).

PARANÁ: Morungava, *Dusén* 16467 (BM, GH, S, US).

ALSO: PARAGUAY, ARGENTINA.

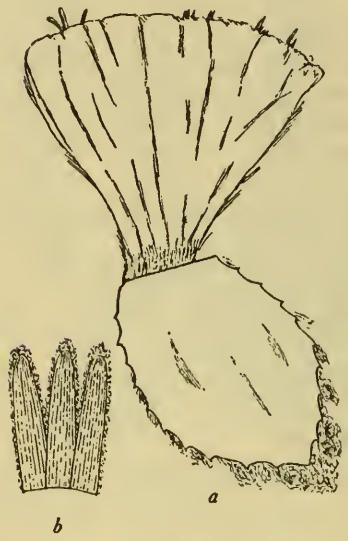

FIG. 81.

FIG. 82.

FIG. 81.—*Bromelia villosa: a,* Inflorescence, × ½; *b,* sepals (ventral side), × 1.

FIG. 82.—*Acanthostachys strobilacea: a,* Scape and inflorescence, × 1/20; *b,* inflorescence, × 1; *c,* flower, × 1; *d,* petal and stamen, × 1; *e,* pistil, × 1.

24. *Orthophytum* Beer

Orthophytum Beer, Flora 37: 347. 1854.
Prantleia Mez in Mart. Fl. Bras. 3, pt. 3: 257. 1891.
Sincoraea Ule, Bot. Jahrb. 42: 191. 1908.
Cryptanthopsis Ule, Bot. Jahrb. 42: 193. 1908.

Endemic to Brazil.

1. Scape lacking or short and hidden by the leaf-sheaths; inflorescence sunk in the center of the leaf-rosette.
   2. Leaf-blades linear, only 5–8 mm. wide.
      3. Sepals lanceolate, acute, 14 mm. long; leaf-blades laxly serrulate, 4–5 cm. long..... 1. **O. amoenum**

3. Sepals narrowly triangular, acuminate, 30 mm. long; leaf-blades densely serrulate, 30 cm. long..... 2. **O. navioides**

2. Leaf-blades narrowly triangular, 11–15 mm. wide, 3–6 cm. long; sepals narrowly triangular, spinose-acuminate, 14 mm. long.... 3. **O. saxicola**

1. Scape evident, well developed.

4. Inflorescence short and compact.

5. Flowers fasciculate; inflorescence capitiform.

6. Primary bracts lanceolate without distinction between sheath and blade; sepals narrowly triangular, spinose-acuminate, 14 mm. long, entire, glabrous or subglabrous..... 3. **O. saxicola**

6. Primary bracts with a large ovate sheath and narrowly triangular caudate-acuminate blade; sepals oblong, acute, 17–20 mm. long, mucronate, serrulate, densely white-lanate apically. 4. **O. mello-barretoi**

5. Flowers spicate; inflorescence digitate; floral bracts straight; sepals 12 mm. long; the posterior ones very broadly alate. (Fig. 83.) 5. **O. rubrum**

4. Inflorescence elongate, lax at least toward the base.

7. Scape-bracts lanceolate, abruptly acuminate; sepals 10 mm. long.

8. Leaf-spines 8 mm. long; sepals lanate toward the apex. 6. **O. leprosum**

8. Leaf-spines 2 mm. long; sepals and all the remainder of the inflorescence glabrous..... 7. **O. glabrum**

7. Scape-bracts linear-triangular, long-caudate.

9. Upper primary bracts with elongate blades; sepals 16–17 mm. long. 8. **O. foliosum**

9. Upper primary bracts with short blades or without distinct blades, scarcely more than twice as long as the spikes.

10. Leaf-scales wholly appressed; inflorescence dense for about half its length; sepals 15 mm. long. (Fig. 84.).. 9. **O. maracasense**

10. Leaf-scales spreading and crisped; inflorescence lax for more than three-fourths of its length; sepals 11 mm. long. (Fig. 85.) 10. **O. disjunctum**

1. ***Orthophytum amoenum*** (Ule) L. B. Smith, p. 33.
Sincoraea amoena Ule, Bot. Jahrb. 42: 191, *fig. 1 A-F.* 1908.
BAÍA: Serra do Sincorá, *Ule* 7106 (B, type).

2. ***Orthophytum navioides*** (L. B. Smith) L. B. Smith, p. 34.
Cryptanthopsis navioides L. B. Smith, Contr. Gray Herb. 129: 31, *pl. 3, figs. 4–6.* 1940.
BAÍA: Jacobina, *Foster* 90 (GH, type; R, US).

3. ***Orthophytum saxicola*** (Ule) L. B. Smith, p. 34.
Cryptanthopsis saxicola Ule, Bot. Jahrb. 42: 193, *fig. 1 G-K.* 1908.
BAÍA: Maracás, *Foster* 2471-A (US); *Ule* 7031 (B, type). Salvador to Milagres, *Foster* 2441 (US).

4. ***Orthophytum mello-barretoi*** L. B. Smith, Bol. Mus. Nac. Rio de Janeiro nov. ser. no. 15: 2, *pl. 1, figs. c-e.* 1952.
MINAS GERAIS: Mun. Jaboticatubas: Serra do Cipó, *Foster* 631 (GH); *Melo Barreto* 2121 (R, type; US); *Pires & Black* 2719 (IAN). Palacio, Serra do Cipó, km. 127, *Melo Barreto* 7665 (R).

5. ***Orthophytum rubrum*** L. B. Smith, p. 34, fig. 83.
BAÍA: Table Rock near Maracás, *Foster* 2444 (US, type).

6. ***Orthophytum leprosum*** (Mez) Mez, in DC. Monogr. Phan. 9: 117. 1896.
Prantleia leprosa Mez in Mart. Fl. Bras. 3, pt. 3: 259, *pl. 58, fig. 2.* 1891.
BRAZIL: *Glaziou* 14035 (K, US neg. 4184).
GOIÁS (?): Cachoeira do Inferno, *Pohl* 5229 (W, type).

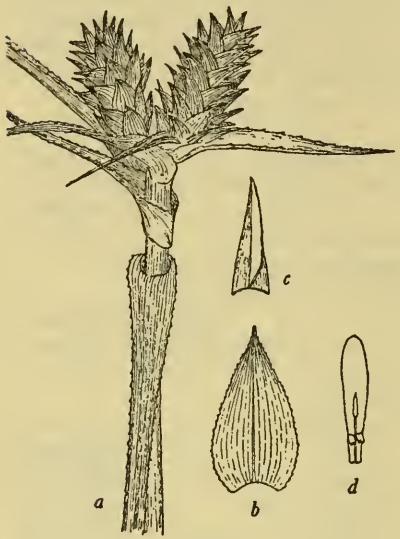

FIG. 83.

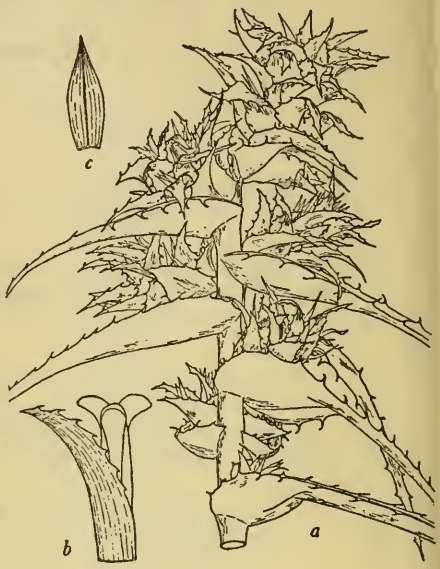

FIG. 84.

FIG. 83.—*Orthophytum rubrum: a,* Scape and inflorescence (after M. B. Foster), × ½; *b,* floral bract, × 1; *c,* sepal, × 1; *d,* petal and stamen, × 1.
FIG. 84.—*Orthophytum maracasense: a,* Inflorescence, × ½; *b,* floral bract and flower (after M. B. Foster), × 1; *c,* sepal, × 1.

7. ***Orthophytum glabrum*** (Mez) Mez in DC. Monogr. Phan. 9: 117. 1896.
Prantleia glabra Mez in Mart. Fl. Bras. 3, pt. 3: 258, *pl. 58, fig. 1.* 1891.
MINAS GERAIS: São Miguel, *Pohl* 3436 (BR, type, GH neg. 2792).

8. ***Orthophytum foliosum*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 58, *pl. 74.* 1941.
ESPÍRITO SANTO: *Foster* 2487 (US). Santa Teresa, *Foster* 288 (GH, type; R, US); 881 (GH, US).
MATO GROSSO: Camizão, *Foster* 1079 (GH).

9. ***Orthophytum maracasense*** L. B. Smith, p. 33, fig. 84.
BAÍA: Maracás, *Foster* 2471 (US, type; US neg. 4245).

10. ***Orthophytum disjunctum*** L. B. Smith, p. 33, fig. 85.
PARAÍBA: Queimada to Caruarú (in Pernambuco), *Foster* 2419 (US, type).
PERNAMBUCO: Mun. Quipapa: Engenheiro Pelada, *Silva & Leal* 247 (RB, US).

25. *Canistrum* E. Morr.

Canistrum E. Morr. Belg. Hortic. 23: 257. 1873.

Endemic to Brazil except for one species in Trinidad.

1. Scape completely covered by its entire bracts; pollen-grains with many pores; sepals strongly asymmetric, 15–17 mm. long..... 1. **C. aurantiacum**
1. Scape largely naked; pollen-grains biporate so far as known.
  2. Inflorescence and scape glabrous or inconspicuously appressed-lepidote.
    3. Leaf-spines not more than 3 mm. long; scape long and slender; sepals 16–30 (rarely to 34) mm. long.
      4. Sepals narrowly triangular, subsymmetric, 22–34 mm. long; scape-bracts and primary bracts serrate. (Fig. 86.) 2. **C. cyathiforme**
      4. Sepals strongly asymmetric with a broadly truncate apex, 16 mm. long; scape-bracts and primary bracts entire.... 3. **C. fosterianum**
    3. Leaf-spines to 7 mm. long; scape short and stout so that the inflorescence is but little elevated above the leaf-sheaths; sepals 38 mm. long. 4. **C. giganteum**
  2. Inflorescence and scape densely ferruginous-lanate.
    5. Scape 4 mm. in diameter; inflorescence 6–7 cm. in diameter without the bracts; petals bearing 2 narrow calli..... 5. **C. perplexum**
    5. Scape stout; inflorescence 7–12 cm. in diameter without the bracts; petals bearing 2 fimbriate scales at the base. (Fig. 87.)..... 6. **C. lindenii**

1. ***Canistrum aurantiacum*** E. Morr. Belg. Hortic. 23: 257, *pl. 15.* 1873.
Aechmea aurantiaca Baker, Journ. Bot. 17: 235. 1879.

Brazil: Cultivated, *E. Morren* (LG, type ?).

Pernambuco: (Dois Irmãos), *Ridley, Lea & Ramage* (BM). Recife, *Foster* 2428 (GH, US).

2. ***Canistrum cyathiforme*** (Vell.) Mez in Mart. Fl. Bras. 3, pt. 3: 252. 1891. Figure 86.
Tillandsia cyathiformis Vell. Fl. Fluminensis 137. 1825; Icon. 3: *pl. 144.* 1835.
Karatas regnellii Baker, Handb. Bromel. 10. 1889. In part, not as to type (*Nidularium giganteum*).
Regelia regnellii Lindm. Oefvers. Vet. Akad. Förhandl. 47: 543. 1890.
Mosenia sicarius Lindm. Svensk. Akad. Handl. 24: no. 8: 27, *pl. 5, figs. 1–11.* 1891.
Canistrum regnellii Mez in Mart. Fl. Bras. 3, pt. 3: 252. 1891.
Canistrum schwackeanum Mez, Bot. Jahrb. 30, Beibl. 67: 4. 1901.

Brazil: *Sellow* (B, F neg. 11304); *Voss* (GH, SP).

Minas Gerais: Pedra Branca, Caldas, *Regnell* III-1259 (B (F neg. 11303), S, US). Corrego Alegre, *Kuhlmann & Gehrt* (GH, SP). Pouso Alegre, *Salvador* (GH, SP).

Rio de Janeiro: Cachoeira do Rancho Frio, Serra dos Orgãos, *Brade* 16627 (RB). Teresópolis, *Foster* 1014 (GH, US).

São Paulo: Alto da Serra, *Hoehne* (GH, SP); *L. B. Smith* 1843 (B, GH, S). Apiai, *M. Kuhlmann* (GH, SP). Campos da Bocaina, *Loefgren & Edwall* (SP, GH neg. 7174). Serra da Bocaina, *Brade* 21150 (RB, US). Campos

do Jordão, *Eugenio* 3346 (GH). Cunha, *Kiehl & Franco* (SP). Sorocaba, Santos, *Mosén* 3705 (S). Mun. Amparo: Monte Alegre, *M. Kuhlmann* 981 (SP). Mun. São Paulo: Cantareira, *Hoehne* (GH, SP). Estação Florestal, *Foster* 340 (GH, R).

PARANÁ: Banhado, Serra do Mar, *Dusén* 15489-b (GH, S, US). Roça Nova, Curitiba, *Dusén* 2318 (R). Jaguariaíva, *Dusén* 11716 (S, US); 14948 (S, US). Mun. Piraquara: Estrada da Graciosa, Alto da Serra, *Hatschbach* 3054 (US).

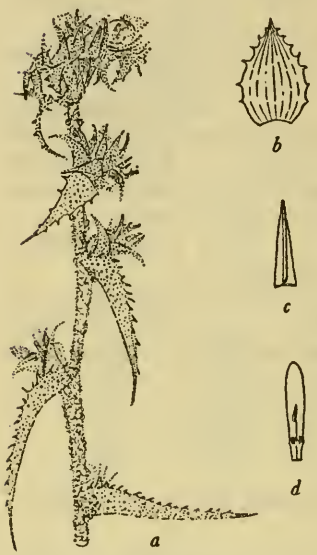

FIG. 85.

FIG. 86.

FIG. 85.—*Orthophytum disjunctum: a,* Inflorescence, × ½; *b,* floral bract, × 1; *c,* sepal, × 1; *d,* petal and stamen, × 1.

FIG. 86.—*Canistrum cyathiforme: a,* Habit, × 1/20; *b,* inflorescence, × ¼; *c,* floral bract and flower, × ½; *d,* sepal, × ½; *e,* petal and stamens, × ½. (All after Lindman.)

3. ***Canistrum fosterianum*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 2: 195, *pl. 62.* 1952.

BAÍA: Salvador, *Foster* 2479 (US, type).

4. ***Canistrum giganteum*** (Baker) L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 2: 118. 1950.

Nidularium giganteum Baker, Journ. Bot. 18: 50. 1880.

Karatas regnellii Baker, Handb. Bromel. 10. 1889. In part, as to type.

Canistrum cyathiforme Mez in Mart. Fl. Bras. 3, pt. 3: 252, *pl. 57.* 1891. In part, as to description and illustration, not as to basonym.

Canistrum ingratum Mez, Bot. Jahrb. 30, Beibl. 67: 3. 1901.

MINAS GERAIS: Passo Quatro, *Zikan* (SP). Serra da Mantiqueira, *Magelhães* 1585 (B, type of *Canistrum ingratum* Mez, F neg. 11302). Serra do Picú, *Glaziou* 11692 (FM, US, isotypes). Mun. Jaboticatubas: Serra do Cipó, *Foster* 609 (GH, US).

Rio de Janeiro: Itatiaia, *Brade* 14051 (RB, US neg. 4204); *Ferreira in L. B. Smith* 1713 (F, GH); *Foster* 128 (GH, R); *L. B. Smith* 1776 (GH).
São Paulo: Serra da Bocaina, *Brade* 21155 (RB, US).

5. ***Canistrum perplexum*** L. B. Smith, Proc. Amer. Acad. 70: 148, *pl. 1, figs. 12–15.* 1935.
São Paulo: Alto da Serra, *Foster* 373 (R); *M. Kuhlmann* (SP, US); *L. B. Smith* 1969 (GH, type). Jard. Bot. São Paulo, *Hoehne* (SP).

6. ***Canistrum lindenii*** (Regel) Mez in Mart. Fl. Bras. 3, pt. 3: 256. 1891.
1. Primary and outer bracts yellowish white to nearly white, sometimes faintly green at apex; inflorescence 100–500-flowered..... Var. a. **lindenii**
2. Inflorescence sunk in the center of the rosette or raised only slightly. Var. a. **lindenii** forma 1. **exiguum**
2. Inflorescence raised 20 cm. or more above the center of the rosette. Var. a. **lindenii** forma 2. **elatum**
1. Primary and outer bracts colored green or rose; inflorescence 50–90-flowered.
3. Primary and outer bracts green..... Var. b. **viride**
4. Inflorescence raised 20 cm. or more above the center of the rosette. Var. b. **viride** forma 1. **magna**
4. Inflorescence sunk in the center of the rosette or raised only slightly. Var. b. **viride** forma 2. **parva**
3. Primary and outer bracts rose to bright red..... Var. c. **roseum**
5. Inflorescence raised 15 cm. or more above the center of the rosette. Var. c. **roseum** forma 1. **procerum**
5. Inflorescence sunk in the center of the rosette or raised only slightly. Var. c. **roseum** forma 2. **humile**

6a. ***Canistrum lindenii*** var. ***lindenii***

6a1. Forma ***exiguum*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 2: 37. 1950.
Nidularium lindenii Regel, Ind. Sem. Hort. Petrop. for 1868: 78. 1869.
Canistrum eburneum E. Morr. Belg. Hortic. 28: 207. 1878.
Aechmea eburnea Baker, Handb. Bromel. 69. 1889.
Brazil: Cultivated, *Hort. Liége* (LG, type).
Santa Catarina: Mun. Brusque: Brusque, *Reitz* 3646 (HBR); 3849 (HBR, US). Limeira, *Reitz* (HBR). Mun. Florianópolis: Itacorubí, *Smith & Reitz* 6153 (R, US). Mun. Itajaí: Praia Braba, *Smith & Reitz* 6096 (R, RB, US). Mun. Pôrto Belo: Canto Grande, *Reitz* 3620 (HBR); 3620-a (HBR).

6a. ***Canistrum lindenii*** var. ***lindenii***

6a2. Forma ***elatum*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 2: 37. 1950.
Santa Catarina: São Francisco do Sul, *Reitz* 3672 (HBR, type). Mun. Itajaí: Praia Braba, *Reitz* 4482 (HBR).

6b. ***Canistrum lindenii*** var. ***viride*** (E. Morr.) Reitz, Anais Bot. Herb. Barbosa Rodrigues 2: 38. 1950.

6b1. Forma ***magnum*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 19. 1952.
Canistrum viride E. Morr. Catal. 7. 1873, nomen; Belg. Hortic. 24: 376, *pl. 16.* 1874.
Aechmea viridis Baker, Journ. Bot. 17: 235. 1879.
Canistrum lindenii var. *viride* forma *elatum* Reitz, Anais Bot. Herb. Barbosa Rodrigues 2: 38. 1950.

PARANÁ: Ilha das Peças, Baía de Paranaguá, *Hort. Liége* (LG, type).
SANTA CATARINA: Mun. Brusque: Ribeirão do Ouro, *Reitz* (HBR); 3917 (HBR).

6b2. Forma ***parvum*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 19. 1952.
Canistrum lindenii var. *viride* forma *exiguum* Reitz, Anais Bot. Herb. Barbosa Rodrigues 2: 38. 1950.
SANTA CATARINA: Mun. Brusque: Brusque, *Reitz* 3918 (HBR). Ribeirão do Ouro, *Reitz* 3586 (HBR). Mun. Florianópolis: Cacupé, *Inst. Malariologia* (HBR). Ribeirão da Ilha, *Reitz* 3922 (HBR). Mun. Nova Trento: Morro do Bom Socorro, *Reitz* 3647 (HBR); 3914 (HBR). Mun. Palhoça: Garopaba, *Reitz* 3698 (HBR).

6c. ***Canistrum lindenii*** var. ***roseum*** (E. Morr.) L. B. Smith, Anais Bot. Herb. Barbosa Rodrigues 2: 14. 1950.

6c1. Forma ***procerum*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 19. 1952. FIGURE 87.
Canistrum roseum E. Morr. Belg. Hortic. 29: 301. 1879.
Aechmea rosea Baker, Handb. Bromel. 68. 1889.
? *Aechmea fusca* Baker, Handb. Bromel. 69. 1889.
? *Canistrum fuscum* E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3: 257. 1891.
? *Canistrum binotii* Mez, Repert. Sp. Nov. Fedde 16: 5. 1919.
Canistrum lindenii var. *roseum* forma *elatum* Reitz, Anais Bot. Herb. Barbosa Rodrigues 2: 38. 1950.
BRAZIL: Cultivated, *Atkinson* 120 (MT); *Comte de Germiny* (LG, type, GH neg. 2932).
ESPÍRITO SANTO: Santa Teresa, *Foster* 292 (GH, R).
RIO DE JANEIRO: Petrópolis, *Foster* 337 (GH, R). Teresópolis, *collector?* (R).
SÃO PAULO: Moinho Velho, *Gehrt* (GH, SP). Sorocaba, Santos, *Mosén* 3803 (S).
PARANÁ: Curitiba to the sea, *Foster* 456 (GH). Jacareí, *Dusén* 15522 (GH, S); 17054 (GH, S). Volta Grande, *Dusén* 12069 (S).
SANTA CATARINA: Blumenau, *Reitz* (HBR). Mun. Biguaçú: Fachinal, *Reitz* 4155 (HBR). Mun. Brusque: Ribeirão do Ouro, *Reitz* (HBR); 3561 in part (HBR, US); 3587 (HBR).

6c2. Forma ***humile*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 19. 1952.
Canistrum lindenii var. *roseum* forma *exiguum* Reitz, Anais Bot. Herb. Barbosa Rodrigues 2: 38. 1950.
SANTA CATARINA: Mun. Araranguá: Sombrio, *Reitz* C-1011 (GH, HBR). Mun. Brusque: Mata Azambuja, *Inst. Malariologia* (HBR). Brusque, Mata São Pedro, *Reitz* 3181 (HBR, US). Mun. Florianópolis: Ribeirão da Ilha, *Reitz* 3833 (HBR); 3928 (HBR).

26. *Wittrockia* Lindm.

Wittrockia Lindm. Svensk. Akad. Handl. 24: no. 8: 15, 20. 1891.

Endemic to Brazil.

1. Petals acute; leaves coriaceous when dry, bearing spines up to 4 mm. long. (Fig. 88.) ..... 1. **W. superba**

1. Petals obtuse; leaves thin, submembranaceous or papyraceous when dry, finely serrulate.
   2. Sepals nearly or quite free.
      3. Inflorescence raised above the leaf-sheaths on a slender scape; leaf-blades 20 mm. wide, green; sepals subsymmetric..... **2. W. minuta**
      3. Inflorescence sunk in the center of the leaf-rosette; leaf-blades 45 mm. wide; sepals strongly asymmetric..... 3. **W. amazonica**

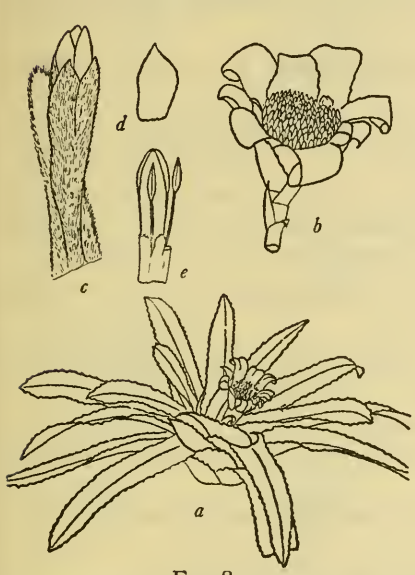

FIG. 87.

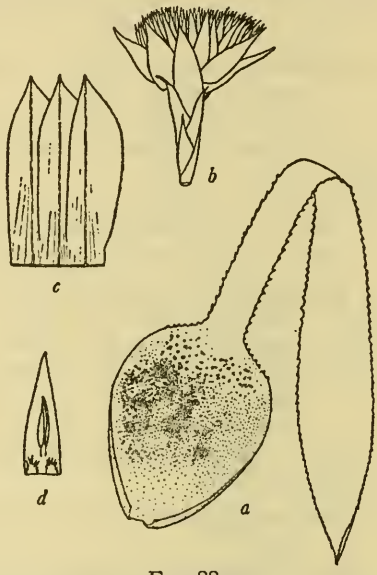

FIG. 88.

FIG. 87.—*Canistrum lindenii* var. *roseum* f. *procerum:* *a*, Habit, × 1/18; *b*, inflorescence, × 1/10; *c*, floral bract and flower, × 1; *d*, sepal, × 1; *e*, petal and stamens, × 1. (All after Belgique Horticole.)

FIG. 88.—*Wittrockia superba:* *a*, Leaf, × ⅛; *b*, inflorescence, × ⅛; *c*, sepals, × 1; *d*, petal and stamen, × 1.

   2. Sepals distinctly connate, subsymmetric.
      4. Inflorescence sunk in the center of the leaf-rosette; leaves dark red, the blades to 6 cm. wide; petals white and green..... 4. **W. smithii**
      4. Inflorescence raised above the leaf-sheaths on a long scape; leaves green, the blades much narrower. (Fig. 90.)
         5. Sepals 28 mm. long; petals yellow at the apex. (Fig. 89.) 5. **W. campos-portoi**
         5. Sepals 12 mm. long; petals blue at the apex. (Fig. 90.) 6. **W. azurea**

1. ***Wittrockia superba*** Lindm. Svensk. Akad. Handl. 24: no. 8:20, *pl. 2 figs. 13–21.* Feb. 1891. FIGURE 88.

   Nidularium karatas sensu Wawra, Oesterr. Bot. Zeitschr. 30:70. 1880 Not Lem. 1854.

Nidularium wawreanum Mez in Mart. Fl. Bras. 3, pt. 3: 245. Nov. 1891.
Canistrum cruentum F. Mueller, Gartenflora 42: 717. 1893.
Canistrum superbum Mez in Mart. Fl. Bras. 3, pt. 3: 620. 1894.
Nidularium superbum Ule, Verh. Bot. Ver. Brand. 48: 149. 1907.

DISTRITO FEDERAL: Tijuca, *Glaziou* 13251 (GH).

SÃO PAULO: Santos, *Foster* 487 (GH); *Mosén* 3704 (S).

PARANÁ: Near Santa Catarina boundary on Joinvile-Curitiba road, *Reitz* 3758-b (HBR).

SANTA CATARINA: Brusque, *Reitz* (HBR). Mun. Araranguá: Sombrio, *Reitz* C-493 (GH, HBR, US).

2. ***Wittrockia minuta*** (Mez) L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 2: 197. 1952.
Nidularium minutum Mez, Repert. Sp. Nov. Fedde 16: 4. 1919.
Canistrum minutum L. B. Smith, Proc. Amer. Acad. 68: 145, *pl. 1, figs. 4, 5.* 1933.

SÃO PAULO: Alto da Serra, *Foster* 359 (GH); *King* (SP); *D. Lemos* (SP, US); *L. B. Smith, Hoehne & Kuhlmann* 1829 (GH, US). Cultivated from material sent from Alto da Serra by Wackett, *Mez* (B, type).

3. ***Wittrockia amazonica*** (Baker) L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 2: 197. 1952.
Karatas amazonica Baker, Gard. Chron. nov. ser. 25: 814. 1886.
Nidularium amazonicum Lindm. Oefvers. Vet. Akad. Förhandl. 47: 541. 1890.
Canistrum amazonicum Mez in Mart. Fl. Bras. 3, pt. 3: 249. 1891.

BRAZIL: Cultivated, *Royal Bot. Gard.* (K, type, GH neg. 2686); *Jard Bot. Liége* (LG).

4. ***Wittrockia smithii*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 19, *pl. 5.* 1952.

PARANÁ: Curitiba to Paranaguá, *Reitz* 5760 (HBR, US).

SANTA CATARINA: Ribeirão Grande, Taió, *Reitz* 4150 (HBR). Mun. Biguaçú: Fachinal, *Reitz* 4207 (HBR, type). Mun. Blumenau: Morro Spitzkopf, *Reitz* 4658 (HBR); *Smith & Reitz* 6282 (US); 6292 (R, US). Mun. Brusque: Ribeirão do Ouro, *Reitz* 3561 in part (HBR, US). Mun. Imaruí: Vargem do Cedro, *Reitz* 4532 (HBR). Mun. Itajaí: Morro do Baú, *Reitz* (HBR, US). Mun. Palhoça: Anitápolis, *Reitz* 4536 (HBR).

5. ***Wittrockia campos-portoi*** L. B. Smith, p. 36, fig. 89.

BRAZIL: Cultivated, *L. B. Smith* (US, type; HBR).

6. ***Wittrockia azurea*** L. B. Smith, p. 36, fig. 90.

MINAS GERAIS: Coronel Pacheco [Agua Limpa], *Heringer* 1536 (SP, type, US neg. 4250).

27. *Hohenbergia* Schult. f.

Hohenbergia Schult. f. in R. & S. Syst. 7, pt. 2: p. lxxi, 1251. 1830.

Guatemala, West Indies, Venezuela.

1. Floral bracts acuminate.
2. Inflorescence bipinnate with the spikes in a dense head, or rarely simple. **1. H. littoralis**

2. Inflorescence amply tripinnate.
   3. Floral bracts 20–30 mm. long; spikes capitate at the ends of the branches; posterior sepals broadly alate-carinate. (Fig. 91.)..... 2. **H. stellata**
   3. Floral bracts 12–18 mm. long; spikes usually separated along the elongate branches.
      4. Sepals and floral bracts serrulate; spikes aggregated in clusters that are mostly broader than long..... 3. **H. brachycephala**

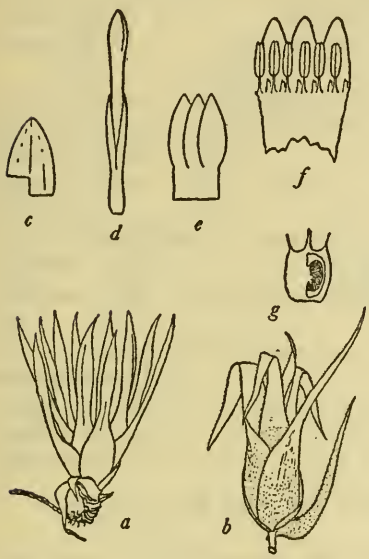

FIG. 89.

FIG. 90.

FIG. 89.—*Wittrockia campos-portoi: a,* Habit, × 1/10; *b,* inflorescence × ¼; *c,* floral bract, × 1; *d,* flower × 1; *e,* sepals, × 1; *f,* corolla lobes and stamens, × 1; *g,* longitudinal section of ovary, × 1.

FIG. 90.—*Wittrockia azurea: a,* Habit, × ⅛; *b,* floral bract and flower, × 1; *c,* sepal, × 1; *d,* base of petal, × 2; *e,* longitudinal section of ovary, × 1.

   4. Sepals and floral bracts entire.
      5. Spikes broad and spiny because of the spreading floral bracts; mucro of the sepal 2–3.5 mm. long..... 4. **H. horrida**
      5. Spikes smooth and slender because of the erect or suberect floral bracts.
         6. Branches of the inflorescence not more than 20 cm. long. 5. **H. catingae**
         6. Branches of the inflorescence 25–40 cm. long. 6. **H. caruaruensis**

1. Floral bracts broadly acute or obtuse, usually mucronate.
   7. Branches of the inflorescence very short.
      8. Inflorescence densely bipinnate from a few spikes; floral bracts muticous, 20 mm. long..... 7. **H. membranostrobilus**

8. Inflorescence laxly tripinnate, interrupted, the spikes fascicled in the axils of the primary bracts; floral bracts apiculate, pungent, 13 mm. long..... **8. H. disjuncta**

7. Branches of the inflorescence, or at least the lowest, elongate.

9. Spikes completely glabrous.

10. Sepals 5.5–6 mm. long; spikes cylindrical, many-flowered. (Fig. 92.) **9. H. salzmannii**

10. Sepals not over 4 mm. long; spikes globose or ellipsoid, few-flowered.

11. Plants to 2.4 m. high; sepals muticous..... **10. H. blanchetii**

11. Plants less than 5 dm. high; sepals mucronate..... **11. H. minor**

9. Spikes lanate or flocculose.

12. Indument dark ferruginous; spikes globose, mostly exceeding the secondary bracts; sepals not auricled, 4.5 mm. long, mucronulate. (Fig. 93.)..... **12. H. augusta**

12. Indument very pale, whitish or yellowish; spikes slender (except *H. criantha*).

13. Secondary bracts equaling or exceeding the globose spikes; sepals strongly mucronate, 5 mm. long..... **13. H. eriantha**

13. Secondary bracts shorter than the slender spikes; sepals mucronulate.

14. Floral bracts 8 mm. long, much exceeded by the sepals. **14. H. ramageana**

14. Floral bracts 11–15 mm. long, equaling or exceeding the sepals.

15. Sepals auricled, 4–5 mm. long..... **15. H. ridleyi**

15. Sepals not auricled, 6 mm. long..... **16. H. utriculosa**

1. ***Hohenbergia littoralis*** L. B. Smith, Contr. Gray Herb. 129: 33, *pl. 3, figs. 11–13.* 1940.

Baía: Salvador, *Foster* 46 (GH, type (US neg. 4030, 4031), R). Itapoã near Salvador, *L. B. Smith* 7115 (US).

2. ***Hohenbergia stellata*** Schult. f. in R. & S. Syst. 7, pt. 2: 1251. 1830. Figure 91.

Aechmea glomerata Hook. f. Bot. Mag. 93: *pl. 5668.* 1867. As to material illustrated.

Aechmea oligosphaera Baker, Handb. Bromel. 48. 1889.

Aechmea longisepala Baker, Handb. Bromel. 48. 1889.

Hohenbergia oligosphaera Mez in DC. Monogr. Phan. 9: 124. 1896.

Brazil: Cultivated, *Hennings* (GH).

Piauí: Guaribas, *Luetzelburg* (! Mez). Parnaguá, *Luetzelburg* (! Mez).

Baía: *Blanchet* (BM); *Porte* (P, GH neg. 2971). Agua Preta, *Foster* 79 (GH). Milagres to Maracás, *Foster* 2453 (US). Paramirim dos Creoulos, *Luetzelburg* (! Mez). Salvador, *Foster* 41 (GH, R). Rio São Francisco, northeastern Baía, *Luetzelburg* (! Mez). Sincorá, *Martius* (M, type).

Also: Tobago, Trinidad, Venezuela.

3. ***Hohenbergia brachycephala*** L. B. Smith, Contr. Gray Herb. 129: 32, *pl. 3, figs. 14–16.* 1940.

Baía: Agua Preta, *Foster* 64 in part (R). Rio Grungogi, *Curran* 121 (US, type, US neg. 3515).

4. ***Hohenbergia horrida*** Harms, Notizblatt 12: 525. 1935.
PARAÍBA: Campina Grande to Caruarú (in Pernambuco), *Foster* 2420 (US). Campina Grande to Pocinhos, *Foster* 2416 (US).
PERNAMBUCO: Poção, *Pickel* 3519 (B, type).

5. ***Hohenbergia catingae*** Ule, Bot. Jahrb. 42: 195. 1908.
BRAZIL: Cultivated, *Brade et al.* 19146 (RB, US).

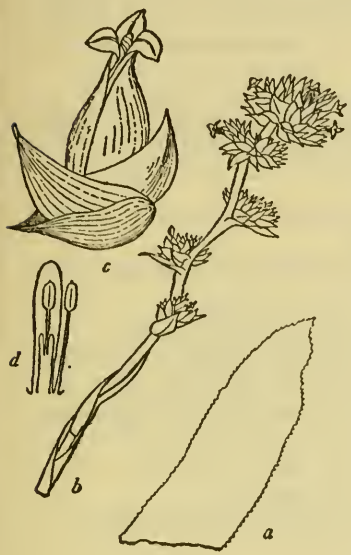

FIG. 91.

FIG. 92.

FIG. 91.—*Hohenbergia stellata: a,* Apex of leaf, × ⅙; *b,* scape and inflorescence, × ⅙; *c,* floral bract and flower, × 1; *d,* petal and stamens, × 1. (All after Pflanzenreich.)

FIG. 92.—*Hohenbergia salzmannii: a,* Upper part of habit, × ca. 1/20; *b,* branch of inflorescence, × 1; *c,* flower, × 1; *d,* sepal, × 1; *e,* longitudinal section of ovary, × 1. (*b* and *c* after Flora Brasiliensis.)

BAÍA: (Caldeirão), Rio das Contas, *Ule* 7042 (B, type, F neg. 11295). Iturassú to Maracás, *Foster* 2456 (US). Jacobina, *Foster* 86 (GH). Milagres to Maracás, *Foster* 2454 (US). Mun. Amargosa: Milagres, *Foster* 2475 (US); 2476 (US). Mun. Geremoabo: *Schery* 494 (GH).

6. ***Hohenbergia caruaruensis*** Harms, Notizblatt 11: 780. 1933.
PERNAMBUCO: Caruarú, *Pickel* 2900 (B, type).

7. ***Hohenbergia membranostrobilus*** Mez in Mart. Fl. Bras. 3, pt. 3: 269. 1891.
RIO DE JANEIRO: (Serra Gonçala), *Glaziou* 8984 (B, type, F neg. 11296).
DISTRITO FEDERAL: Cultivated (?), Quinta, *Glaziou* 18566 (P).

8. ***Hohenbergia disjuncta*** L. B. Smith, Contr. Gray Herb. 129: 33, *pl. 3, fig. 7–10.* 1940.
BAÍA: Agua Preta, *Foster* 64 in part (GH, type (US neg. 4032, 4033), R).

9. ***Hohenbergia salzmannii*** (Baker) E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3:271, *pl. 60, fig. 2.* 1891. FIGURE 92.

Aechmea salzmannii Baker, Handb. Bromel. 49. 1889.

Hohenbergia sellowiana Mez in DC. Monogr. Phan. 9:132. 1896.

BRAZIL: *Sellow* bromel. 67 in part (P, type of *Hohenbergia sellowiana* Mez, GH neg. 2972).

BAÍA: Salvador, *Foster* 44 (GH, R); *Lindman* A-63 (S); *Lutz* (GH); *Rose & Russell* 19895 (US); *Smith, Seabra & Leão da Costa* 7113 (US).

10. ***Hohenbergia blanchetii*** (Baker) E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3:267. 1891.

Aechmea blanchetii Baker, Handb. Bromel. 49. 1889.

BAÍA: Agua Preta, *Foster* 75 (GH, R). Ilheus, *Blanchet* 2996 (BM, type, US neg. 4022). Rio Grungogi, *Curran* 168 (US); 199 (US).

ESPÍRITO SANTO: Rio Jucú, *Foster* 214 (US).

11. ***Hohenbergia minor*** L. B. Smith, Contr. Gray Herb. 129:34, *pl. 3, figs. 17, 18.* 1940.

BAÍA: Agua Preta, *Foster* 69 (GH). Itapira, *Foster* 69-A (GH, type, US neg. 4034).

12. ***Hohenbergia augusta*** (Vell.) E. Morr. Catal. 9. 1873. FIGURE 93.

Tillandsia augusta Vell. Fl. Fluminensis 135. 1825; Icon. 3: *pl. 135.* 1835.

Pironneava glomerata Gaud. Atl. Voy. Bonite *pl. 63.* 1843.

Aechmea glomerata Hook. Bot. Mag. 93: *pl. 5668.* 1867. As to basonym only.

Aechmea augusta Baker, Journ. Bot. 17:162. 1879.

Aechmea multiceps Baker, Journ. Bot. 18:49. 1880.

Hohenbergia ferruginea Carr. Rev. Hortic. 53:437, *fig. 104.* 1881.

ESPÍRITO SANTO: Vitória, *Foster* 192 (GH).

RIO DE JANEIRO: Niteroi, *Smith & Brade* 2346 (GH).

DISTRITO FEDERAL: Andaraí Grande, *Glaziou* 11681 (P, type of *Aechmea multiceps* Baker, GH neg. 3039). Gavea, *Reitz* 3838 (HBR); *Ule* 4139 (R). Jardim Botânico to Alto da Boa Vista, *L. B. Smith* 1374 (B, BA, BM, F, GH, K, P, S, US). Monte do Cochrane, *L. B. Smith* 1409 (GH, S).

SÃO PAULO: Iguapé, *Loefgren & Edwall* (GH, SP). Prainha, Santos, *Foster* 483 (GH); *Gehrt* (SP, US).

PARANÁ: Caiobá, *Foster* 441 (GH); *M. Kuhlmann* (SP, US).

SANTA CATARINA: *Gaudichaud* 128 (P, type of *Pironneava glomerata* Gaud., GH neg. 3040). Blumenau, *Reitz* 4182 (HBR). Mun. Brusque: Brusque, *Inst. Malariologia* (HBR). Limeira, *Reitz* 3634 (HBR). Mun. Florianópolis: Lagoa de Piri, *Smith & Reitz* 6193 (US). Mun. Itajaí: Canoas, Luiz Alves, *Reitz* 4757 (! Reitz). Mun. Palhoça: Garopaba, *Reitz* 3701 (HBR). Mun. Pôrto Belo: Canto Grande, *Reitz* 3613 (HBR).

13. ***Hohenbergia eriantha*** (Brongn. ex Baker) Mez in Mart. Fl. Bras. 3, pt. 3:269. 1891.

Aechmea eriantha A. Brongn. ex Baker, Handb. Bromel. 47. 1889.

PERNAMBUCO (?): Cultivated, *Jard. Bot. Paris* (P, type, GH neg. 2973).

14. ***Hohenbergia ramageana*** Mez in DC. Monogr. Phan. 9:127. 1896.

PARAÍBA: Areia, *Vasconcelos* 208 (RB, US). João Pessoa [Paraíba do Norte], *Xavier* A (GH).

PERNAMBUCO: Afogadas to Boa Viagem, *Baker & Collins* (GH). (Dois Irmãos), *Ridley & Ramage* (BM, type, US neg. 4021).
SÃO PAULO: Itapecerica da Serra, Rio Embú-Guassú, *Handro* 384 (SP, US).

15. ***Hohenbergia ridleyi*** (Baker) Mez in Mart. Fl. Bras. 3, pt. 3: 266. 1891.
Aechmea ridleyi Baker, Handb. Bromel. 47. 1889.
Hohenbergia pickelii Harms, Notizblatt 10: 785. 1929.
PARAÍBA–PERNAMBUCO: Taboleiro de També [Itambé], *Pickel* 3429 (IPA).
PERNAMBUCO: *Forsett* 55 (S). Iguaraçu, *Ridley & Ramage* (BM, type, US neg. 4020). Tapera, *Pickel* (R); 1921 (B, type of *Hohenbergia pickelii* Harms, F neg. 11298).

16. ***Hohenbergia utriculosa*** Ule, Bot. Jahrb. 42: 196. 1908.
BAÍA: Maracás, *Foster* 2461 (US). Milagres to Maracás, *Foster* 2440 (US). Milagres, *Foster* 2477 (US). Serra do Sincorá, *Ule* 7132 (B, type, F neg. 11299).

28. *Gravisia* Mez

Gravisia Mez in Mart. Fl. Bras. 3, pt. 3: 180. 1891, 299. 1892.

Costa Rica, Jamaica, Tobago, Trinidad, Venezuela, Guiana.

1. Flowers fasciculate on very short branches; floral bracts large.
2. Inflorescence lax, at least toward the base; scape-bracts flat, uniform in texture and all entire; sepals 14 mm. long..... 1. **G. aquilega**
2. Inflorescence dense throughout; scape-bracts with involute much thickened apices, the lower ones serrate; sepals 18 mm. long. **2. G. capitata**
1. Flowers pinnate on elongate branches; floral bracts minute; sepals 14 mm. long..... 3. **G. constantinii**

1. ***Gravisia aquilega*** (Salisb.) Mez in DC. Monogr. Phan. 9: 173. 1896. FIGURE 94.
Bromelia aquilega Salisb. Parad. Lond. *pl. 40.* 1806.
Bromelia exsudans Lodd. Bot. Cab. 9: *pl. 801.* 1824.
Aechmea aquilega Griseb. Fl. Brit. West Ind. 592. 1864.
Aechmea exsudans Baker, Handb. Bromel. 44. 1889.
Aechmea chrysocoma Baker, Handb. Bromel. 44. 1889.
Aechmea aquilegioides Kuntze, Rev. Gen. 2: 698. 1891.
Gravisia exsudans Mez in Mart. Fl. Bras. 3, pt. 3: 300. 1892.
Gravisia chrysocoma Mez in Mart. Fl. Bras. 3, pt. 3: 301, *pl. 65.* 1892.
BRAZIL: Cultivated, *Devansaye* (LG); *Foster* 60 (GH).
PARÁ: Rio Gurupi, *Lopes* (R). Rio Irituia, *C. F. Baker* 433 (MG).
MARANHÃO: Rio Maracaçume, *Fróes* 1948-a (GH, NY).
CEARÁ: Aratuba [Coite or Santos Dumont], *Cutler* 8178 (US). Serra de Baturité, *Ule* 8993 (B, F neg. 11284). (Cume do Bico), Serra de Baturité, *Ducke* (MG). (Riacho do Capim), *Huber* (MG).
PERNAMBUCO: Afogadas to Boa Viagem, *Baker & Collins* (GH). (Caxagua), *Ridley, Lea & Ramage* (BM). Iguaraçu, *Ramage* (BM).
BAÍA: Ituraçu to Maracás, *Foster* 2457 (US). Jacobina, *Foster* 91 (GH, R). Portoa, *Foster* 84 (GH, R). Salvador, *Foster* 45 (GH). Salvador to Feira, *Foster* 2433 (US). Boca do Rio, Salvador, *Smith, Seabra & Leão da Costa* 7114 (US).
ALSO: COSTA RICA, VENEZUELA, TRINIDAD, TOBAGO, GUIANA.

2. ***Gravisia capitata*** (Schult.) L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 57, *pl. 73, fig. 2.* 1941.

Hohenbergia capitata Schult. in R. & S. Syst. 7, pt. 2: 1252. 1830.

BAÍA: Almada, *Martius* (M, type).

ESPÍRITO SANTO: Santa Teresa, *Foster* 284 (GH, R).

3. ***Gravisia constantinii*** Mez, Repert. Sp. Nov. Fedde 14: 245. 1916.

BRAZIL: Cultivated, *Jard. Bot. Paris* (P, type).

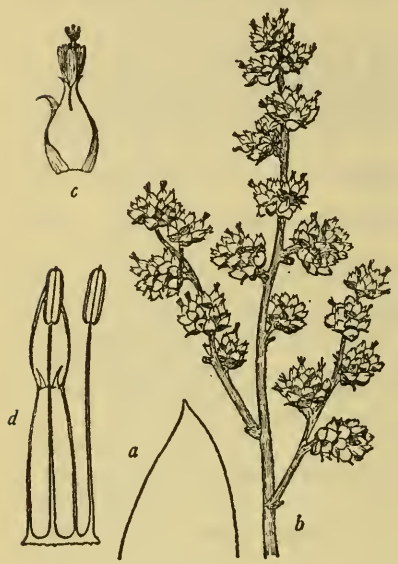

FIG. 93.

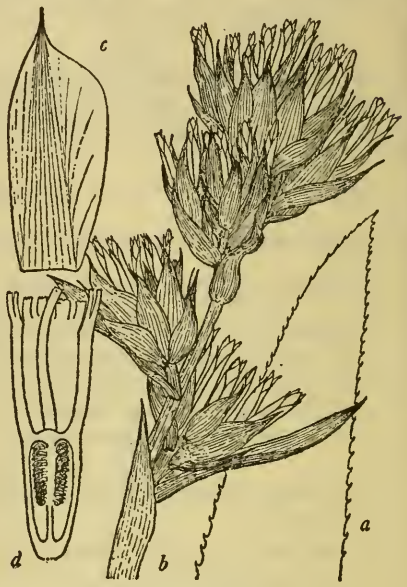

FIG. 94.

FIG. 93.—*Hohenbergia augusta: a,* Apex of leaf, × ¼; *b,* inflorescence, × ¼; *c,* floral bract and flower, × 2; *d,* petal and stamens, × 5. (All after Gaudichaud.)

FIG. 94.—*Gravisia aquilega: a,* Apex of leaf, × ¼; *b,* inflorescence, × ½; *c,* sepal, × 2.5; *d,* longitudinal section of ovary, × 2.5. (All after Flora Brasiliensis.)

29. *Aechmea* R. & P.

Aechmea R. & P. Fl. Peruv. Prodr. 47. 1794, nomen conservandum.

México and the West Indies to Argentina.

1. Petal-appendages well developed; inflorescence simple or compound, never perennial.
   2. Inflorescence compound, or if simple then lax or cyathiform or the flowers distichous.
      3. Sepals unarmed; flowers in more than two ranks.

Subgenus **Lamprococcus**
(Species 1–14)

3. Sepals mucronate or mucronulate, or if unarmed then the flowers distichous.
4. Inflorescence not cyathiform.
5. Floral bracts neither decurrent nor forming pouches around the flowers, distichous or polystichous.
6. Sepals nearly or quite free..... Subgenus **Aechmea** (Species 15–40)
6. Sepals connate for one-third to half their length, their mucros about as long as their free lobes..... Subgenus **Hoplophytum** (Species 41–50)
5. Floral bracts decurrent and forming pouches around the flowers, distichous..... Subgenus **Platyaechmea** (Species 51–54)
4. Inflorescence cyathiform, its bracts or the inner leaves of the rosette forming an involucre about it, compound or simple. Subgenus **Ortgiesia** (Species 55–60)
2. Inflorescence simple, strobilate with the flowers in many ranks, scapose, not at all cyathiform (the bracts massed below the inflorescence in some species but spreading and not forming an involucre).
7. Sepals mucronate or mucronulate; petal-appendages basal or higher. Subgenus **Pothuava** (Species 61–73)
7. Sepals unarmed; appendages usually inserted well above the base of the petal..... Subgenus **Macrochordium** (Species 74–80)
1. Petal-appendages rudimentary or reduced; inflorescence simple or rarely digitate, perennial; flowers strobilate, in many ranks; floral bracts thick and more or less ligneous in the Brazilian species. Subgenus **Purpurospadix** (Species 81–92)

The above definitions of subgenera largely follow Mez's system, but make allowance for a species with a simple inflorescence, *Aechmea contracta,* in subgenus *Platyaechmea.* The subgenus *Ortgiesia* is retained pending further study, although the range of sepal fusion indicates that it might be a more natural disposition of the species to distribute them among the other subgenera. The natural division of the genus is now so involved that the following more or less artificial key is more practical for the purposes of identification.

CONSPECTUS OF SUBKEYS

1. Inflorescence compound..... **Subkey A**
1. Inflorescence simple.
2. Floral bracts serrulate..... **Subkey B**
2. Floral bracts entire.
3. The floral bracts flat, usually thin, nerved..... **Subkey C**
3. The floral bracts navicular, enfolding at least the base of the flower. **Subkey D**

SUBKEY A

1. Floral bracts serrate; flowers in more than two ranks.
   2. Primary bracts foliaceous, spreading; spikes globose, to 15 cm. in diameter; floral bracts thick, recurved; sepals 30 mm. long, free. 81. **Ae. fernandae**
   2. Primary bracts bracteiform, erect and forming an involucre about the inflorescence; spikes longer than broad, small; floral bracts thin, erect.
      3. Margins of the floral bracts decurrent, forming pouches; sepals 9 mm. long; flowers 32 mm. long..... 55. **Ae. hamata**
      3. Margins of the floral bracts free.
         4. Primary bracts shorter than the branches; sepals unarmed, free; flowers 13 mm. long..... 56. **Ae. caesia**
         4. Primary bracts exceeding the branches; sepals mucronulate, connate; flowers 30–35 mm. long..... 57. **Ae. fasciata**
1. Floral bracts entire or at most slightly erose.
   5. Rhachis winged or excavated; floral bracts decurrent and forming pouches; flowers in two ranks. (Fig. 101.)
      6. Scape-bracts all densely imbricate; primary bracts entire, small; floral bracts about equaling the ovary; sepals mucronulate 5–13 mm. long. 51. **Ae. distichantha**
      6. Scape-bracts massed toward the top of the scape but lax below; primary bracts serrulate; leaves concolorous (For species with dark-banded leaves see note under 38. *Ae. chantinii*).
         7. Floral bracts exceeding the ovary; leaf-blades not narrowed toward the base.
            8. Spikes long-stipitate; sepals unarmed, 10–12 mm. long. 52. **Ae. amazonica**
            8. Spikes short-stipitate or sessile; sepals mucronulate, to 7.5 mm. long..... 53. **Ae. tillandsioides**
         7. Floral bracts shorter than the ovary at anthesis; leaf-blades subpetiolate; sepals apiculate, 5–8 mm. long..... 54. **Ae. contracta**
   5. Rhachis more or less angled but never winged nor excavated.
      9. Floral bracts equaling or exceeding the sepals.
         10. Inflorescence lax, tripinnate or more divided.
            11. Floral bracts divergent, not touching one another; sepals 21–24 mm. long..... 16. **Ae. blanchetiana**
            11. Floral bracts imbricate; sepals 17 mm. long... 17. **Ae. fraudulosa**
         10. Inflorescence dense.
            12. Leaf-blades with broad dark purple spots beneath; inflorescence ovoid, 7 cm. long; sepals free, 11 mm. long, mucronulate. 18. **Ae. orlandiana**
            12. Leaf-blades concolorous; inflorescence cylindric or slenderly fusiform, nearly 30 cm. long.
               13. Sepals free, 9 mm. long, unarmed. (Fig. 96.).. 15. **Ae. mutica**
               13. Sepals connate, 23 mm. long including the 5 mm. mucro. 41. **Ae. macrochlamys**
      9. Floral bracts distinctly surpassed by the sepals.
         14. The floral bracts in the form of a cylinder or cup, completely enclosing the base of the ovary. (Fig. 97.)

15. Mucro of the floral bracts 3–5 mm. long; inflorescence fertile throughout; sepals 3–10 mm. long.
16. Spikes very dense; flowers few, subfasciculate; sepals mucronate. (Fig. 97.) ..... 19. **Ae. mertensii**
16. Spikes lax; flowers obviously in two ranks; sepals obscurely mucronulate or unarmed..... 20. **Ae. huebneri**
15. Mucro of the floral bracts to 15 mm. long; inflorescence partly sterile; sepals 16–21 mm. long.
17. Branches at the base of the inflorescence reduced to fascicles of sterile setiform bracts; inflorescence pale-flocculose, soon glabrous..... 21. **Ae. setigera**
17. Branches all bearing a few flowers at their bases, but the upper branches with sterile apices; inflorescence densely ferruginous-flocculose..... 22. **Ae. kuntzeana**
14. The floral bracts narrower, not completely enclosing the base of the ovary.
18. Sepals connate for one-third to half their length, their mucros nearly or quite as long as their free lobes; scape-bracts very thin, soon disintegrating.
19. Inflorescence digitate; spikes few, strobilate, many-flowered. 66. **Ae. calyculata**
19. Inflorescence paniculate; spikes many, lax, few-flowered.
20. Petals white; leaves frequently banded; flowers 15 mm. long; sepals 3.5 mm. long without the 3 mm. mucro. 42. **Ae. candida**
20. Petals colored.
21. The petals yellow; inflorescence densely white-flocculose; branches slender, geniculate; scape-bracts mostly imbricate; flowers 20–25 mm. long..... 43. **Ae. caudata**
21. The petals blue.
22. Inflorescence persistently white-flocculose; branches nearly or quite straight; flowers 20 mm. long. 44. **Ae. coelestis**
22. Inflorescence soon glabrous; branches geniculate.
23. Flowers 17 mm. long; scape-bracts mostly imbricate. 45. **Ae. organensis**
23. Flowers 25 mm. long; scape-bracts mostly remote. 46. **Ae. gracilis**
18. Sepals nearly or quite free, their mucros relatively short.
24. Mucros of the sepals evident without a lens. To p. 197.
25. Flowers imbricate, all touching each other; inflorescence very dense; spikes densely few-flowered; sepals 6 mm. long without the 4 mm. mucro..... 23. **Ae. phanerophlebia**
25. Flowers lax, not touching or only the immature ones.
26. Sepals 12–23 mm. long (unrecorded in *Ae. megalantha* which has petals 35 mm. long); inflorescence amply 3–4-pinnate.
27. Floral bracts 10–12 mm. long, exceeding the ovary. 24. **Ae. eurycorymbus**
27. Floral bracts much shorter than the ovary.
28. The floral bracts setiform from a small triangular base, 2–3 mm. long; inflorescence tomentose-lepidote.

29. Inflorescence dense except toward the base, its axes stout; primary bracts broad; sepals 23 mm. long.
25. **Ae. tomentosa**

29. Inflorescence lax, its axes slender; primary bracts narrow; sepals 12 mm. long. (Fig. 98.)
26. **Ae. stelligera**

28. The floral bracts broad.

30. Petals 25 mm. long; floral bracts 5–8 mm. long.
27. **Ae. werdermannii**

30. Petals 35 mm. long; floral bracts 1–3 mm. long.
28. **Ae. megalantha**

26. Sepals 4–10 mm. long.

31. Spikes 9–20 cm. long; rhachis straight; flowers in more than two ranks. (Fig. 99.)..... 29. **Ae. lingulata**

31. Spikes short; rhachis often flexuous or geniculate.

32. Leaf-blades narrowly triangular; ovary trigonous; sepals 6 mm. long..... 30. **Ae. purpureo-rosea**

32. Leaf-blades ligulate.

33. Floral bracts navicular; rhachis strongly quadrangular; inflorescence bipinnate; sepals 4–5 mm. long.
31. **Ae. angustifolia**

33. Floral bracts nearly flat; rhachis subterete or irregularly angled with the flowers in more than two ranks.

34. Mucro of the floral bract longer than the inconspicuous base; trichomes of the inflorescence linear; sepals 5 mm. long..... 32. **Ae. sprucei**

34. Mucro of the floral bract no longer than the suborbicular base.

35. Ovaries 15 mm. long, minutely verrucose; inflorescence subdense, ovoid, 17 cm. long; floral bracts 4 mm. long; sepals 9–10 mm. long.
33. **Ae. melinonii**

35. Ovaries not more than 10 mm. long, even; inflorescence lax at least at the base; floral bracts from more than half as long to exceeding the ovaries; sepals 5–8 mm. long.

36. Petals nearly 3 times as long as the sepals, blue; sepals 8 mm. long; inflorescence narrowly ovoid, 17 cm. long; lower primary bracts about equaling the branches.
34. **Ae. azurea**

36. Petals only about twice as long as the sepals, yellow (uncertain in *Ae. tocantina*); sepals 5 mm. long without the mucro; inflorescence narrowly cylindric or laxly digitate or pinnate from several long cylindric branches that greatly exceed the primary bracts.

37. Spike-rhachis geniculate; inflorescence cobwebby, becoming glabrous.
35. **Ae. ramosa**

37. Spike-rhachis straight; inflorescence covered with fine appressed stellate trichomes. 36. **Ae. tocantina**

24. Mucro of the sepal lacking or invisible without a lens, sepals sometimes acuminate with a soft apex.

38. Inflorescence amply tripinnate, densely lanate; sepals ovate, soft-acuminate, 11 mm. long..... 37. **Ae. araneosa**

38. Inflorescence not more than bipinnate.

39. Leaf-blades marked with spots or bands; sepals 10 mm. long.

40. Floral bracts minute; leaves two-ranked; inflorescence diffuse..... 1. **Ae. marmorata**

40. Floral bracts exceeding the ovary; leaves in more than two ranks.

41. Scape-bracts imbricate; inflorescence short and dense. 38. **Ae. chantinii**

41. Scape-bracts remote; inflorescence elongate. 39. **Ae. fosteriana**

39. Leaf-blades concolorous.

42. Ovary alate; inflorescence few-flowered; floral bracts large; sepals 8 mm. long, connate for 4 mm. 2. **Ae. brachycaulis**

42. Ovary wingless, terete.

43. Leaf-sheaths erect, forming a slender cylinder, concealing most of the short scape.

44. Floral bracts minute; sepals 7 mm. long. 3. **Ae. corymbosa**

44. Floral bracts to 7 mm. long; sepals 3.5 mm. long. 4. **Ae. brevicollis**

43. Leaf-sheaths divergent, much exceeded by the scape.

45. Floral bracts evident, equaling about the middle of the ovary; scape-bracts red, persistent.

46. Flowers in two ranks; primary bracts narrow; sepals subfree, 4–6 mm. long. 40. **Ae. schultesiana**

46. Flowers in more than two ranks; primary bracts ample; sepals about a third connate, 8 mm. long. 5. **Ae. weilbachii**

45. Floral bracts minute or lacking.

47. Inflorescence simple in its apical half.

48. Flowers distinctly pedicellate; scape-bracts red, ample, enclosing the scape; sepals 4 mm. long (Fig. 95.)..... 6. **Ae. podantha**

48. Flowers sessile; sepals 5–6 mm. long.

49. Ovary even; petal-blades wholly red. 7. **Ae. fulgens**

49. Ovary verrucose; petal-blades with white margins..... 8. **Ae. capixabae**

47. Inflorescence branched throughout.

50. Petals white; sepals 6.5 mm. long. 9. **Ae. corallina**

50. Petals colored; sepals 4 mm. long.
51. Inflorescence longer than broad; petal-blades wholly blue..... 10. **Ae. miniata**
51. Inflorescence about as broad as long; petal-blades blue only at the apex.
11. Ae. conglomerata

SUBKEY B

1. Leaf-blades narrowly triangular, acuminate, 4–30 mm. wide; scape not exceeding the leaf-sheaths; sepals to 17 mm. long.
2. Sepals broad, strongly asymmetric, rounded and mucronate; leaf-spines ascending..... 58. **Ae. recurvata**
2. Sepals narrowly lance-triangular, acuminate; leaf-spines recurved.
59. Ae. pitcairnioides
1. Leaf-blades ligulate, acuminate to broadly rounded and apiculate, 60–150 mm. wide; scape various.
3. Sepals 25–30 mm. long, narrow, subsymmetric; leaf-blades acuminate, channeled toward the base; species of the Amazon Basin.
4. Leaves and bracts sparsely pale-lepidote to glabrous on the under side.
81. Ae. fernandae
4. Leaves densely ferruginous-lepidote on the under side.
82. Ae. rubiginosa
3. Sepals 17–20 mm. long, often strongly asymmetric; leaf-blades acute to rounded and apiculate, not channeled; species of eastern Brazil.
5. Scape-bracts laxly if at all imbricate, small, colored; leaf-blades bearing broad white cross-bands..... 57. **Ae. fasciata**
5. Scape-bracts densely imbricate, more or less foliaceous; leaf-blades concolorous.
6. Inflorescence globose to cylindric; scape elongate.
7. Bases of the leaves and scape-bracts green, scarcely different from the blades. (Fig. 102.)..... 61. **Ae. pectinata**
7. Bases of the leaves and scape-bracts dark castaneous to nearly black. (Fig. 109.)..... 83. **Ae. multiflora**
6. Inflorescence depressed-globose; scape very short.
8. Scape-bracts and floral bracts red, drying to dark castaneous; floral bracts coarsely serrate, flat toward the base.... 84. **Ae. depressa**
8. Scape-bracts and floral bracts always green; floral bracts serrulate, their bases enfolding the flowers..... 85. **Ae. saxicola**

SUBKEY C

1. Flowers mostly in two ranks; leaves subpetiolate; floral bracts shorter than the ovary at anthesis; sepals apiculate, 5–8 mm. long... 54. **Ae. contracta**
1. Flowers mostly in more than two ranks.
2. Sepals obtuse or acute with a soft apex, never mucronate nor pungent.
3. Inflorescence lax, its axis plainly visible.
4. Flowers slenderly pedicellate; inflorescence usually pendulous; sepals 9 mm. long; ovary verrucose..... 12. **Ae. racinae**
4. Flowers sessile.
5. Ovary strongly alate; scape-bracts entire; sepals 8 mm. long; floral bracts large..... (2. **Ae. brachycaulis**)

5. Ovary terete; lower scape-bracts serrulate; sepals 4.5 mm. long; floral bracts minute..... 13. **Ae. victoriana**

3. Inflorescence dense, few-flowered, its axis completely hidden by the flowers and floral bracts; sepals 8–9 mm. long.

6. Sepals symmetric; inflorescence subcorymbiform; scape about equaling the leaf-sheaths..... 14. **Ae. mitis**

6. Sepals strongly asymmetric; inflorescence distinctly spicate; scape elongate..... 62. **Ae. turbinocalyx**

2. Sepals mucronate or pungent.

7. Scape-bracts massed below the inflorescence, spreading, ample, thin, red, persistent. (Fig. 103.)..... 63. **Ae. nudicaulis**

7. Scape-bracts about equally distributed along the scape.

8. Inflorescence lax, its axis clearly visible; sepals usually connate for about half their length; scape-bracts narrow, thin, fragile and soon lost. (Fig. 100.)

9. Petals white.

10. Leaves broadly rounded and apiculate, sometimes banded; sepals 3.5 mm. long without the 3 mm. mucro..... 42. **Ae. candida**

10. Leaves abruptly acuminate, densely and evenly cinereous-lepidote beneath; sepals 4 mm. long without the 1 mm. mucro. (Fig. 100.)..... 47. **Ae. bicolor**

9. Petals colored.

11. The petals yellow.[1]

12. Flowers subverticillate; leaves often white-banded beneath; sepals 7 mm. long including the 3 mm. mucro. 48. **Ae. blumenavii**

12. Flowers evenly distributed along the axis or more lax toward the base, but not at all verticillate; leaves not banded; sepals 7–11 mm. long including the long mucro.

13. Sepals connate for one-third to half their length. 43. **Ae. caudata**

13. Sepals short-connate; anthesis beginning in the middle of the inflorescence..... 49. **Ae. kertesziae**

11. The petals blue.

14. Inflorescence very lax, few-flowered, soon glabrous; flowers 25 mm. long; scape-bracts mostly remote... 46. **Ae. gracilis**

14. Inflorescence with its axis slightly exposed, many-flowered.

15. Flowers 20 mm. long; inflorescence stout; floral bracts soft. 64. **Ae. cylindrata**

15. Flowers 15 mm. long; inflorescence slender; floral bracts pungent..... 50. **Ae. gamosepala**

8. Inflorescence dense, all or nearly all of its axis concealed by the flowers and floral bracts.

16. Floral bracts and sepals dark castaneous, coriaceous; flowers strongly complanate; sepals 34 mm. long, wholly covered by the bracts; inflorescence 14 cm. in diameter..... 86. **Ae. conifera**

16. Floral bracts and sepals stramineous or brightly colored; flowers terete or nearly so; sepals not wholly concealed by the bracts.

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[1] This group of species centering in Santa Catarina is practically impossible to classify now on the basis of herbarium material. Its further elaboration awaits the conclusion of field studies by Reitz.

17. Leaf-sheaths concealing the inflorescence; sepals to 17 mm. long, much connate; flowers to 38 mm. long..... 58. **Ae. recurvata**
17. Leaf-sheaths surpassed by the inflorescence.
18. Petals blue; floral bracts quickly deciduous; flowers 20 mm. long..... 64. **Ae. cylindrata**
18. Petals yellow; floral bracts persistent.
19. Scape short, barely raising the inflorescence above the leaf-sheaths; flowers 25 mm. long... 60. **Ae. pimenti-velosoi**
19. Scape elongate.
20. Floral bracts subnavicular and enfolding the base of the ovary; mucro about half as long as the calyx-lobe; flowers 20 mm. long..... 65. **Ae. comata**
20. Floral bracts very narrow; mucro almost as long as the calyx-lobe; flowers 17 mm. long.... 66. **Ae. calyculata**

SUBKEY D

1. Sepals mucronulate or pungent.
2. Floral bracts and sepals completely covered with a white woolly indument; inflorescence cylindric, 6 cm. in diameter; sepals 10 mm. long. 87. **Ae. perforata**
2. Floral bracts and sepals clearly visible.
3. The floral bracts thin, strongly nerved.
4. Flowers finally becoming reflexed; floral bracts suborbicular; leaves spinose-acuminate; sepals 14 mm. long, their mucros 3 mm. long. 67. **Ae. squarrosa**
4. Flowers never more than spreading.
5. Floral bracts emarginate; inflorescence with a conspicuous coma of sterile bracts; sepals 9 mm. long, their mucros minute. 68. **Ae. alopecurus**
5. Floral bracts acute to acuminate.
6. Scape-bracts subcoriaceous, persistent, ample, very densely imbricate and wholly concealing the scape; leaves acute or acuminate; petals blue toward the apex; flowers 20–25 mm. long; sepals 8–10 mm. long, lanate at the base..... 69. **Ae. vanhoutteana**
6. Scape-bracts membranaceous, soon disintegrating, narrow, the lower ones laxly imbricate to remote; leaves rounded and apiculate; petals yellow.
7. Inflorescence lax especially toward the base, anthesis beginning in the middle; sepals 7 mm. long exclusive of the 3 mm. mucro. 49. **Ae. kertesziae**
7. Inflorescence dense throughout, its axis completely hidden; sepals 3–5 mm. long exclusive of the 1.5–2 mm. mucro.
8. Lower scape-bracts mostly exceeding the internodes, narrowly triangular..... 65. **Ae. comata**
8. Lower scape-bracts remote, ovate..... 70. **Ae. kleinii**
3. The floral bracts thick, coriaceous or woody.
9. Apices of the floral bracts angled, acuminate, not truly mucronate; sepals 22–27 mm. long.
10. Scape-bracts serrate; floral bracts and sepals punctulate-lepidote. 88. **Ae. sphaerocephala**

10. Scape-bracts entire; floral bracts and sepals completely covered with appressed white scales. (Fig. 110.).... 89. **Ae. leucolepis**

9. Apices of the floral bracts mucronate with terete spines.

11. Sepals 26 mm. long; floral bracts acuminate into an 8–12 mm. mucro; inflorescence green..... 90. **Ae. stephanophora**

11. Sepals not over 17 mm. long.

12. The sepals free.

13. Sepals 4.5 mm. long, the mucro minute; petals yellow. 71. **Ae. pineliana**

13. Sepals 8–17 mm. long.

14. Axis of the inflorescence lanate; floral bracts slightly thickened toward the apex; mucro of the sepals minute. 68. **Ae. alopecurus**

14. Axis of the inflorescence appressed-lepidote; floral bracts much thickened toward the apex.

15. Sepals 8–9 mm. long; scape slender; petals white or greenish..... 72. **Ae. triticina**

15. Sepals 16–17 mm. long; scape stout.

16. Floral bracts and sepals covered with white appressed scales; sepal mucro large, stout; petals blue toward the apex..... 91. **Ae. cariocae**

16. Floral bracts brown-lepidote; sepals glabrous, the delicate mucro 0.5 mm. long; color of petals unknown. 92. **Ae. castanea**

12. The sepals connate; scape-bracts divergent, acuminate into a stout subulus. (Fig. 104.)..... 73. **Ae. ornata**

1. Sepals obtuse to emarginate or acute with a soft point.

17. Floral bracts thin, nerved, about equaling the sepals; scape-bracts erect, equally distributed; sepals 8 mm. long, connate for 2 mm. (Fig. 105.) 74. **Ae. nervata**

17. Floral bracts at least subcoriaceous, not nerved; upper scape-bracts massed beneath the inflorescence, divergent to spreading.

18. Leaves, or at least the outer ones, petiolate, channeled, minutely serrulate; sepals free, 8 mm. long; petals white..... 75. **Ae. alba**

18. Leaves not at all petiolate; sepals connate.

19. Leaf-blades minutely and subdensely serrulate, linear, 4–9 dm. long, 2–4 cm. wide; inflorescence sparsely lanate to appressed-lepidote; floral bracts acute; sepals 11 mm. long, half connate; petals yellow at anthesis.....76. **Ae. lamarchei**

19. Leaf-blades laxly serrate with spines 1–7 mm. long, ligulate to narrowly triangular.

20. Petals lavender to purple at anthesis; leaf-blades all narrowly triangular; sepals 6 mm. long, connate for 2 mm. 77. **Ae. triangularis**

20. Petals yellow at anthesis; leaf-blades ligulate or rarely the outermost narrowly triangular.

21. Floral bracts truncate; sepals 8 mm. long, half connate; inflorescence white-lanate..... 78. **Ae. bromeliifolia**

21. Floral bracts acute or apiculate.
    22. Leaves and scape-bracts spotted with red; sepals 8 mm. long, about half connate; petals appendaged near the middle; inflorescence flocculose. (Fig. 107.)..... 79. **Ae. maculata**
    22. Leaves and scape-bracts concolorous; sepals 12 mm. long, connate for 2 mm.; petals appendaged at the base; inflorescence appressed-lepidote. (Fig. 108.)
80. **Ae. chlorophylla**

Subgenus *Lamprococcus* (Beer) Benth.

1. ***Aechmea marmorata*** (Lem.) Mez in Mart. Fl. Bras. 3, pt. 3: 310, *pl. 66.* 1892.
   Billbergia marmorata Lem. Ill. Hortic. 2: *pl. 48.* 1855.
   Billbergia vittata sensu Baker, Handb. Bromel. 78. 1889. In part, not Brongn.
   Quesnelia effusa Lindm. Svensk. Akad. Handl. 24: no. 8: 26, *pl. 4, figs. 1–6.* 1891.
   Billbergia speciosa sensu Wittm. Bot. Jahrb. 13, Beibl. 29: 11. 1891.

Espírito Santo: Santa Teresa, *Foster* 248 (GH).

Distrito Federal: Cultivated, *Ule* 4692 in part (R). Corcovado, *Glaziou* 8983 (P, US). Morro do Archer, Tijuca, *Brade et al.* 1549 (RB, US). Morro Queimado, *Brade* 11272 (R). Rio de Janeiro, *J. G. Kuhlmann* (RB, US). São Cristovão, *Glaziou* 12233 (F, P); 16429 (P); *Lindman* A-23 (S). Tijuca, *Smith & Brade* 2241 (GH).

São Paulo: Rio Buturoca, Santos, *Mosén* 3491 (S, type of *Quesnelia effusa* Lindm.). Cubatão, Santos, *Gehrt* (GH, SP).

2. ***Aechmea brachycaulis*** Baker, Handb. Bromel. 53. 1889.
   Ronnbergia marantoides L. B. Smith, Contr. Gray Herb. 95: 43, *pl. 11, figs. 1–3.* 1931.

Brazil: Cultivated, unpublished plate by *E. Morren* (K, type).

Baía: Cultivated, *Strauss* (B, F neg. 11308). Agua Preta, *Foster* 77 (GH). Rio Grungogi, *Curran* 142 (US, type of *Ronnbergia marantoides* L. B. Smith).

3. ***Aechmea corymbosa*** (Mart. ex Schult.) Mez in Mart. Fl. Bras. 3, pt. 3: 316. 1892.
   Billbergia corymbosa Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1268. 1830.

Amazonas: Esperança, *Pires & Black* 915 (IAN). Rio Dimití, upper Rio Negro basin, *Schultes & López* 10008 (US). Tabatinga, near Colombian boundary, *Pires & Black* 1069 (IAN).

Also: Colombia, Perú.

4. ***Aechmea brevicollis*** L. B. Smith, Contr. Gray Herb. 154: 32, *pl. 3, figs. 1, 2.* 1945.

Amazonas: Cocui to Rio Içana on Rio Negro, *Schultes & López* 9538 (US). Rio Içana, Tunuí, *Black* 48-2601 (IAN); *Pires* 766 (IAN). Ipanoré to Rio Negro on Rio Vaupés, *Schultes & Pires* 9154-A (US). Irá-Igarapé to Igarapé Abiú, Rio Taraira, *Schultes & López* 10187 (IAN).

Also: Colombia, Venezuela.

5. ***Aechmea weilbachii*** Didr. Ann. Sci. Nat. IV. 2:375. 1854.
1. Leaves green..... Var. a. **weilbachii**
1. Leaves tinged with purple..... Var. b. **leodiensis**

5a. ***Aechmea weilbachii*** var. ***weilbachii***
Aechmea subinermis Baker, Journ. Bot. 17:228. 1879.
Quesnelia glaziovii Baker, Handb. Bromel. 87. 1889.
BRAZIL: Cultivated, *Barry* (US); *Foster* 508 (GH); *Lindman* A-19 (S). *Reitz* 5677 (HBR).
RIO DE JANEIRO: Mandioca, Serra da Estrella, *Glaziou* 9326 (P).
DISTRITO FEDERAL: Corcovado, *Glaziou* 18567 (P). Cultivated (?), Quinta da Bôa Vista, *Glaziou* 16418 (P); 17285 (P).

5b. ***Aechmea weilbachii*** var. ***leodiensis*** André, Rev. Hortic. 59:31. 1887.
BRAZIL: Described from cultivation. No herbarium material known.

6. ***Aechmea podantha*** L. B. Smith, p. 18, fig. 95.
ESPÍRITO SANTO: Santa Teresa, *Foster* 842 (GH, type, US neg. 4248); 844 (GH, depauperate specimen).

7. ***Aechmea fulgens*** Brongn. Ann. Sci. Nat. II. 15:371. 1841.
1. Leaves green..... Var. a. **fulgens**
1. Leaves red-purple beneath..... Var. b. **discolor**

7a. ***Aechmea fulgens*** var. ***fulgens***
PERNAMBUCO: Cultivated, *Berlin* (US); *Quesnel* (P, type, GH neg. 2956). Escola [São Bento], *Pickel* 1281 in part (IPA). Tapera, *Pickel* 1281 in part (IPA); 2298 (! Mez).

7b. ***Aechmea fulgens*** var. ***discolor*** (C. Morr.) Brongn. ex Baker, Handb. Bromel. 52. 1889.
Aechmea discolor C. Morr. Ann. Soc. Gand 2:175, *pl. 65.* 1846.
PERNAMBUCO: Cultivated, *Atkinson* 11 (BH); 12 (MT); *Foster* 1252 (GH); *Kew* (K, GH neg. 1388); *Quesnel* (P, type).

8. ***Aechmea capixabae*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1:56, *pl. 72.* 1941.
ESPÍRITO SANTO: Santa Teresa, *Foster* 258 (GH, R); 278 (GH, type; R); 843 (GH).

9. ***Aechmea corallina*** (Beer) Brongn. ex Baker, Handb. Bromel. 52. 1889.
Lamprococcus corallinus Beer, Bromel. 106. 1857.
BAÍA: Described from cultivated material sent by Porte, none known to survive.

10. ***Aechmea miniata*** (Beer) Hort. ex Baker, Handb. Bromel. 53. 1889.
1. Leaves green..... Var. a. **miniata**
1. Leaves tinged with red..... Var. b. **discolor**

10a. ***Aechmea miniata*** var. ***miniata***
Lamprococcus miniatus Beer, Bromel. 104. 1857.
BRAZIL: Cultivated, *Atkinson* 10 (MT); *Clover* (MICH); *Foster* IX (GH); *New York Bot. Gard.* (US); *Rivage* (G, F neg. 8558).
BAÍA: *Blanchet* (P). Agua Preta, *Foster* 70 (GH, US). Ilheus, *Blanchet* 2371 (! Mez).

10b. ***Aechmea miniata*** var. ***discolor*** (Beer) Beer ex Baker, Handb. Bromel. 53. 1889.

Lamprococcus miniatus var. *discolor* Beer, Bromel. 104. 1857.

BRAZIL: Cultivated, *Foster* (GH); 1253 (GH); *New York Bot. Gard.* (US).

11. ***Aechmea conglomerata*** Hort. ex Baker Handb. Bromel. 52. 1889.

1. Leaf-blades green on both sides.
   2. Leaves farinose beneath, glabrous above..... Var. a. **conglomerata**
   2. Leaves farinose on both sides..... Var. b. **farinosa**
1. Leaf-blades claret-brown beneath..... Var. c. **discolor**

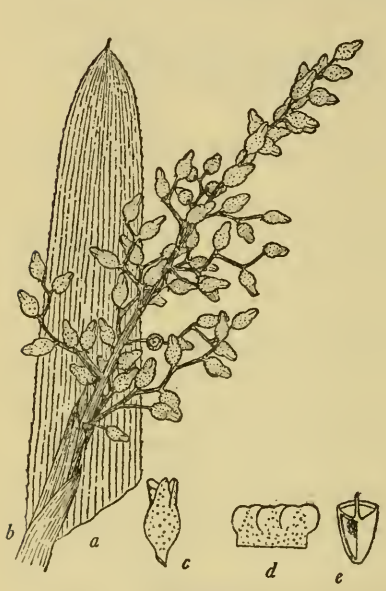

FIG. 95.

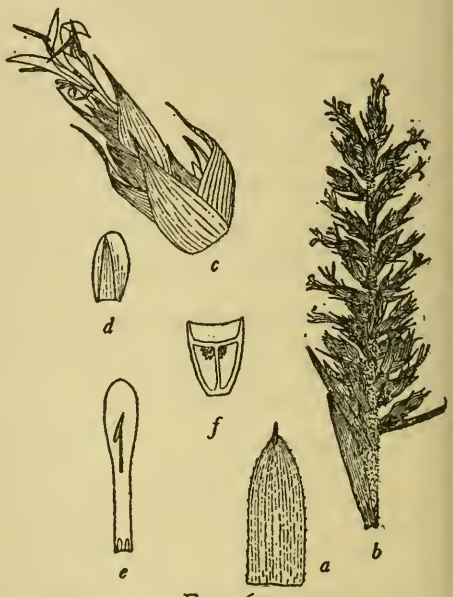

FIG. 96.

FIG. 95.—*Aechmea podantha:* *a,* Leaf-blade, × ½; *b,* inflorescence, × ½; *c,* flower, × 1; *d,* sepals, × 1; *e,* longitudinal section of ovary, × 1.

FIG. 96.—*Aechmea mutica:* *a,* Apex of leaf, × ¼; *b,* inflorescence, × ¼; *c,* branch, × 1; *d,* sepal, × 1; *e,* petal and stamen, × 1; *f,* longitudinal section of ovary, × 2.

11a. ***Aechmea conglomerata*** var. ***conglomerata***

Lamprococcus glomeratus Beer, Bromel. 105. 1857.

Aechmea glomerata Mez in Mart. Fl. Bras. 3, pt. 3: 315. 1892. Not Hook. 1867.

BRAZIL: Cultivated, *Hennings* (B, F neg. 11313).

11b. ***Aechmea conglomerata*** var. ***farinosa*** (Regel) Baker, Handb. Bromel. 53. 1889.

Lamprococcus farinosus Regel, Ind. Sem. Hort. Petrop. for 1868. 79. 1869.

Aechmea glomerata var. *farinosa* Mez in Mart. Fl. Bras. 3, pt. 3: 316. 1892.

BRAZIL: Described from cultivation; no herbarium material seen.

11c. ***Aechmea conglomerata*** var. ***discolor*** Beer ex Baker, Handb. Bromel. 53. 1889.

Lamprococcus glomeratus var. *discolor* Beer, Bromel. 105. 1857. Nomen.

BRAZIL: Described from cultivation; no herbarium material seen.

12. ***Aechmea racinae*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 56, *pl. 71.* 1941.

1. Scape elongate, decurved..... Var. a. **racinae**
1. Scape short, erect..... Var. b. **erecta**

12a. ***Aechmea racinae*** var. ***racinae***

ESPÍRITO SANTO: Guiomar, *Foster* 320 (GH, type; R); 960 (GH, SP). Mun. Cachoeiro de Itapemirim: *Brade* 19370 (RB, US).

12b. ***Aechmea racinae*** var. ***erecta*** L. B. Smith, Arquiv. Jard. Bot. Rio de Janeiro 10: 142. 1950.

ESPÍRITO SANTO: Mun. Cachoeiro de Itapemirim: *Brade* 19415 (RB, type, US neg. 3260).

13. ***Aechmea victoriana*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 57, *pl. 73, fig. 1.* 1941.

ESPÍRITO SANTO: Vitória [Victoria], *Foster* 203 (GH, type; R); 869 (GH, US).

14. ***Aechmea mitis*** (Mart. ex Schult.) L. B. Smith, p. 16.

Billbergia mitis Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1267. 1830.

BRAZIL: *Martius* (M, type, F neg. 8642).

Subgenus *Aechmea*

(Subgenus *Euaechmea* Mez)

15. ***Aechmea mutica*** L. B. Smith, p. 16, fig. 96.

ESPÍRITO SANTO: Santa Teresa, *Foster* 293 (GH, R, US); 806 (GH, type, US neg. 4259).

16. ***Aechmea blanchetiana*** (Baker) L. B. Smith, p. 13.

Streptocalyx laxiflora Baker, Handb. Bromel. 31. 1889.

Tillandsia blanchetiana Baker, Handb. Bromel. 182. 1889.

Aechmea laxiflora Mez in Mart. Fl. Bras. 3, pt. 3: 335. 1892. Not Benth. 1846.

Aechmea remotiflora Mez in DC. Monogr. Phan. 9: 219. 1896.

BAÍA: *Blanchet* 2274 (BM, type, US neg. 4018). Agua Preta, *Foster* 74 (GH, R). Ilheus, *Foster* 83 (GH).

17. ***Aechmea fraudulosa*** Mez, Engl. Pflanzenreich IV. 32: 636. 1935.

Streptocalyx blanchetii Baker, Handb. Bromel. 32. 1889.

Aechmea blanchetii Mez in Mart. Fl. Bras. 3, pt. 3: 336. 1892. Not Baker 1889.

BAÍA: *Blanchet* (G, F neg. 8485); 1527 (BM, type); *Glocker* (S).

18. ***Aechmea orlandiana*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 55, *pl. 69.* 1941.

ESPÍRITO SANTO: Itapemirim, *Foster* 165 (GH, type (US neg. 3950), R); 970 (GH, US).

19. ***Aechmea mertensii*** (Meyer) Schult. in R. & S. Syst. 7, pt. 2: 1272. 1830. FIGURE 97.

Bromelia mertensii Meyer, Fl. Essequeb. 144. 1818.
Aechmea spicata Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1273. 1830.
Bromelia thyrsiflora Willd. ex Schult. in R. & S. Syst. 7, pt. 2: 1282. 1830.
Aechmea thyrsiflora Schlecht. Linnaea 18: 437. 1844.
Aechmea mucroniflora Hook. Bot. Mag. 81: *pl. 4832.* 1855.
Aechmea wullschlaegeliana Mez in Mart. Fl. Bras. 3, pt. 3: 330. 1892.
Aechmea humilis Mez in DC. Monogr. Phan. 9: 216. 1896.

This is one of the most variable species in all the Bromeliaceae. The extreme range in the size of the flowers and in the size and density of the inflorescence has caused the proposal of a number of species, yet ampler recent material shows complete intergradation between all extremes.

AMAZONAS: *Xavier* 169 (US). Rio Japura, *Martius* (M, type of *Aechmea spicata* Mart., F neg. 8635). Marari, Rio Juruá, *Ule* 5363 (MG). Manaus, *J. G. Kuhlmann* 295 (RB); *Luetzelburg* 22099 (M); *Krukoff* 7970 (GH, NY); *Tate* 44 (NY). Panuré, Rio Uaupés, *Pires* 1103 (IAN). São Gabriel, Rio Negro, *Melin* 132 (S). São Paulo de Olivença, Palmares, *Krukoff* 8596 (NY). Uanari, Rio Negro, near Uaupés [São Gabriel], *Pires* 800 (IAN). (Terra Preta), Rio Negro, *J. G. Kuhlmann* 1031 (RB). Mun. Humaïta: Livramento, *Krukoff* 6986 (GH, NY).

PARÁ: *Hoffmannsegg* 6313 (B, F neg. 11327). Belém, *Archer* 7841 (IAN, US); *Huber* (MG); *Pires & Black* 671 (GH, IAN); *Smith, Pires & Black* 7119 (US). (Cassipa), Rio Tapajos, *Krukoff* 1268 (NY). Upper Rio Cuminá, *Sampaio in Rondon* 19222 (R). Santa Julia, *J. G. Kuhlmann* 1675 (RB). Rio Tinga, off Rio Cupari, *Black* 47–2031 (IAN). Vigia, *Black* 50–9772 (IAN).

PERNAMBUCO: Aripibú, *Pickel* 3457 (IPA).

MATO GROSSO: Tabajara, upper Rio Machado, *Krukoff* 1488 (NY).

ALSO: TRINIDAD, GUIANA, VENEZUELA, COLOMBIA, PERÚ.

20. ***Aechmea huebneri*** Harms, Notizblatt 10: 581. 1929.

AMAZONAS: Rio Tarumá-Mirim, near Manaus, *Huebner* 51 (B, type, F neg. 11315). Mun. São Paulo de Olivença: Basin of creek Belém, *Krukoff* 8803 (NY).

Krukoff 8803 is definitely tripinnate while the type appears to be bipinnate, although it may be represented by a single long branch.

ALSO: COLOMBIA.

21. ***Aechmea setigera*** Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1273. 1830.

Aechmea prieureana Baker, Handb. Bromel. 39. 1889.

AMAZONAS: (Caldeirão), Rio Solimões, *Martius* (M, type, F neg. 8636). Riosinho Juruena, Rio Jutai, *Fróes* 21044 (IAN). Rio Tarumá-Mirim, lower Rio Negro, *Ducke* (MG).

RIO BRANCO: Ilha do Ajarani, *J. G. Kuhlmann* 390 (RB, US). (São José do Rio Branco), *Luetzelburg* 21927 (R).

PARÁ: Ilha do Mosqueiro near Belém, *Killip & Smith* 30656 (US).

SÃO PAULO: Cachoeira do Maribondo, *Gehrt* (GH, SP).

ALSO: GUIANA, VENEZUELA, COLOMBIA, PANAMÁ.

22. ***Aechmea kuntzeana*** Mez in DC. Monogr. Phan. 9: 208. 1896; Harms Notizblatt 12: 528. 1935.

Hoiriri kuntzeana Kuntze, Rev. Gen. 3, pt. 2: 303. 1898.

ACRE: (Seringal São Francisco), *Ule* 9165 (! Harms).
ALSO: BOLIVIA.

23. ***Aechmea phanerophlebia*** Baker, Handb. Bromel. 47. 1889.
ESPÍRITO SANTO: Collatina, *Foster* 221 (GH, R). Itapemirim, *Foster* 154 (GH, R). Santa Teresa, *Foster* 221-A (GH, R); 507 (GH).
MINAS GERAIS: Ipatinga, *Foster* 743 (GH).
RIO DE JANEIRO: Alto Macaé, *Glaziou* 17286 (F, G, F neg. 8488). Cantagallo, *Glaziou* 16412 (K, type, GH neg. 2695).
SÃO PAULO: Bocaina, *Brade* 20905 (RB, US); *Glaziou* 16411 (P).

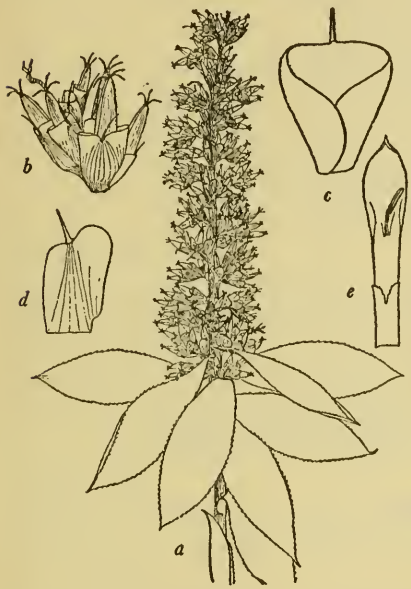

FIG. 97.

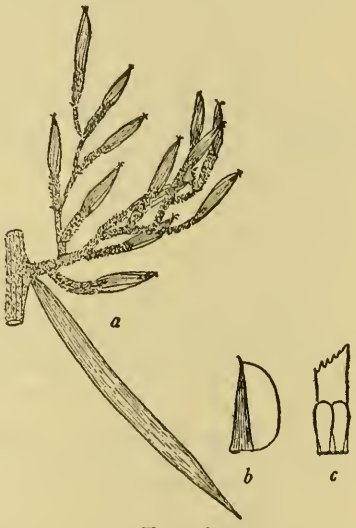

FIG. 98.

FIG. 97.—*Aechmea mertensii: a,* Inflorescence, × ¼; *b,* branch, × 1; *c,* floral bract, × 2; *d,* sepal, × 2; *e,* petal and stamen, × 2.
FIG. 98.—*Aechmea stelligera: a,* Branch of inflorescence, × ½; *b,* sepal, × 1; *c,* base of petal, × 2.

24. ***Aechmea eurycorymbus*** Harms, Notizblatt 12: 528. 1935.
PARAÍBA: *Xavier* B (US). Campina Grande, *Foster* 2408 (US).
PERNAMBUCO: Floresta, *Werdermann* 2931 (B, type).

25. ***Aechmea tomentosa*** Mez in DC. Monogr. Phan. 9: 229. 1896.
PERNAMBUCO: Iguaraçu, *Ramage* (BM, type).

26. ***Aechmea stelligera*** L. B. Smith, p. 18, fig. 98.
PARAÍBA: Areia, *Vasconcellos* (US, type; SP).

27. ***Aechmea werdermannii*** Harms, Notizblatt 12: 529. 1935.
PERNAMBUCO: Floresta, *Werdermann* 2911 (B, type).

28. ***Aechmea megalantha*** Harms, Gartenflora 86: 159, *fig.* 1937.
BRAZIL (?): Described from cultivated material; no herbarium specimen seen.

29. ***Aechmea lingulata*** (L.) Baker, Journ. Bot. 17: 164. 1879.

1. Branches spreading and curved-ascending; subulate apex of the floral bracts much longer than the inconspicuous base..... Var. a. **lingulata**
1. Branches straight, spreading to reflexed.
   2. Sepals about 2 mm. long without the mucro; floral bracts with broadly ovate base about as long as the subulate apex. Var. b. **patentissima**
   2. Sepals 7 mm. long without the mucro; floral bracts with a relatively short mucro..... Var. c. **froesii**

29a. ***Aechmea lingulata*** var. ***lingulata.*** FIGURE 99.

Bromelia lingulata L. Sp. Pl. 285. 1753.
Billbergia odora Miq. Linnaea 18: 377. 1844.
Aechmea odora Baker, Journ. Bot. 17: 226. 1879.
Wittmackia lingulata Mez in Mart. Fl. Bras. 3, pt. 3: 275. 1891.
Wittmackia odora Mez in Mart. Fl. Bras. 3, pt. 3: 277. 1891.
Wittmackia glaziovii Mez in DC. Monogr. Phan. 9: 142. 1896.

CEARÁ: Serra de Maranguape, *Ule* 4997 (B, F neg. 11294).
PARAÍBA: Campina Grande, *Foster* 2406 (US).
PERNAMBUCO: (Jaqueira), *Ridley, Lea & Ramage* (BM). Russinha, *Pickel* 3657 (GH, IPA, NY).
BAÍA: Agua Preta, *Foster* 58 (GH, R); 61 (GH, R); 82 (GH, R). Maracás, *Foster* 2468 (US). Milagres to Maracás, *Foster* 2455 (US).
ESPÍRITO SANTO: Monte Claro, *Foster* 225 (GH, US). Mun. Collatina: Linhares, *Foster* 771 (GH, US); 786 (GH).
RIO DE JANEIRO: Cabo Frio, *Ule* (R). Enseada de Imbetiba, Macaé, *Glaziou* 18569 (B, type of *Wittmackia glaziovii* Mez, F neg. 11293).
ALSO: GUIANA, TRINIDAD, LESSER ANTILLES.

29b. ***Aechmea lingulata*** var. ***patentissima*** (Mart. ex Schult.) L. B. Smith, p. 15.

Billbergia patentissima Mart. ex Schult. in R. & S. Syst. 7: pt. 2: 1270. 1830.
Aechmea patentissima Baker, Journ. Bot. 17: 227. 1879.
Wittmackia patentissima Mez in Mart. Fl. Bras. 3, pt. 3: 278, *pl. 61.* 1891.

BAÍA: Almada, *Martius* (M, type).

29c. ***Aechmea lingulata*** var. ***froesii*** L. B. Smith, p. 15.

BAÍA: Colonia Itatinga to Bom Gosto, *Fróes* 19970 (NY, type, US neg. 4249).

30. ***Aechmea purpureo-rosea*** (Hook.) Wawra, Oesterr. Bot. Zeitschr. 30: 148. 1880.

Billbergia purpureo-rosea Hook. Bot. Mag. 61: *pl. 3304.* 1834.
Aechmea suaveolens Knowles & Westcott, Fl. Cab. 3: 177, *pl. 134.* 1840.

BRAZIL: *Freyreis* (S).
RIO DE JANEIRO: Niteroi, *Smith & Brade* 2347 (GH).
DISTRITO FEDERAL: Cultivated, *Ule* (R). Cosme Velho, *Glaziou* 11688 (K, US neg. 4196). Spontaneous, Jardim Botânico, *J. G. Kuhlmann* 6198 (RB). Rio de Janeiro, *Bowie & Cunningham* (BM); *Widgren* 81 (S). Silvestre to Paineiras, *L. B. Smith* 2255 (GH). Tijuca, *Hoehne* (SP). Barra da Tijuca, *Reitz* 4063 (HBR).

31. ***Aechmea angustifolia*** Poepp. & Endl. Nov. Gen. & Sp. 2: 43, *pl. 159.* 1838.
Aechmea cumingii Baker, Journ. Bot. 17: 227. 1879.
Aechmea boliviana Rusby, Bull. N. Y. Bot. Gard. 4: 456. 1907.
Aechmea cylindrica Mez, Repert. Sp. Nov. Fedde 12: 413. 1913.
Aechmea inconspicua Harms, Notizblatt 10: 786. 1929.

AMAZONAS: Rio Castanho on Rio Paduiri, upper Rio Negro Basin, *Cardona* 1388 (US). Mun. Humaitá: Livramento, *Krukoff* 6775 (GH, NY). Tres Casas, Rio Madeira, *Krukoff* 6501 (NY); 6533 (NY, GH).

RIO BRANCO: Jarú, *J. G. Kuhlmann* 155 (RB).

ACRE: Rio Macauã on Rio Iaco, *Krukoff* 5538 (NY, GH). (Seringal Auristella), *Ule* 9164 (B, type of *Aechmea cylindrica* Mez, F neg. 11311).

ALSO: COSTA RICA to PERÚ and BOLIVIA.

32. ***Aechmea sprucei*** Mez in DC. Monogr. Phan. 9: 226. 1896.
Aechmea paniculigera sensu Baker, Handb. Bromel. 40. 1889. In part, not as to type.

AMAZONAS: Taperinha, Santarem, *Ginzberger & Zerny* 392 (F).

PARÁ: *Spruce* 104 (K, type, GH neg. 2696). Approagas, Rio Capim, *Huber* (MG). São Miguel do Guamá, Rio Guamá and Rio Irituia, *Dárdano & Black* 48–3162 (IAN); 48–3195 (IAN). Tomé Assú, Dist. Acará, *Mexia* 6032 (GH, US).

MARANHÃO: *Hesketh* (CGE).

CEARÁ: Aquiraz, *Drouet* 2616 (GH, US).

ALSO: COLOMBIA.

33. ***Aechmea melinonii*** Hook. Bot. Mag. 87: *pl. 5235.* 1861.
Hohenbergia melinonii Baker, Saund. Ref. Bot. 4: sub *pl. 284.* 1871.
Aechmea jenmanii Baker, Journ. Bot. 20: 329. 1882.

AMAPÁ: Cunani, *Huber* 984 (MG).

ALSO: GUIANA.

34. ***Aechmea azurea*** L. B. Smith, Arquiv. Jard. Bot. Rio 10: 141, *fig. 1.* 1950.

ESPÍRITO SANTO: Mun. Castelo: Braço do Sul, *Brade* 19158 (RB, type, US neg. 3256).

35. ***Aechmea ramosa*** Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1272. 1830.

1. Sepals and ovary green and yellow..... Var. a. **ramosa**
1. Sepals red, ovary white..... Var. b. **festiva**

35a. ***Aechmea ramosa*** var. ***ramosa***
Aechmea platynema Baker, Handb. Bromel. 35. 1889. In part, not as to type.
Aechmea reukartiana Hort. Liége ex C. Chevalier, Rev. Hortic. 108: 109. 1936. In synon.

BRAZIL: Cultivated, *Hort. Liége* (LG, *Aechmea reukartiana* Hort.).

ESPÍRITO SANTO: Campinas to Vitória, *Foster* 207 (GH, R). Guiomar, *Foster* 943 (GH). Itapemirim, *Foster* 150 (GH); 150-A (GH). Santa Teresa, *Foster* 850 (GH, US).

MINAS GERAIS: Mariana, *Martius* 1036 (M, type, F neg. 8638). Paraibana, *Oliveira* (SP). Mun. Antônio Dias: Parque Nacional near Ipatinga, *Foster* 730 (GH, US).

RIO DE JANEIRO: Belém, *Schwacke & Burlamaqui* (R). Imbuí, Niteroi, *Brade* 11058 (R).

DISTRITO FEDERAL: Rio de Janeiro, *Glaziou* 15672 (GH, P). São Cristovão, *Glaziou* 16420 (F).

35b. ***Aechmea ramosa*** var. ***festiva*** L. B. Smith, p. 18.
ESPÍRITO SANTO: Mun. Collatina: Linhares, *Foster* 770 (GH, type, US neg. 4280).

36. ***Aechmea tocantina*** Baker, Handb. Bromel. 39. 1889.
GOIÁS: Rio Tocantins, *Weddell* 2365 (P, type, GH neg. 2365).
MATO GROSSO: Diamantino, *Lindman* A-3425 (S).
ALSO: BOLIVIA.

37. ***Aechmea araneosa*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 53, *pl. 64.* 1941.
ESPÍRITO SANTO: Santa Teresa, *Foster* 241 (GH, type; R); 836 (GH, US).

38. ***Aechmea chantinii*** (Carr.) Baker, Handb. Bromel. 49. 1889.
Billbergia chantinii Carr. Rev. Hortic. 50: 112, *fig. 22.* 1878; 52: 272, *figs. 54–56.* 1880.
AMAZONAS: Described from cultivation.

The first publication of *Aechmea chantinii* was based on sterile material and consequently noted only the handsomely cross-banded leaves. The second included flowering material and gave figures of the inflorescence. From these is indicated a species with lax spikes and flowers in more than two ranks as shown in the foregoing key.

However, there is material now in cultivation purporting to be *Ae. chantinii* but with dense spikes and two-ranked flowers. The floral bracts and winged rhachis form pouches around the flowers, a character not easily verified in the second publication of *Ae. chantinii.*

The present plant has a long history of cultivation and can not be identified with any other species. If the two have a common ancestry, then the type of *Ae. chantinii* may have been a depauperate or injured individual or even a hybrid. In that case the present material is more typical in a genetical sense than is the taxonomic type.

39. ***Aechmea fosteriana*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 54, *pl. 67.* 1941.
ESPÍRITO SANTO: Vitória, *Foster* 177 (GH, type; R); 878 (GH, US).

40. ***Aechmea schultesiana*** Mez in Mart. Fl. Bras. 3, pt. 3: 334. 1892.
Billbergia paniculata Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1268. 1830. Not *Aechmea paniculata* R. & P. 1802.
Aechmea friedrichsthalii Mez & Donn.-Smith, Bot. Gaz. 19: 263. 1894.
Aechmea inermis Mez, Bull. Herb. Boiss. II. 4: 620. 1904.
AMAZONAS: Rio Japurá, *Martius* (M, type, F neg. 8637).
ALSO: COSTA RICA to VENEZUELA and PERÚ.

Subgenus *Hoplophytum* (Beer) Mez

41. ***Aechmea macrochlamys*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 54, *pl. 68.* 1941.
ESPÍRITO SANTO: Santa Teresa, *Foster* 244 (GH, type; US); 837 (GH, US).

42. ***Aechmea candida*** E. Morr. ex Baker, Handb. Bromel. 41. 1889.
BRAZIL: Cultivated, *Liége* (LG); *Strauss* (B, F neg. 11309). Unpublished plate, *E. Morren* (K, type).

43. ***Aechmea caudata*** Lindm. Svensk. Akad. Handl. 24: no. 8:29, *pl. 6, figs. 1–9.* Feb. 1891.

1. Leaf-blades concolorous..... Var. a. caudata
1. Leaf-blades with broad white longitudinal stripes..... Var. b. variegata

43a. ***Aechmea caudata*** var. ***caudata***

Aechmea platzmannii Wittm. Bot. Jahrb. 13, Beibl. 29:2, 12. Mar. 1891.
Aechmea henningsiana Wittm. Bot. Jahrb. 13, Beibl. 29:12. Mar. 1891.

BRAZIL: *Glaziou* 16414 (P).

ESPÍRITO SANTO: Santa Teresa, *Foster* 290 (GH, R).

SÃO PAULO: Alto da Serra, *Hoehne* (SP). Guarujá, *L. B. Smith* 2030 (B, BA, BM, F, GH, K, S, US). Mogi das Cruzes, *Foster* 490 (GH). Iguapé, Santos, *Hoehne* (SP). Ilha da Queimada Grande, Santos, *Amaral & Domingues* (SP). Ponta de Taipú, Santos, *Mosén* 3242 (S, type). Prainha, Santos, *Foster* 482 (GH, R); *Gehrt* (SP, US). São Vicente, Santos, *Burchell* 3291 (K, US neg. 4197); *L. B. Smith* 2099 (GH, P).

PARANÁ: Caiobá, *Foster* 437 (GH); *M. Kuhlmann* (SP, US). Casa Ipiranga, *Dusén* 15411 (S). Curitiba, *Dusén* 14608 (S). Curitiba to Joinvile near the Santa Catarina line, *Reitz* 3758-c (HBR); 3880 (HBR). Guaratuba, *Reitz* 4276 (HBR). Jacareí, *Dusén* (S); 6636 (S); 15406 (S); 15451-b (S); 15606 (S); 17497 (S). Pôrto de Cima, Serra do Mar, *Dusén* 10333 (GH, S).

SANTA CATARINA: Mun. Araranguá: Meleiro, *Reitz* C-2 (GH, HBR). Serra do Pilão, *Reitz* 3430 (HBR, US). Mun. Brusque: Ribeirão do Ouro, *Reitz* (HBR); 3648 (HBR). Mun. Florianópolis: Campeche (praia), *Reitz* 5085 (! Reitz). Ribeirão da Ilha, *Reitz* 3929 (HBR). Mun. Orleães: Orleães, *Reitz* 1753 (GH, HBR). Serra do Rio do Rastro, *Reitz* 3330 (HBR). Santa Clara, *Reitz* 1746 (HBR, LIL, R, US). Mun. São Francisco do Sul: Pôrto das Canoas, *Smith & Reitz* 5709 (US).

43b. ***Aechmea caudata*** var. ***variegata*** M. B. Foster, Bromel. Soc. Bull. 3:47. 1953.

BRAZIL: Cultivated, *Foster* 2834 (US, type).

44. ***Aechmea coelestis*** (C. Koch) E. Morr. Fl. des Serres 21:5, *pl. 2146.* 1875.

Hoplophytum coeleste C. Koch, Ind. Sem. Hort. Berol. for 1856, App.: 6. 1857.

BRAZIL: Cultivated, *André* K-328 (NY); *L. B. Smith* (GH).

ESPÍRITO SANTO: Mun. Cachoeiro de Itapemirim: Vargem Alta, *Brade* 19969 (RB, US neg. 3349).

MINAS GERAIS: *Sellow* 229 (! Mez).

RIO DE JANEIRO: Teresópolis, *Sampaio* 2613 (R).

DISTRITO FEDERAL: Gavea, *Smith & Mus. R* 6434 (R, US). Cultivated, São Cristovão, *Lindman* A-17 (S). Tijuca, *Glaziou* 16416 (P, F neg. 11320); *Smith & Brade* 2185 (GH).

SÃO PAULO: Mato do Governo, Itú, *Gehrt* (GH, SP). Mun. São Paulo: Florestal, *Foster* 468 (GH). Pirajussára, *Gehrt* (SP). São Paulo, *Doering* (SP).

PARANÁ: Curitiba to Paranaguá, *Foster* 505 (GH).

45. ***Aechmea organensis*** Wawra, Oesterr. Bot. Zeitschr. 30: 116. 1880.
Aechmea nudicaulis var. *microdon* Baker, Journ. Bot. 17: 235. 1879.
Aechmea floribunda sensu Baker, Handb. Bromel. 42. 1889. In part, not as to type.

Rio de Janeiro: Teresópolis, *Foster* 997 (GH); *Glaziou* 11680 (F).
Distrito Federal: Rio de Janeiro, *Reitz* 5673 (HBR, US).

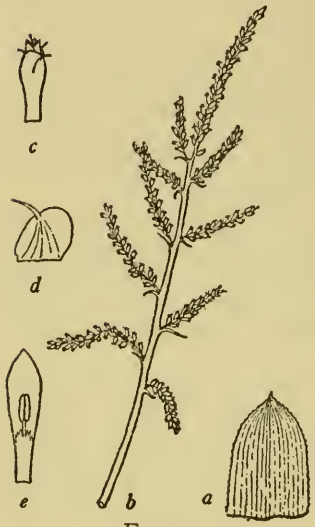

Fig. 99.

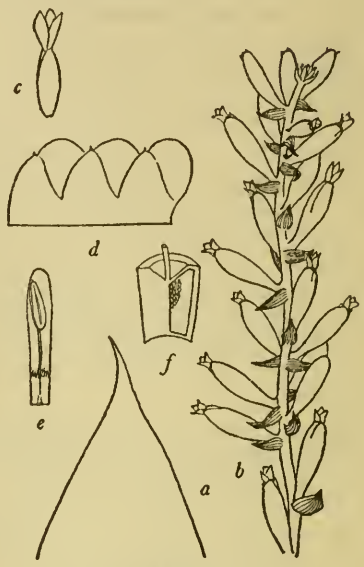

Fig. 100.

Fig. 99.—*Aechmea lingulata* var. *lingulata: a,* Apex of leaf, × ⅙; *b,* inflorescence, × ⅙; *c,* flower, × 1; *d,* sepal, × 2; *e,* petal and stamen, × 2. (*a* and *b* after Botanical Magazine.)

Fig. 100.—*Aechmea bicolor: a,* Apex of leaf, × 1; *b,* inflorescence, × 1; *c,* flower, × 1; *d,* sepals, × 2; *e,* petal and stamen, × 2; *f,* longitudinal section of ovary, × 2.

São Paulo: Source of the Rio Cotia, *Gehrt* (GH, SP). Cubatão, *Burchell* 3617 (K, type of *Aechmea nudicaulis* var. *microdon* Baker). São Paulo to Curitiba, km. 379, *Foster* 392 (GH, R); *M. Kuhlmann* (SP).
Paraná: Curitiba, *Foster* 457 (GH). Ipiranga, *Dusén* 3541 (R). Morrêtes, *Hoehne* (SP, GH neg. 7169); *M. Kuhlmann* (SP, US). São João, Curitiba to Paranaguá, *Reitz* 5729 (HBR, US); 5753 (1 Reitz).
Rio Grande do Sul: Cultivated, Pôrto Alegre, *Golland in Lindman* (S).

46. ***Aechmea gracilis*** Lindm. Svensk. Akad. Handl. 24: no. 8: 30, *pl. 6, figs. 10–16.* 1891.

Brazil: Cultivated, *Foster* 451 in part (GH).
São Paulo: Alto da Serra, *Foster* 357 (GH). Iguapé, Santos, *Loefgren & Edwall* (GH, SP). Morro do Curupira, Sorocaba, Santos, *Mosén* 3707 (S, type).

PARANÁ: Pôrto de Cima, Serra do Mar, *Jönsson in Dusén* 813-a (GH, S).
SANTA CATARINA: Mun. Biguaçú: Fachinal, *Reitz* C-951 (GH, HBR).

47. ***Aechmea bicolor*** L. B. Smith, p. 12, fig. 100.
BAÍA: Ituaçú to Jequié, *Foster* 2450 (US, type; US neg. 4242).

48. ***Aechmea blumenavii*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 21, *pl. 6.* 1952.
SANTA CATARINA: Mun. Blumenau: Morro Spitzkopf, *Reitz* 4679 (HBR, type). Mun. Brusque: Ribeirão do Ouro, *Reitz* (! Reitz); 3559 (HBR, US); 3559-a (HBR); 3638 (HBR). Mun. Itajaí: Morro do Baú, Luiz Alves, *Reitz* 4743 (! Reitz).

49. ***Aechmea kertesziae*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 24, *pl. 7-I.* 1952.
SANTA CATARINA: Canto Grande, Pôrto Belo, *Reitz* 3617 (HBR); 3621 (HBR); 3624-a (HBR); 3628 in part (HBR); 3643 (HBR). Laguna, *Reitz* 4165 (HBR, type); *Smith & Reitz* 5947 (R, US). Mun. Itajaí: Cabeçudas, *Reitz* 3627 (! Reitz); *Smith & Reitz* 6079 (US). Praia Braba, *Reitz & Klein* 1094 (! Reitz).

50. ***Aechmea gamosepala*** Wittm. Bot. Jahrb. 13, Beibl. 29: 3, 13. 1891.
Aechmea thyrsigera Spegazzini, Physis 3: 45. 1917.
Chevalieria thyrsigera Mez, Engl. Pflanzenreich IV. 32: 95. 1934.
SÃO PAULO: São Paulo, *Ostermeyer* (SP).
PARANÁ: Guaratuba, *Frenzel* (Inst. Biol. Pesq. Tec.); *Hochne* (SP); *Reitz* 4272 (HBR); *Smith & Reitz* 5734 (R, US). Curitiba to Joinvile near Santa Catarina line, *Reitz* 3891 (HBR). Mun. Paranaguá: Caiobá, *Foster* 439 (GH, R); *Hatschbach* 1854 (US); *Tessmann* (US).
SANTA CATARINA: Joinvile, *Reitz* 3726 (HBR); 3881 (HBR). São Francisco do Sul, *Reitz* 3675 (HBR); 3729 (HBR); 3913 (HBR). Mun. Araquari: Barra do Sul, *Reitz & Klein* 508 (! Reitz). Itajuba, *Reitz* 3758-g (HBR). Mun. Araranguá: Sombrio, *Reitz* C-642 (GH, HBR); C-1222 (HBR, US).
RIO GRANDE DO SUL: Torres, *Golland* (S). Mun. São Francisco de Paula: Taimbé, *Rambo* (US).
ALSO: ARGENTINA.

Subgenus *Platyaechmea* Benth. & Hook. f.

51. ***Aechmea distichantha*** Lem. Jard. Fleur. 3: *pl. 269.* 1853.
1. Inflorescence lax or sublax, usually broadly pyramidal; spikes more or less spreading, many-flowered; leaves usually acute or acuminate.
2. Petals purple or blue..... Var. a. **distichantha**
2. Petals white..... Var. a. **distichantha** forma **albiflora**
1. Inflorescence dense; spikes erect, few-flowered.
3. Inflorescence elongate, slenderly cylindric or fusiform; plants large; leaves usually acuminate..... Var. b. **schlumbergeri**
3. Inflorescence short, ovoid; plants small; leaves usually rounded and apiculate..... Var. c. **glaziovii**

51a. ***Aechmea distichantha*** var. ***distichantha.*** FIGURE 101.
Tillandsia polystachia Vell. Fl. Fluminensis 136. 1825; Icon. 3: *pl. 138.* 1835. Not L. 1762.

Aechmea excavata Baker, Journ. Bot. 17: 134. 1879.
Aechmea brasiliensis Regel, Gartenflora 34: 258, *pl. 1202.* 1885.
Aechmea myriophylla E. Morr. ex Baker, Bot. Mag. 113: *pl. 6939.* 1887.
Quesnelia distichantha Lindm. Svensk. Akad. Handl. 24: no. 8: 25, *pl. 4, figs. 7–10.* 1891.
Aechmea polystachya Mez in Mart. Fl. Bras. 3, pt. 3: 343. 1892.
Aechmea polystachya var. *excavata* Mez in DC. Monogr. Phan. 9: 251. 1896.
Hoiriri polystachya Kuntze, Rev. Gen. 3, pt. 2: 303. 1898.
Aechmea polystachya var. *myriophylla* Hassler, Ann. Conserv. & Jard. Bot. Genève 20: 290. 1919.
Aechmea platyphylla Hassler, Ann. Conserv. & Jard. Bot. Genève 20: 291. 1919.

Material listed under the typical variety is not so homogeneous as under the others because in case of doubt collections have been left there.

Brazil: *Sellow* bromel. 74 (P). Cultivated, *Atkinson* 100 (BH).

Minas Gerais: *Widgren* (S). Serra dos Cabritos, Capivari, Caldas, *Mosén* 1729 (S). Serra do Picu, *Glaziou* 11691 (P); 12236 (P).

Rio de Janeiro: Itatiaia, *Brade* 14052 (RB); *Dusén* (S); 2198 (S).

Distrito Federal: Cascadura, Serra da Bica, *Glaziou* 15481 (P). Quinta, *Glaziou* 16408 (P). Cultivated, Hort. Museu, *Ule* (R).

São Paulo: Alto da Serra, *Luederwaldt* (SP). Campinas, *Franco & Mendes* (SP). Campos da Bocaina, *Glaziou* 11695 (P). Campos do Jordão, *Eugenio* 3442 (GH); *Hoehne* (GH, SP); *Pickel* 5339 (US). Salesópolis, Boracéa, *M. Kuhlmann* 2344 (SP). Santo Amaro, *Krieger* 179 (SP). Santos, *Mendonça* 10 (R). Mun. São Paulo: *Glaziou* 13245 (P). Cidade Jardim, *Smith & Kuhlmann* 1814 (GH). Orchidario, *Foster* 349 (GH, R). Vila Ema, *Brade* 10969 (R).

Paraná: Campo Largo, *Foster* 406 (GH). Curitiba, *Tessmann* (US). Curitiba to Paranaguá, *Reitz* 5764 (HBR, US). Jaguariaíva, *Dusén* 15502 (S, US). Roça Nova, *Dusén* 10273 (GH, S). Serra de São Luiz, *M. Kuhlmann* (GH, SP). Serrinha, *Dusén* 15570 (GH, S). Teixeira Soares, km. 161, *Hertel* 37 (Paran.). Tibagi, *Reiss* 72 (GH, US). Mun. Piraquara: Borda do Campo, *Hatschbach* 2017 (US). Mun. Timoneira: *Braga* 196 (Paran.).

Santa Catarina: Ribeirão Grande, Taió, *Reitz* 3901 (HBR). Serra do Mirador, Taió, *Reitz* 3960 (HBR). Mun. Bom Retiro: Figueiredo, *Reitz* 2897 (HBR, US); 2978 (HBR, US). Mun. Chapecó: Itapiranga, *Reitz* 3825 (HBR).

Rio Grande do Sul: Alto Uruguai, *Golland* (S).

Also: Bolivia, Paraguay, Argentina, Uruguay.

51a. ***Aechmea distichantha*** var. ***distichantha*** forma ***albiflora*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 102. 1943. As var. "typica."

Paraná: Campo Largo, *Foster* 406A (GH, type). Serra São Luiz, *Gonçalves* (SP).

51b. ***Aechmea distichantha*** var. ***schlumbergeri*** E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3: 343. 1892.
Chevalieria grandiceps Griseb. Goett. Abh. 24: 329. 1879.
Aechmea grandiceps Mez in Mart. Fl. Bras. 3, pt. 3: 346. 1892.
Aechmea involucrata Rusby, Bull. N. Y. Bot. Gard. 4: 456. 1907.

Aechmea polystachya var. *longifolia* Castellanos, Com. Mus. Nac. Hist. Nat. Buenos Aires 2: 139, *fig. 3.* 1925.

? *Aechmea rubra* A. Silveira, Floralia Montium 2, Add.: 1, *pl. 9c.* 1931.

Aechmea involucrifera Mez, Engl. Pflanzenreich IV. 32: 157. 1934.

Brazil: Cultivated, *Hort. Liége* (LG, type).

Minas Gerais: Caldas, *Regnell* I-437 (S, US). Poços de Caldas, *Viegas* (SP).

São Paulo: Mun. São Paulo: *Foster* 488 (GH).

Also: Bolivia, Paraguay, Argentina.

51c. ***Aechmea distichantha*** var. ***glaziovii*** (Baker) L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 102. 1943.

Aechmea glaziovii Baker, Journ. Bot. 17: 133. 1879.

Quesnelia wittmackiana Regel, Gartenflora 37: 497, *pl. 1281, fig. 2.* 1888.

Aechmea jucunda E. Morr. ex Baker, Handb. Bromel. 55. 1889.

Aechmea regelii Mez in Mart. Fl. Bras. 3, pt. 3: 339. 1892.

Aechmea wittmackiana Mez in Mart. Fl. Bras. 3, pt. 3: 340. 1892.

Aechmea pulchella E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3: 341. 1892.

Brazil: Cultivated, *Atkinson* 88 (BH); *Bleu* (LG, GH neg. 2931); *Hort. Liége* (LG, *Aechmea wittmackiana* Mez, *Ae. pulchella* E. Morr.).

Minas Gerais: Poços de Caldas, *Viégas* (SP). Sapucaí Mirim, *Kuhlmann* 2606 (SP). Mun. Delfim Moreira: São Francisco dos Campos, *Kuhlmann & Kühn* 2431 (SP).

Rio de Janeiro: Itatiaia, *Brade* (RB); 14053 (RB); *Ferreira in L. B. Smith* 1712 (GH); *Foster* 147 (GH, R, US); *Glaziou* 8986 (P, isotype of *Aechmea glaziovii* Baker, GH neg. 2955); *L. B. Smith* 1474 (GH, S); 1662 (GH); 1726 (GH).

São Paulo: Alto da Serra, *Hoehne* (GH, SP); *Luederwaldt* (SP); *L. B. Smith* 1872 (GH); 2109 (GH). Serra da Bocaina, *Duarte & Brade* 21197 (RB, US); *Glaziou & Schwacke* (R). Bananal, Serra da Bocaina, *Brade & Apparicio* 20146 (RB, US). Itapira, *Hoehne* (GH, SP). Mogi das Cruzes, *Pickel* 5089 (SP). São Paulo, *M. Kuhlmann* (SP); *Pickel* 4675 (SP). Mun. Amparo: Monte Alegre, *Kuhlmann & Kühn* 410 (SP). Mun. Atibaia: Pedra Grande, *Gehrt* (SP).

Paraná: Mun. Campo Largo: Serra São Luiz de Puruna, *Hatschbach* 1566 (US).

52. ***Aechmea amazonica*** Ule, Verh. Bot. Ver. Brand. 48: 136. 1907.

Amazonas: All Ule's herbarium material is from Peru but in his original description he notes seeing the species along the Rio Juruá.

Also: Colombia.

53. ***Aechmea tillandsioides*** (Mart. ex Schult.) Baker, Journ. Bot. 17: 134. 1879.

Billbergia tillandsioides Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1269. 1830.

Aechmea xiphophylla Baker, Handb. Bromel. 63. 1889.

Amazonas: Cocui to Rio Içana on the Rio Negro, *Schultes & López* 9568 (IAN, US). Ega [Teféé], *Poeppig* (P). Ilha Vista Alegre, upper Rio Negro, *Baldwin* 3461 (US). Tefé, *Black* 47–1227 (IAN); *Pires* 1301 (IAN). Mun. Humaitá: Rio Madeira, *Krukoff* 7155 (GH).

Acre (?): São João, *Ule* 6007 (MG).
Also: México to Colombia and Guiana.

54. ***Aechmea contracta*** (Mart. ex Schult.) Baker, Journ. Bot. 17: 234. 1879.
Billbergia contracta Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1263. 1830.
Brazil: Probable, but not yet recorded.
Colombia: Araracoara and Pôrto das Miranhas, *Martius* (M, type, F neg. 8633).

Subgenus *Ortgiesia* (Regel) Mez

55. ***Aechmea hamata*** Mez in Mart. Fl. Bras. 3, pt. 3: 347. 1892.
Brazil: Cultivated, *Hennings* (B, type, F neg. 11314).

56. ***Aechmea caesia*** E. Morr. ex Baker, Handb. Bromel. 43. 1889.
Brazil: Unpublished plate, *E. Morren* (K, type). Cultivated, *Sander* (LG).

57. ***Aechmea fasciata*** (Lindl.) Baker, Journ. Bot. 17: 231. 1879.
1. Leaves green..... Var. a. **fasciata**
1. Leaves red-purple..... Var. b. **purpurea**

57a. ***Aechmea fasciata*** var. ***fasciata***.
Billbergia fasciata Lindl. Bot. Reg. 13: *pl. 1130*. 1828.
Billbergia rhodocyanea Lem. Fl. des Serres 3: *pl. 207*. 1847.
Aechmea dealbata E. Morr. ex Baker, Handb. Bromel. 58. 1889.
Brazil: *Sellow* bromel. 94 (P). Cultivated, *Hort. Liége* (LG, *Aechmea dealbata* E. Morr.); *Hort. Vratislaw* (GH).
Rio de Janeiro: Alto da Serra to Meio da Serra, *L. B. Smith* 1548 (GH, S). Rio Paquequer, Serra dos Orgãos, *Brade* 16484 (RB). Old road below Petrópolis, *Smith & Mus. R* 6459 (R, US). Teodoro de Oliveira to Nova Friburgo, *Smith & Mus. R* 7112 (R, US). Teresópolis, *Bailey* 1295 (BH); *Brade* (R); *Duarte & Pereira* (RB); *Foster* 977 (GH); *Ule* 4137 (R); *Veloso* (R).
Distrito Federal: Andaraí Grande, *Glaziou* 11686 (K (US neg. 4194), P). Corcovado, *L. B. Smith* 1396 (GH); *Smith & Vieira* 1384 (B, GH). Paineiras, Corcovado, *J. G. Kuhlmann* 6152 (RB, US). Engenho Novo, *Glaziou* 11677 (P). Gavea, *Reitz* 4474 (HBR). Quinta da Boa Vista, *Glaziou* 16409 (P); 16410 (K, US neg. 4195). Realengo, *Viana Freire* 400 (R). Rio de Janeiro, *Gaudichaud* 123 (P); *Wilkes Expedition* (GH, US). Cultivated, São Cristovão, *Lindman* A-7 (S); A-9 (S); *Ule* (R).

57b. ***Aechmea fasciata*** var. ***purpurea*** (Guillon) Mez, Engl. Pflanzenreich IV. 32: 152. 1934.
Billbergia rhodocyanea purpurea Guillon, Rev. Hortic. 55: 453. 1883.
Brazil: Described from cultivation, no herbarium material seen.

58. ***Aechmea recurvata*** (Kl.) L. B. Smith, Contr. Gray Herb. 98: 5. 1932.
1. Inflorescence completely exserted above the leaf-sheaths; floral bracts serrate..... Var. a. **recurvata**
1. Inflorescence almost or wholly included by the leaf-sheaths.
2. Leaves and bracts strongly serrate..... Var. b. **ortgiesii**
2. Leaves and bracts entire or nearly so..... Var. c. **benrathii**

58a. ***Aechmea recurvata*** var. ***recurvata***
Macrochordium recurvatum Kl. Allg. Gartenz. 24: 393. 1856.
Hohenbergia legrelliana Baker, Saund. Ref. Bot. 4: *pl. 285*. 1871.

Ortgiesia tillandsioides β subexserta Regel, Gartenflora 24: 188. 1875.
Aechmea legrelliana Baker, Journ. Bot. 17: 236. 1879.
Ortgiesia legrelliana Baker, Handb. Bromel. 19. 1889.
Aechmea ampullacea Mez in DC. Monogr. Phan. 9: 257. 1896.
Aechmea ampullacea var. *longifolia* Hassler, Ann. Conserv. & Jard. Bot. Genève 20: 293. 1919.

BRAZIL: *Sellow* bromel. 64 (P).

PARANÁ: Morrêtes, *M. Kuhlmann* (SP). Palmas, *Reitz* 4221 (HBR). Pedra Preta, *M. Kuhlmann* (GH, SP). Mun. Prudentópolis: Linha Esperança, *Frenzel* (Inst. Biol. Pesq. Tec.).

SANTA CATARINA: Mun. Biguaçú: Fachinal, *Reitz* C-931 (HBR). Mun. Canoinhas: Papanduva, *Reitz* 4752 (! Reitz). Mun. Itajaí: Praia Braba, *Reitz* (! Reitz). Mun. Porto União: Maratá, *Reitz* 4220 (HBR).

RIO GRANDE DO SUL: Capella, *Eugenio* 447 (NY); 2661 (GH). Cascata de Hermenegilda, Serra dos Tapes, *Lindman* (S). Pôrto Alegre, *Lindman* a in part (S); *Rambo* (LIL). Pôrto Alegre to Canoas, *Lindman* A-411 (S). São Leopoldo, *Eugenio* 1893 (GH, HBR). Toca do Tigre, near Itapoan, *Rambo* (US). Mun. Rio Grande: Cocuruté, *Lindman* b in part (S); A-749 (S).

58b. ***Aechmea recurvata*** var. ***ortgiesii*** (Baker) Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 29. 1952.
Ortgiesia tillandsioides Regel, Ind. Sem. Hort. Petrop. for 1866: 81. 1867.
Aechmea ortgiesii Baker, Journ. Bot. 17: 236. 1879.
Portea tillandsioides Nicholson, Dict. Gard. 3: 202. 1886.

BRAZIL: Cultivated, *Glaziou* 16448 (P); 16449 (P); 17287 (P).

PARANÁ: *Foster* 454 (GH); Hoehne (GH, SP). Pinhaes, *Dusén* 14609 (S). Piraí, *Dusén* 3028 (R). Mun. Curitiba: Curitiba, *Dusén* 2410 (R, S). Santa Felicidade, *Hatschbach* 1913 (US). Mun. Ponta Grossa: Vila Velha, *Foster* 404 (GH, US neg. 3951, 3952).

SANTA CATARINA: Blumenau, *F. Mueller* (GH). Campo dos Padres, *Reitz* 2593 (HBR, US). Serra do Mirador, Taió, *Reitz* 3955 (HBR); 4751 (! Reitz). Mun. Canoinhas: Papanduva, *Reitz* 3919 (HBR). Mun. Itajaí: Cabeçudas, *Reitz* 3959 (HBR, US). Mun. São Joaquim: Fachinal, Bom Jardim, *Reitz* 3282 (HBR, US).

58c. ***Aechmea recurvata*** var. ***benrathii*** (Mez) Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 30. 1952.
Aechmea benrathii Mez, Repert. Sp. Nov. Fedde 16: 6. 1919.
? *Aechmea rupestris* F. Mueller ex Ule, Bericht. Deutsch. Bot. Gesellsch. 17: 56. 1899. Nomen.

SANTA CATARINA: Cultivated, *Benrath* (B, type, F neg. 11307). Blumenau, *Schwacke* 55 (R). Brusque, *Reitz* (HBR); 3503 (HBR); 3629 (HBR). Joinvile, *Reitz* (! Reitz). Mun. Araranguá: Sombrio, *Reitz* C-1223 (HBR). Mun. Itajaí: Cabeçudas, *Reitz* 3624 (HBR); *Smith & Reitz* 6082 (R, US). Itajaí, *Reitz* 4754 (! Reitz). Praia Braba, *Reitz* 2295 (HBR, US); *Smith & Reitz* 6097 (US). Mun. Jaraguá do Sul: Corupá, *Seidel in Reitz* 4041 (HBR).

59. ***Aechmea pitcairnioides*** Mez in DC. Monogr. Phan. 9: 258. 1896.

BAÍA: *Blanchet* (G, type, F neg. 8482).

60. ***Aechmea pimenti-velosoi*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4:26, *pl. 8.* 1952.

1. Ovary white-tomentulose..... Var. a. **pimenti-velosoi**
1. Ovary glabrous, red..... Var. b. **glabra**

60a. ***Aechmea pimenti-velosoi*** var. ***pimenti-velosoi.***

SANTA CATARINA: Mun. Rio do Sul.: Barra do Trombudo, *Reitz* 4051 (HBR, type; US); 4061 (HBR, US); 4184 (HBR).

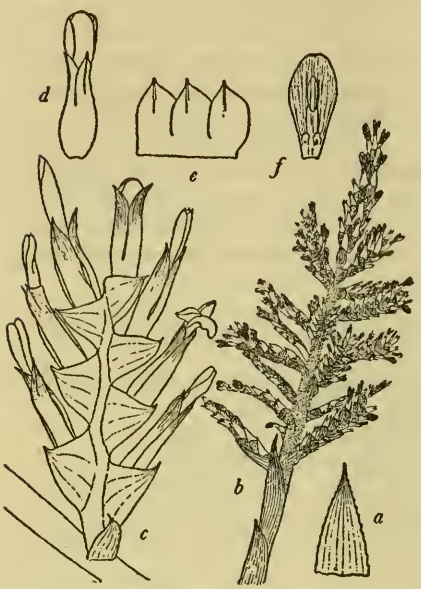

FIG. 101.

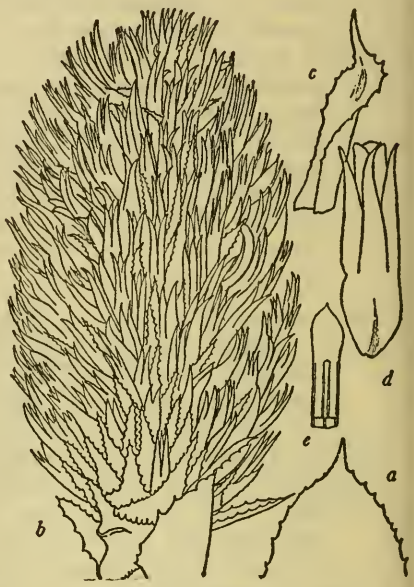

FIG. 102.

FIG. 101.—*Aechmea distichantha* var. *distichantha: a,* Apex of leaf, × ¼; *b,* inflorescence, × ¼; *c,* spike, × 1; *d,* flower, × 1; *e,* sepals, × 1; *f,* petal and stamens, × 1. (*b, d, e,* and *f* after Arquivos de Botânica do Estado de S. Paulo.)

FIG. 102.—*Aechmea pectinata: a,* Apex of leaf, × ½; *b,* inflorescence, × ½; *c,* floral bract, × 1; *d,* flower, × 1; *e,* petal with groove into which filament fits, × 1. (All after Lindman.)

60b. ***Aechmea pimenti-velosoi*** var. ***glabra*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 5:256. 1953.

SANTA CATARINA: Mun. Itajaí: Praia Braba, *Reitz* 5707 (HBR, type); *Reitz & Klein* 753 (! Reitz).

Subgenus *Pothuava* (Gaud.) Benth. & Hook. f.

61. ***Aechmea pectinata*** Baker, Journ. Bot. 17:233. 1879. FIGURE 102.
Chevalieria crocophylla E. Morr. Belg. Hortic. 35:81. 1885.
Aechmea crocophylla Baker, Handb. Bromel. 65. 1889.
Aechmea armata Lindm. Svensk. Akad. Handl. 24: no. 8:33, *pl. 7, figs. 1–13.* 1891.

Rio de Janeiro: Restinga de Mauá, *Ule* 4136 (R). Serra dos Orgãos, *Ule* 1984 (R).

Distrito Federal: Praia de Sernambetiba, *Smith & Mus. R* 6818 (R, US), 6819 (R, US), 6820 (US), 6821 (US). Tijuca, *Glaziou* 15484 (C, G (F neg. 8487)).

São Paulo: Alto da Serra, *Foster* 360 (GH, R); *Hoehne* (GH, SP); *L. B. Smith* 1841 (GH, S). Cubatão, *L. B. Smith* 2045 (GH). Serra de Cubatão, *Burchell* 3594 (K, type, GH neg. 2698). Ramal Mairink to Santos, *Lamber* (GH, SP). Rio Buturoca, Santos, *Mosén* 3244 (S, type of *Aechmea armata* Lindm.). Monte Japui, São Vicente, *L. B. Smith* 2096 (GH).

Paraná: Caiobá, *Foster* 433 (GH, R); *M. Kuhlmann* (SP). Guaratuba, *Inst. Malariologia* (HBR); *Reitz* 4249 (HBR); *Smith & Reitz* 5744 (R, RB, US). Jacareí, *Dusén* 7891 (S); 14607 (GH, S, US). Pôrto Dom Pedro II, *Dusén* 4448 (R, S).

Santa Catarina: Mun. Araquari: Barra do Sul, *Reitz & Klein* 538 (! Reitz). Mun. São Francisco do Sul: Pôrto das Canoas, *Smith & Reitz* 5706 (R, RB, US). São Francisco do Sul, *Reitz* 3681 (! Reitz); 3731 (HBR); 3834 (HBR); 3884 (HBR, US).

62. ***Aechmea turbinocalyx*** Mez in Mart. Fl. Bras. 3, pt. 3: 359. 1892.

Baía: *Blanchet* (G, type, F neg. 8483).

63. ***Aechmea nudicaulis*** (L.) Griseb. Fl. Brit. West Ind. 593. 1864.

1. Floral bracts reniform and minute or lacking..... Var. a. **nudicaulis**
1. Floral bracts triangular, relatively conspicuous.
   2. Petals and sepals yellow..... Var. b. **cuspidata**
   2. Petals red; sepals tinged with red..... Var. c. **aureo-rosea**

63a. ***Aechmea nudicaulis*** var. ***nudicaulis***

Bromelia nudicaulis L. Sp. Pl. 286. 1753.

Not recorded in Brazil.

México, Central America, West Indies, Venezuela.

63b. ***Aechmea nudicaulis*** var. ***cuspidata*** Baker, Journ. Bot. 17: 234. 1879. Figure 103.

Tillandsia uni-spicata Vell. Fl. Fluminensis 132. 1825; Icon. 3: *pl. 124.* 1835.

Pothuava spicata Gaud. Atl. Voy. Bonite *pl. 117.* 1851.

Aechmea sulcata Lindm. Svensk. Akad. Handl. 24: no. 8: 31, *pl. 5, figs. 15–21.* 1891.

Aechmea nudicaulis var. *sulcata* Mez in DC. Monogr. Phan. 9: 269. 1896.

Brazil: *Regnell* 212 (S); *Widgren* 920 (S).

Baía: *Blanchet* 2282 (P).

Espírito Santo: (Bananal), *Viana Freire* 48 (R). Cachoeiro de Itapemirim, *Foster* 973 (GH). Vargem Alta, *Foster* 920 (GH). Vitória, *Foster* 180 (GH); 879 (GH, US). Vitória to Campinas, *Foster* 211 (GH).

Minas Gerais: Caldas, *Mosén* 758 (S); 4429 (S); *Regnell* III-1255 (S, type of *Aechmea sulcata* Lindm.; US); III-1257 (S). Serra de Ouro Preto, *Ule* 341 (R). Pouso Alegre, *Hoehne* (GH, SP). Sapucaí Mirim, *M. Kuhlmann* 2605 (SP).

Rio de Janeiro: Contagallo, *Glaziou* 15482 (P). Itatiaia, *Foster* 126 (GH); 137 (GH, US). Restinga de Mauá, *Ule* (R). Petrópolis, *Goés & Constantino* 1078 (RB). Old road below Petrópolis, *Smith & Mus. R* 6494

(US); 6496 (R, US). Lagoa de Piratininga, *J. G. Kuhlmann* (RB, US). Vila Nova, *Glaziou* 7501 (P). Mun. São João de Barra: Atafona, *Sampaio* 6317 (R); *Santos & Lauro* (R). Barcelos to Atafona, *Smith & Mus. R* 6674 (R, US).

Distrito Federal: Monte do Cochrane, *L. B. Smith* 1349 (GH). Jardim Botânico, *Bailey* 258 (BH). Quinta, *Glaziou* 16407 (P); 16415 (P). Ilha do Raimundo, *Vidal* (R). "Isle aux Rats," Rio Harbor, *Commerson* (P). Recreio dos Bandeirantes, *Foster* 495 (GH); 496 (GH); *Lutz* 858 (R); 1455 (GH); 1456 (GH); *Lutz & Cochrane* (R, US). Rio de Janeiro, *Hoehne* (SP). Restinga de Jacarepaguá, *Ule* (R). Restinga de Sernambetiba, *Silveira & Brade* 15771 (RB); *Smith & Mus. R* 6813 (US), 6826 (R, US), 6831 (US). Tijuca, *Glaziou* 2732 (P). Tijuca, Excelsior, *Lutz* 1441 (R). Restinga da Tijuca, *Machado* (RB).

São Paulo: Alto da Serra, *Smith, Hoehne & Kuhlmann* 1833 (GH). Atibaia, *Foster* 476 (GH, R). Rio Buturoca, Santos, *Mosén* 2978 (S). Cubatão, *L. B. Smith* 2042 (GH). Guarujá, *L. B. Smith* 2029 (B, F, GH, K, S, US). Itanhaém, *L. B. Smith* 2059 (GH). Santos, *Foster* 486 (GH, US). Ramal Mairink to Santos, *Lamber* (SP). Mun. São Paulo: Butantã, *Hoehne* (SP). Santo Amaro, *Krieger* 181 (SP). São Paulo, *Doering* (GH, SP); *Loefgren* (GH, SP); *Ostermeyer* (SP).

Paraná: Caiobá, *Foster* 434 (GH, R); *Gehrt* (SP, US). Curitiba to Joinvile near the Santa Catarina line, *Reitz* 3758-e (HBR). Guaratuba, *Reitz* 4238 (HBR). Jacareí, *Dusén* 9010 (S, US); 15830 (S); 16103 (GH, S, US); 17316 (GH, S, US). Morrêtes, *Dusén* 8594 (S). Mun. Paranaguá: Paranaguá, *Tessmann* (US). Rio Pereque, *Hatschbach* 1998 (US).

Santa Catarina: *Gaudichaud* 131 (P, type of *Pothuava spicata* Gaud.); *D'Urville* (P). Blumenau, *Reitz* 3706 (HBR). Brusque, *Reitz* 3236 (HBR); 3699 (HBR). Laguna, *Reitz & Klein* 94 (HBR). Ribeirão Grande, Taió, *Reitz* 3980 (HBR). São Francisco do Sul, *Reitz* 3654-c (HBR). Mun. Araranguá: Sombrio, *Reitz* C-779 (HBR). Mun. Florianópolis: Rio Vermelho, *Reitz* 4268 (HBR). Trinidade, *Rohr* (LIL). Mun. Itajaí: Praia Braba, *Reitz* 2291 (HBR, US). Mun. Jaraguá do Sul: Corupá, *Seidel* 34 (! Reitz). Mun. Orleães: Rio Mirador, *Reitz* 3370 (HBR). Mun. Palhoça: Campo do Massiambú, *Reitz* 4966 (! Reitz).

Rio Grande do Sul: Lagoa dos Quadros near Tôrres, *Rambo* (HBR, US).

63c. ***Aechmea nudicaulis*** var. ***aureo-rosea*** (Antoine) L. B. Smith, p. 17.

Hoplophytum aureo-roseum Antoine, Wien. Ill. Garten-Zeit. 6: 97, *pl. 1.* 1881.

Aechmea aureo-rosea Baker, Handb. Bromel. 63. 1889.

Brazil: Cultivated, *Ule* 4043 (R).

Minas Gerais: Coronel Pacheco, *Heringer* 1149 (SP). Mun. Nova Lima: Lagoa Grande, *Williams & Assis* 5786-a (GH).

Rio de Janeiro: Alto da Serra to Meio da Serra, *L. B. Smith* 1544 (GH). Carmo, on Rio Paquequer, *Neves Armond* 125 (R). Soberbo to Guapi, Serra dos Orgãos, *L. B. Smith* 1531 (B, GH, S). Suruí, *Foster* 18-A (GH).

Distrito Federal: Ilha d'Agua, Rio Harbor, *Delforge* 3 (RB). Guaratiba, *Smith & Mus. R* 6530 (R, US). Paineiras, Corcovado, *L. B. Smith* 1216 (GH). Rio de Janeiro, *Reitz* 4028 (HBR). Tijuca, *Foster* 322 (GH, R); *Lindman* A-53 (S).

São Paulo: [Alto da] Serra, *Handro* (SP). Buturoca, Santos, *Mosén* 2978 (C (F neg. 22317), S).

64. ***Aechmea cylindrata*** Lindm. Svensk. Akad. Handl. 24: no. 8: 32, *pl. 8, figs. 28–35.* 1891.

Aechmea cylindrata var. *micrantha* Lindm. Svensk. Akad. Handl. 24: no. 8: 32, *pl. 8, figs. 36–40.* 1891.

? *Aechmea hyacinthus* F. Mueller, Gartenflora 42: 717. 1893.

São Paulo: Alto da Serra, *Foster* 382 (GH); *Hoehne* (GH, SP). Boracéa, *Lima & da Silva* (SP). Rio Buturoca, Santos, *Mosén* 2975 (S); 3245 (S, type of *Aechmea cylindrata* var. *micrantha* Lindm.). Salesópolis to Boracéa, *M. Kuhlmann* 2040 (SP). Ribeirão do Tijuco, *M. Kuhlmann* (SP). Rio Tijuco, *Foster* 464 (GH, R).

Paraná: Carvalho, *Dusén* 13154 (S). Curitiba, *Foster* 421 (GH). Curitiba to Paranaguá, *Reitz* 5758 (HBR, US). Ipiranga, Monte Alegre, *Dusén* 3491 (R). Jacareí, *Dusén* 6633 (S); 7890 (S); 9011 (S, US); 14559 (S); 16104 (S); 17196 (S, US); 17317 (S). Morrêtes, *Hoehne* (GH, SP); *M. Kuhlmann* (SP, US). 4 km. from Paranaguá, *Foster* 450 (GH, R, US). Mun. São José dos Pinhaes: Vossoroca, *Hatschbach* 1592 (US).

Santa Catarina: Blumenau, *Reitz* 3670 (HBR). Herval, *Dusén* (S). Mun. Brusque: Morro da Bateia, *Reitz* C-1902 (HBR, US). Morro Spitzkopf, *Reitz* 2252 (HBR, US). Ribeirão do Ouro, *Reitz* 3633 (HBR). Mun. Itajaí: Morro do Baú, *Reitz* C-2063 (HBR, US); 4189 (HBR).

65. ***Aechmea comata*** (Gaud.) Baker, Journ. Bot. 17: 234. 1879.

1. Leaf-blades concolorous..... Var. a. **comata**
1. Leaf-blades yellow-striped..... Var. b. **makoyana**

65a. ***Aechmea comata*** var. ***comata***

Pothuava comata Gaud. Atl. Voy. Bonite *pl. 116.* 1851.

Hoplophytum lindenii E. Morr. Belg. Hortic. 15: 164. 1865.

Aechmea lindenii Baker, Journ. Bot. 17: 233. 1879.

Macrochordium lindenii Wittm. Bot. Jahrb. 13, Beibl. 29: 23. 1891.

Brazil: *Gaudichaud* (P, type). Cultivated, *Atkinson* 92 (BH, MT); *E. Morren* (LG); *Strauss* (B, F neg. 11321).

Santa Catarina: Laguna, *Reitz* 4166 (HBR). Mun. Biguaçú: Fachinal, *Reitz* C-929 (HBR). Mun. Florianópolis: *Rohr* 457 (LIL). Morro das Pedras, *Smith & Reitz* 6204 (R, RB, US). Ponta Grossa, *Reitz* 4260 (HBR). Santo Antonio, *Reitz* 3831 (HBR); 3831-a (HBR); 3933 (HBR, US). São José, *Hoehne* (GH, SP). Mun. Palhoça: Campo do Massiambú, *Reitz & Klein* 1046 (! Reitz). Paulo Lopes, *Reitz* 3704 (HBR); *Reitz & Klein* 39 (HBR). Mun. Pôrto Belo: Canto Grande, *Reitz* 3629 (HBR, US).

Rio Grande do Sul: Tôrres, *Golland in Lindman* (S).

65b. ***Aechmea comata*** var. ***makoyana*** (Mez) L. B. Smith, p. 14.

Aechmea makoyana Hort. Makoy ex Rev. Hortic. 65: 203. 1893. Nomen.

Hoplophytum lineatum Hort. ex Gard. Chron. 1893, pt. 1: 414. 1893.

Aechmea lindenii var. *makoyana* Mez, Engl. Pflanzenreich IV. 32: 159. 1934.

Brazil: Described from cultivation.

66. ***Aechmea calyculata*** (E. Morr.) Baker, Journ. Bot. 17:232. 1879.
Hoplophytum calyculatum E. Morr. Belg. Hortic. 15:162, *pl. 11.* 1865.
Aechmea selloana Baker, Handb. Bromel. 60. 1889.
Echinostachys pineliana sensu Wittm. Bot. Jahrb. 13, Beibl. 29:14. 1891. Not Brongn.

BRAZIL: *Sellow* bromel. 29 (P); bromel. 71 (P); 4008 (B, type of *Aechmea selloana* Baker, F neg. 11323). Cultivated, *Atkinson* 3 (BH); 4 (UC); 9 (BH, MO).

SANTA CATARINA: *Dusén* 11918 (S); *F. Mueller* (K, GH neg. 2700). Cultivated, *Hort. Liége* (LG); *Linden* (LG, type). Blumenau, *Reitz* 3562 (HBR); 3599 (HBR); 3640 (HBR); 3978 (HBR). Ribeirão Grande, Taió, *Reitz* 3992 (HBR). Mun. Chapecó: Itapiranga, *Reitz* 4753 (! Reitz, inflorescence branched). Itapiranga, Rio Peperí-Guaçú, *Reitz* 3859-a (HBR). Mun. Jaraguá do Sul: Corupá, *Seidel* 7 (HBR).

ALSO: ARGENTINA.

67. ***Aechmea squarrosa*** Baker, Handb. Bromel. 63. 1889. Not Journ. Bot. 28:305. 1890.

RIO DE JANEIRO: Cantagallo, *Glaziou* 15486 (B, isotype, F neg. 11325).

68. ***Aechmea alopecurus*** Mez in Mart. Fl. Bras. 3, pt. 3:367. 1892.

BRAZIL: *Pohl* 5230 (W, type).

69. ***Aechmea vanhoutteana*** (Van Houtte) Mez in Mart. Fl. Bras. 3, pt. 3: 366. 1892.
Echinostachys vanhoutteana Van Houtte, Catal. 1878.
Quesnelia vanhouttei E. Morr. Belg. Hortic. 31:163, 350. 1881.
Quesnelia vanhoutteana E. Morr. Belg. Hortic. 31: *pl. 18.* 1881.
Macrochordium vanhoutteanum Wittm. Bot. Jahrb. 13, Beibl. 29:4. 1891.

RIO DE JANEIRO: Itatiaia, *Foster* 132 (GH, R); 1035 (GH, US); *L. B. Smith* 1443 (B, F, GH, K, S, US).

70. ***Aechmea kleinii*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 5:254, *pl. 1.* 1954.

SANTA CATARINA: Mun. São José: Serra da Boa Vista, *Reitz* 5388 (! Reitz); 5762 (HBR, US); *Reitz & Klein* 935 (HBR, type).

71. ***Aechmea pineliana*** (Brongn. ex Planch.) Baker, Journ. Bot. 17:232. 1879.
Echinostachys pineliana Brongn. ex Planch. Hort. Donat. 25. 1854–58.

BRAZIL: Cultivated, *Hort. Kew* (K, GH neg. 2701); *Ule* (R).

ESPÍRITO SANTO: Santa Teresa, *Foster* 262 (GH, US). Mun. Castelo: Braço do Sul, *Brade* 19432 (RB, US).

RIO DE JANEIRO: Cabo Frio, *Glaziou* 13244 (P). Nova Friburgo, *Glaziou* 15487 (P); 19920 (P). Teresópolis, *Sampaio* 3367 (R).

DISTRITO FEDERAL: "Morro-chemado" (? Morro Queimado), *Pinel* (P, type, GH neg. 2953). Quinta, *Glaziou* 16404 (P).

72. ***Aechmea triticina*** Mez in Mart. Fl. Bras. 3, pt. 3:369. 1892.

1. Apices of the floral bracts surpassed by the sepals; upper scape-bracts entire. Var. a. **triticina**

1. Apices of the floral bracts exceeding the sepals; upper scape-bracts serrulate. Var. b. **capensis**

72a. ***Aechmea triticina*** var. ***triticina***

Espírito Santo: Santa Teresa, *Foster* 281 (GH). Vitória, *Foster* 206 (GH, R). Mun. Cachoeiro de Itapemirim: Vargem Alta, *Foster* 918 (GH, US); 935 (GH, US).

Rio de Janeiro: Palmeiras, *Glaziou* 8985 (B, type, F neg. 11328).

72b. ***Aechmea triticina*** var. ***capensis*** L. B. Smith, p. 19.

Rio de Janeiro: Cabo Frio, *Ule* (R, type). Mun. São João da Barra, Barcelos to Atafona, *L. B. Smith & Mus. R* 6673 (US).

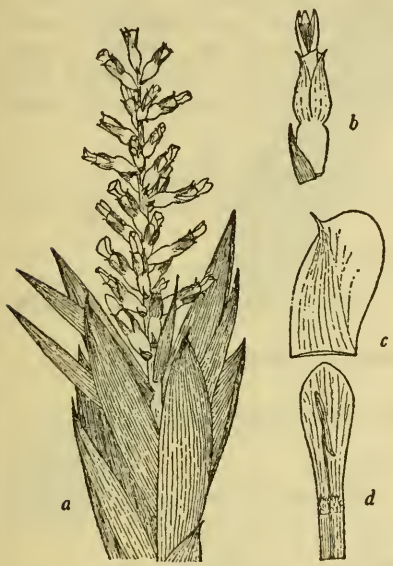

Fig. 103.

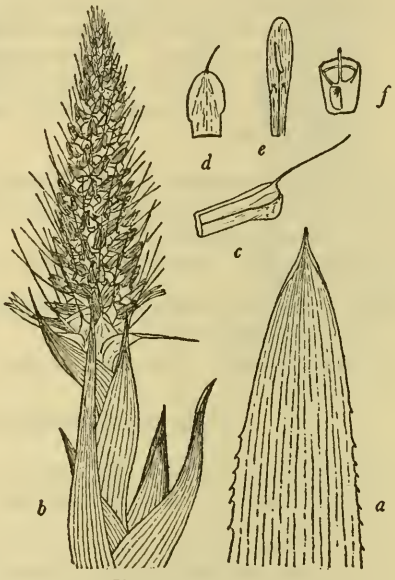

Fig. 104.

Fig. 103.—*Aechmea nudicaulis* var. *cuspidata: a,* Inflorescence, × ½; *b,* floral bract and flower, × 1; *c,* sepal, × 2; *d,* petal and stamen, × 2.

Fig. 104.—*Aechmea ornata* var. *hoehneana: a,* Apex of leaf, × ½; *b,* inflorescence, × ½; *c,* floral bract, × 1; *d,* sepal, × 1; *e,* petal and stamen, × 1; *f,* longitudinal section of ovary, × 1.

73. ***Aechmea ornata*** (Gaud.) Baker, Journ. Bot. 17: 162. 1879.

1. Leaves concolorous.
   2. Inflorescence to 4 cm. in diameter without the petals; flowers stout; petals usually pale red or rose..... Var. a. **ornata**
   2. Inflorescence about 3 cm. in diameter without the petals; flowers slender; petals blue..... Var. b. **hoehneana**
1. Leaves longitudinally green- and yellow-striped..... Var. c. **nationalis**

73a. ***Aechmea ornata*** var. ***ornata***

Chevalieria ornata Gaud. Atl. Voy. Bonite *pl. 62.* 1843.
Aechmea hystrix E. Morr. Belg. Hortic. 30: 243, *pl. 13.* 1880.
Echinostachys hystrix Wittm. Bot. Jahrb. 13, Beibl. 29: 4. 1891.

BRAZIL: *Gaudichaud* 129 in part (P, type, GH neg. 2975). Cultivated, *E. Morren* Icon. (K, GH neg. 1385).

SÃO PAULO: Guapiara, *M. Kuhlmann* (SP, US). Paiol do Meio, *Foster* 1124 (GH, US). São Paulo to Curitiba, km. 278, *Foster* 396 (GH, R).

PARANÁ: Banhado, Serra do Mar, *Dusén* (S); 14468 (GH, S). Curitiba to Joinvile near Santa Catarina line, *Reitz* 3890 (HBR); 4218 (HBR). Curitiba to Paranaguá, km. 48, *Tessmann* (Paran., US). Ipiranga, Serra do Mar, *Dusén* 3543 (R, S). Mun. Piraquara: Campininha, *Hatschbach* 1160 (US).

SANTA CATARINA: Brusque, *Reitz* 3614 (HBR); 3642 (HBR). Campo Alegre, *Reitz* 3886 (HBR). Laguna, *Reitz* 3898 (HBR); 4188 (HBR); *Reitz & Klein* 101 (HBR). São Francisco do Sul, *Reitz* 3885 (HBR). Mun. Biguaçú: Fachinal, *Reitz* C-928 (GH, HBR). Mun. Florianópolis: Rio Vermelho, *Reitz* 4266 (HBR). Mun. Pôrto Belo: Canto Grande, *Reitz* 3615 (HBR).

73b. ***Aechmea ornata*** var. ***hoehneana*** L. B. Smith, p. 17, fig. 104.

SÃO PAULO: Paiol do Meio, *Gehrt* (GH, type (US neg. 4279); SP). São Bernardo, *Edwall* (SP).

PARANÁ: Mun. Paranaguá: Caiobá, *Foster* 452 (GH).

73c. ***Aechmea ornata*** var. ***nationalis*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 30. 1952.

SANTA CATARINA: Morro Baú, Itajaí, *Reitz* 4764 (HBR, type).

Subgenus *Macrochordium* (De Vriese) Baker

74. ***Aechmea nervata*** L. B. Smith, p. 17, fig. 105.

ESPÍRITO SANTO: Vitória, *Foster* 176-A (GH, type, US neg. 4263).

75. ***Aechmea alba*** Mez in Mart. Fl. Bras. 3, pt. 3: 375. 1892.

BAÍA: *Blanchet* 2276 (G, type, F neg. 8480).

RIO DE JANEIRO: (Esperança), *Riedel* (! Mez, citation doubtful, probably from Baía).

76. ***Aechmea lamarchei*** Mez in Mart. Fl. Bras. 3, pt. 3: 370. 1892.
Macrochordium lamarchei E. Morr. ex Baker, Handb. Bromel. 67. 1889. As "lamarckii."
Aechmea lagenaria Mez in Mart. Fl. Bras. 3, pt. 3: 372. 1892.

BRAZIL: Cultivated, *Lamarche* (LG, type); *Strauss* (B, F neg. 11318).

BAÍA: *Blanchet* 1526 (G, isotype of *Aechmea lagenaria* Mez, F neg. 8486).

ESPÍRITO SANTO: Domingos Martins, *Foster* 176 (GH, R). Mun. Cachoeira de Itapemirim: Vargem Alta, Morro de Sal, *Brade* 19414 (RB, US).

MINAS GERAIS: *Saint-Hilaire* C-174 (P). Distrito Carangola, *Mexia* 4316-a (GH, US). Conceição, Belo Horizonte, *Foster* 630 (GH, US). Coronel Pacheco, *Heringer* 1968 (SP). Distrito Ilheu, *Mexia* 4972 (GH, US). Serra do Cipó, *Foster* 637 (GH, US). Viçosa, *Mexia* 4789-a (GH); 4859-a (GH).

77. ***Aechmea triangularis*** L. B. Smith, p. 19, fig. 106.

ESPÍRITO SANTO: Santa Teresa, *Foster* 829 (GH, type, US neg. 4261).

78. ***Aechmea bromeliifolia*** (Rudge) Baker in Benth. & Hook. Gen. Pl. 3: 664. 1883.

Tillandsia bromeliifolia Rudge, Guyan. 32, *pl. 50.* 1807.
Bromelia tinctoria Mart. in Spix & Mart. Reise Bras. 2: 554. 1828.
Macrochordium pulchrum Beer, Bromel. 147. 1857.
Aechmea conspicuiarmata Baker, Handb. Bromel. 67. 1889.
Aechmea macroneottia Baker, Handb. Bromel. 68. 1889.
Aechmea tinctoria Mez in Mart. Fl. Bras. 3, pt. 3: 373, *pl. 73.* 1892.

FIG. 105.

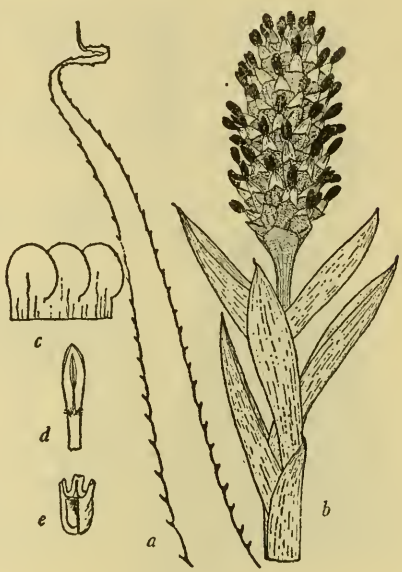

FIG. 106.

FIG. 105.—*Aechmea nervata: a,* Scape and inflorescence, × ½; *b,* sepals, × 1; *c,* base of petal, × 1; *d,* longitudinal section of ovary, × 1.

FIG. 106.—*Aechmea triangularis: a,* Leaf-blade, × ½; *b,* scape and inflorescence, × ½; *c,* sepals, × 1; *d,* petal and stamen, × 1; *e,* longitudinal section of ovary, × 1.

Aechmea pulchra Mez in Mart. Fl. Bras. 3, pt. 3: 374. 1892.
Hoiriri bromeliifolia Kuntze, Rev. Gen. 3, pt. 3: 303. 1898.
Aechmea eriostachya Ule, Bot. Jahrb. 42: 197. 1908.
Aechmea ellipsoidea Rusby, Mem. N. Y. Bot. Gard. 7: 212. 1927.

BRAZIL: *Glaziou* 16405 (P). Goiás to Cuiabá, *Weddell* (P). Cultivated, *Gehrt* (SP); *Ule* (R).

AMAZONAS: Rio Xiborem, *Luetzelburg in Rondon* 22013 (M).

PARÁ: Rio Capim. *Huber* (MG). Upper Rio Cupari between the Xingú and Tapajos, *Krukoff* 1222 (NY).

PIAUÍ: Serra do Brejo, southern Piauí, *Luetzelburg* (! Mez).

CEARÁ: Aurora, southern Ceará, *Luetzelburg* (! Mez).

PARAÍBA: Serra da Viração, *Luetzelburg* (! Mez).

Baía: Bom Jesus de Lapa, Rio São Francisco, *Luetzelburg* (! Mez). Upper Rio de Contas, *Luetzelburg* (! Mez). Serra de Itiuba, *Luetzelburg* (! Mez). Joazeiro, *Luetzelburg* (! Mez). Maracás, *Foster* 2465 (US); *Ule* 7028 (B, type of *Aechmea eriostachya* Ule, F neg. 11312). Toca da Onça *Rose & Russell* 20108 (US).

Minas Gerais: Caldas, *Regnell* III-1726 (B (F neg. 11322), S). Serra do Cipó, *Costa* 34 (R). Conselheiro Matta-Rodeador, *Brade* 13971 (RB). Ouro Branco, *Castellanos* 20585 (GH).

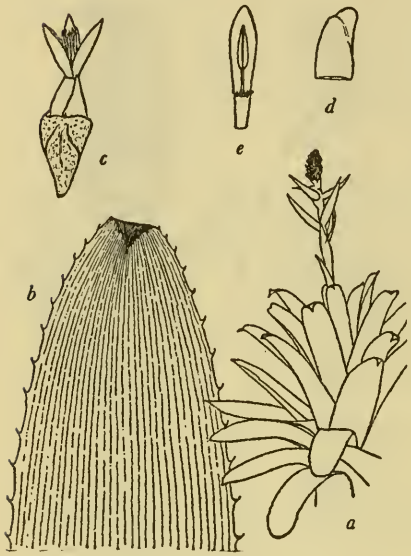

Fig. 107.

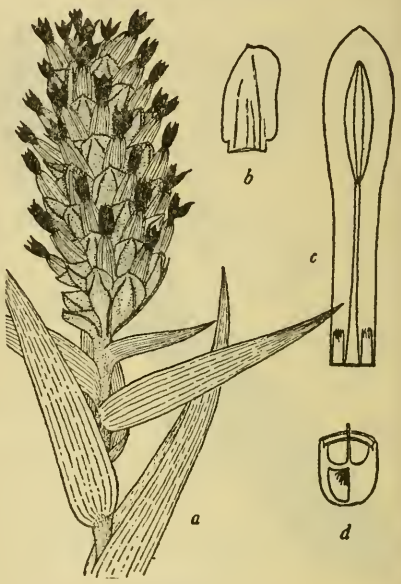

Fig. 108.

Fig. 107.—*Aechmea maculata: a,* Habit (after M. B. Foster), × ⅛; *b,* apex of leaf, × 1; *c,* floral bract and flower, × 1; *d,* sepal, × 1; *e,* petal and stamen, × 1.

Fig. 108.—*Aechmea chlorophylla: a,* Scape and inflorescence, × ½; *b,* sepal, × 1; *c,* petal and stamen, × 2; *d,* longitudinal section of ovary, × 1.

Mato Grosso: Camizão, *Foster* 1090 (GH, US). Guia, *Lindman* A-3521 1/2 (S). São Luiz de Caceres, *Hoehne in Rondon* 383 (R); 439 (R); 4723 (R); 4724 (R).

São Paulo: Campinas, *Mosén* 3929 (S). Pinheiros, *Loefgren* (SP). Rio Tiete, Itapura, *Foster* 1099 (GH, US). Mun. São Paulo: Cidade Jardim, *Smith & Kuhlmann* 1801 (F, GH). Orchidario, *Foster* 342 (GH, R, US). Santo Amaro, *Krieger* 178 (SP). São Paulo, *Kruse* (SP); *Pickel* 4629 (SP).

Paraná: Jaguariaíva, *Dusén* (S); 10779 (S, US); 15446 (S); 16072 (GH, S, US). Serrinha, *Dusén* 7024 (S). Mun. Ponta Grossa: San Luis to Vila Velha, *Foster* 409 (GH, R, US). Vila Velha, *Dusén* 2799 (R); *Gehrt* (SP); *M. Kuhlmann* (SP, US).

Rio Grande do Sul: Caaró near São Luiz, *Rambo* (! Rambo).

Also: Guatemala and British Honduras to Paraguay and Argentina.

79. ***Aechmea maculata*** L. B. Smith, p. 15, fig. 107.
MINAS GERAIS: Cultivated, *Reitz* 4770 (HBR). Pico de Piedade, Belo Horizonte, *Foster* 561 (GH, type, US neg. 4262).

80. ***Aechmea chlorophylla*** L. B. Smith, p. 14, fig. 108.
ESPÍRITO SANTO: Santa Teresa, *Foster* 176-B (GH); 830 (GH, type, US neg. 4260).

Subgenus *Purpurospadix* Mez

81. ***Aechmea fernandae*** (E. Morr.) Baker, Handb. Bromel. 64. 1889.
Bromelia longifolia Rich. Schomburgk, Reise 3:903. 1848. Nomen, not Rudge.
Bromelia fernandae E. Morr. Ill. Hortic. 18:114, *pl. 65.* 1871.
Aechmea schomburgkii Baker, Handb. Bromel. 66. 1889.
PARÁ: Cultivated from material sent by Wallis, *Hort. Liége* (LG).
ALSO: BRITISH GUIANA.

82. ***Aechmea rubiginosa*** Mez in DC. Monogr. Phan. 9:285. 1896.
Aechmea fernandae Baker, Handb. Bromel. 64. 1889. In part, not as to type.
AMAZONAS: (Boca Esperança), *J. G. Kuhlmann* 697 (RB). São Pedro, Rio Padauiri, basin of Rio Negro, *Fróes* 22674 (IAN).
PARÁ: Repartição Cuminá, tributary of Rio Trombetas, *J. G. Kuhlmann* 1706 (RB, US).
ALSO: VENEZUELA.

83. ***Aechmea multiflora*** L. B. Smith, Contr. Gray Herb. 117:4, *pl. 1, figs. 1–3.* 1937. FIGURE 109.
BAÍA: Feira de Santana, *Foster* 2478 (US). Rio Grungogi, *Curran* 297 (US, type). Milagres to Maracás, *Foster* 2451 (US).
ESPÍRITO SANTO: Collatina, *Foster* 224 (GH, R). Itapemirim, *Foster* 153 (GH).

84. ***Aechmea depressa*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1:54, *pl. 66.* 1941.
BAÍA: Agua Preta, *Foster* 71 (GH, type (US neg. 3939, 3949), R).

85. ***Aechmea saxicola*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 2:118, *pl. 48.* 1950.
ESPÍRITO SANTO: Cachoeiro de Itapemirim, *Foster* 164 (US, type; GH, R). Vitória, *Foster* 188 (GH).

86. ***Aechmea conifera*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1:53, *pl. 65.* 1941.
BAÍA: Agua Preta, *Foster* 76 (GH, type (US neg. 3940, 3948), R).

87. ***Aechmea perforata*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1:55, *pl. 70.* 1941.
ESPÍRITO SANTO: Santa Teresa, *Foster* 314 (GH, type (US neg. 3957), R).

88. ***Aechmea sphaerocephala*** (Gaud.) Baker, Journ. Bot. 17:162. 1879.
Chevalieria sphaerocephala Gaud. Atl. Voy. Bonite *pl. 61.* 1843.
Chevaliera gigantea Maury, Bull. Assoc. Franc. (Congr. Toulouse) 556, *pl. 17.* 1888.
Aechmea gigantea Baker, Handb. Bromel. 65. 1889. Not Baker, op. cit. 45.

Espírito Santo: Itapemirim, *Foster* 152 (GH, R, US).
Distrito Federal: Copacabana, *Glaziou* 5466 (P, US). Rio de Janeiro, *Foster* 1139 (GH); *Gaudichaud* 369 in part (P, type, GH neg. 2974).

89. ***Aechmea leucolepis*** L. B. Smith, p. 14, fig. 110.
Baía: Milagres to Maracás, *Foster* 2452 (US, type).

90. ***Aechmea stephanophora*** E. Morr. ex Baker, Handb. Bromel. 67. 1889.
Chevalieria stephanophora Mez in DC. Monogr. Phan. 9: 154. 1896.

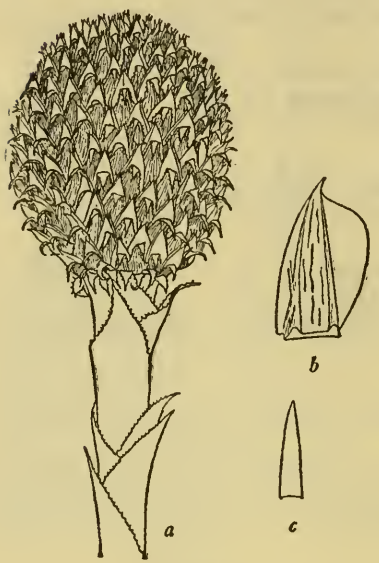

Fig. 109.

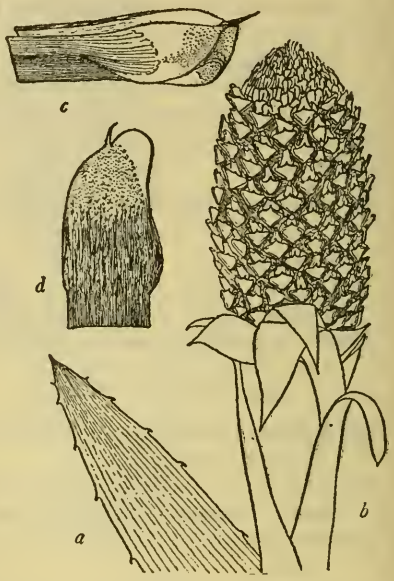

Fig. 110.

Fig. 109.—*Aechmea multiflora: a,* Scape and inflorescence, × ¼; *b,* sepal, × 1; *c,* petal, × 1.
Fig. 110.—*Aechmea leucolepis: a,* Apex of leaf, × ¼; *b,* inflorescence, × ¼; *c,* floral bract, × 1; *d,* sepal, × 1.

Brazil: Cultivated, *E. Morren* icon. (K, type).
Pernambuco: Iguaraçú, *Ridley & Ramage* (BM, US neg. 4024, 4025). Recife, *Foster* 2429 (R, US). South of Recife, Afogados to Boa Viagem, *Baker & Collins* (GH, SP, US).

91. ***Aechmea cariocae*** L. B. Smith, p. 13.
Chevalieria comata Mez in DC. Monogr. Phan. 9: 153. 1896. In part, not as to basonym.
Rio de Janeiro: Vila Nova, *Glaziou* 15485 (K, US neg. 4193).
Distrito Federal: Andarahí Grande, *Glaziou* 9327-b (C (F neg. 22327), P); 14337 (P). Corcovado, *L. B. Smith* 1230 (GH, S).

92. ***Aechmea castanea*** L. B. Smith, p. 13, fig. 111.
Espírito Santo: Santa Teresa, *Foster* 831 (GH, type; US).

30. *Quesnelia* Gaud.

Quesnelia Gaud. Atl. Voy. Bonite *pl. 54.* 1842.

Endemic to Brazil. Records from other countries disproved or highly dubious.

1. Floral bracts subligulate, broadly acute to truncate; inflorescence strobilate, ellipsoid or cylindric; ovary slightly if at all costate; sepals 8–10 mm. long.
   2. Scape-bracts bladeless, entire or nearly so.
      3. Upper part of the floral bract uniform and flat; flowers in about 12 ranks. (Fig. 112.) ..... 1. **Q. arvensis**
      3. Upper part of the floral bract with broad white lepidote strongly crisped margins that contrast sharply with the roseate subglabrous flat center; flowers in 6–10 ranks..... 2. **Q. quesneliana**
   2. Scape-bracts with subfoliaceous serrulate blades..... 3. **Q. testudo**
1. Floral bracts ovate or lanceolate, acute or acuminate; inflorescence dense or lax.
   4. The floral bracts entire, without distinction between base and blade.
      5. Floral bracts dimorphic, the lower large, elliptic, about equaling the flowers, the upper narrowly triangular, surpassed by the sepals; sepals 20 mm. long; inflorescence dense or subdense.
         6. Scape-bracts large, densely imbricate; inflorescence elongate. 4. **Q. imbricata**
         6. Scape-bracts small, barely if at all imbricate; inflorescence subcorymbiform..... 5. **Q. humilis**
      5. Floral bracts uniform or the inflorescence lax.
         7. Inflorescence dense; sepals obtuse, 10–16 mm. long.
            8. Leaves subdensely serrate with spines 4 mm. long; inflorescence cylindric, 15 cm. long; floral bracts cucullate, subcoriaceous. (Fig. 113.) ..... 6. **Q. edmundoi**
            8. Leaves laxly serrulate; inflorescence fusiform, 6–8 cm. long; floral bracts straight, membranaceous.
               9. Floral bracts in 3–4 ranks, the lowest only equaling the sepals; scape-bracts more than half as long as the internodes; leaves rounded and apiculate at least when young..... 7. **Q. lateralis**
               9. Floral bracts in 5–6 ranks, the lowest equaling the petals; scape-bracts remote; leaves acuminate..... 8. **Q. blanda**
         7. Inflorescence lax.
            10. Sepals acute, to 23 mm. long; petals wholly dark blue. (Fig. 114.) 9. **Q. liboniana**
            10. Sepals obtuse, to 17 mm. long; petals green with only the apex blue. 10. **Q. morreniana**
   4. The floral bracts serrate, divided into a reniform base and a distinct narrowly triangular blade.
      11. Inflorescence short, dense; sepals to 19 mm. long..... 11. **Q. indecora**
      11. Inflorescence elongate, lax; sepals 22–27 mm. long. 12. **Q. augusto-coburgii**

1. ***Quesnelia arvensis*** (Vell.) Mez in Mart. Fl. Bras. 3, pt. 3: 381. 1892. FIGURE 112.

Bromelia arvensis Vell. Fl. Fluminensis 130. 1825; Icon. 3: *pl. 114.* 1835.
Quesnelia rufa var. *sororocabae* Lindm. Svensk. Akad. Handl. 24: no. 8: 23, *pl. 3, fig. 1–8.* 1891.
Quesnelia arvensis var. *sororocabae* Mez, Engl. Pflanzenreich IV. 32: 172. 1935.

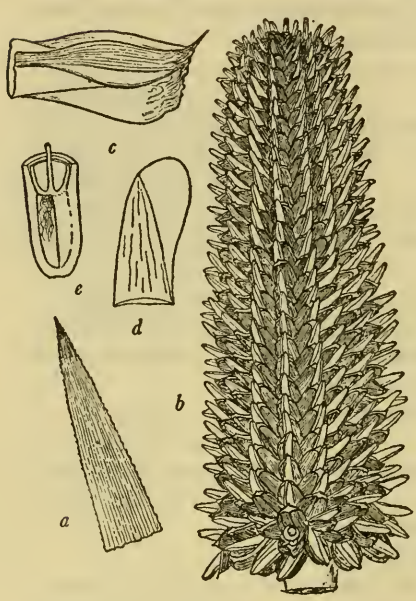

FIG. 111.

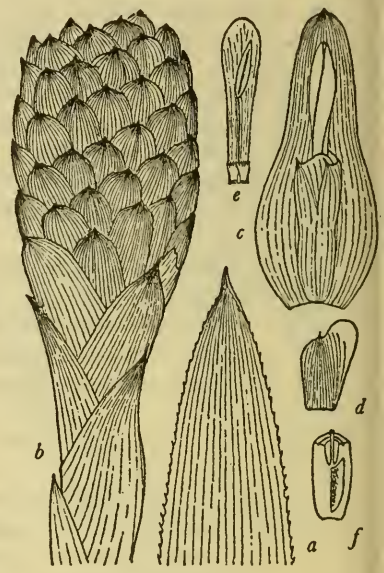

FIG. 112.

FIG. 111.—*Aechmea castanea: a,* Apex of leaf, × ¼; *b,* inflorescence, × ¼; *c,* floral bract, × 1; *d,* sepal, × 1; *e,* longitudinal section of ovary, × 1.

FIG. 112.—*Quesnelia arvensis: a,* Apex of leaf, × ½; *b,* inflorescence, × ½; *c,* floral bract and flower, × 1; *d,* sepal, × 1; *e,* petal and stamen, × 1; *f,* longitudinal section of ovary, × 1.

SÃO PAULO: Caraguatatuba, *Hoehne & Gehrt* (GH, SP). Iguapé, *Hoehne* (SP). Itanhaém, *L. B. Smith* 2060 (GH, S). Piaçaguera, *Hoehne* (SP). Praia Grande, *W. Hoehne* (SP). Suarão, Praia Grande, *Gehrt* (GH, SP). Santos, *Hombron* (P). Guarujá, Santos, *Dusén* 14260 (S). Ramal Mairink to Santos, *Lamber* (GH, SP). Sorocaba, Santos, *Mosén* 3708 (R, S, type of *Quesnelia rufa* var. *sororocabae* Lindm.). São Vicente to Itaipu, *L. B. Smith* 2012 (GH).

2. ***Quesnelia quesneliana*** (Brongn.) L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 2: 196. 1952.

Billbergia quesneliana Brongn. Ann. Sci. Nat. II. 15: 371. 1841.
Quesnelia rufa Gaud. Atl. Voy. Bonite *pl. 54.* 1842.
Quesnelia cayennensis Baker, Handb. Bromel. 85. 1889.

Quesnelia skinneri E. Morr. ex Harms, Engl. & Prantl, Pflanzenfam. ed. 2. 15a: 152. 1930.

Brazil: *Widgren* 1251 (S). Cultivated, *Hennings* (B, F neg. 11330); *Hort. Paris* (P, type, GH neg. 2961); *Reitz* 4794 (HBR).

Espírito Santo: Santa Teresa, *Foster* 312 (GH, R). Vitória, *Foster* 182 (GH, R); 796 (GH).

Rio de Janeiro: Coast, *Foster* 1152 (GH, US). Magé, *Pereira* 607 (RB). Mauá, *Ule* 4044 (R). Mandioca, Serra da Estrella, *Glaziou* 15480 (P, US). Suruí to Petrópolis, *Foster* 330 (GH, R).

Distrito Federal: Gavea, *Frazão* (RB). Laranjeiras, *Glaziou* 18568 (F, P, US). Restinga de Leblon, *Hoehne* 125 (R). Recreio dos Bandeirantes, *Lutz* 945 (R). Rio de Janeiro, *Gaudichaud* 370 (P, type of *Quesnelia rufa* Gaud.; GH neg. 2960); *Reitz* 4186 (HBR).

3. ***Quesnelia testudo*** Lindm. Svensk. Akad. Handl. 24: no. 8: 24, *pl. 3, figs. 9–19.* 1891.

Quesnelia roseo-marginata sensu E. Morr. Belg. Hortic. 31: 82, *pl. 4.* 1881.

Brazil: Cultivated, *Hort. Liége* (LG).

São Paulo: Alto da Serra, *Foster* 376 (GH); *Hoehne* (GH, SP); *L. B. Smith* 1840 (B, GH); 1873 (F, GH). Sorocaba, Santos, *Mosén* 2976 (S, type). Mun. São Paulo: Serra da Cantareira, *Loefgren* (GH, SP).

Santa Catarina: Cultivated in Hort. Museu Nacional, Rio de Janeiro, *Hans* (R).

4. ***Quesnelia imbricata*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 2: 195, *pl. 63.* 1952.

Paraná: Ponta Grossa, *Foster* 2527 (US). Mun. Campo Largo: Campo Largo, *Foster* 405 (GH, type (US neg. 4211), R, US). Serra São Luiz de Purunã, *Hatschbach* 1538 (US); 2301 (US); *M. Kuhlmann* (SP). Mun. Piraquara: Morro Albino Souza, *Hatschbach* 1016 (US).

5. ***Quesnelia humilis*** Mez in Mart. Fl. Bras. 3, pt. 3: 386. 1892.

Quesnelia hoehnei L. B. Smith, Contr. Gray Herb. 95: 43, *pl. 10, figs. 3–5.* 1931.

Brazil: *Glaziou* 16434 (B, type, F neg. 11346).

São Paulo: Cultivated, *M. Kuhlmann* (SP); *T. Rojas* 8839 (US). Alto da Serra, *Foster* 350 (GH); 379 (GH, R); *Gehrt* (GH, SP); *Hoehne & Gehrt* (GH, SP, US); *J. G. Kuhlmann* (RB); *L. B. Smith* 1887 (GH); 1968 (GH, type of *Quesnelia hoehnei* L. B. Smith). Boracéa, Salesópolis, *M. Kuhlmann & Kühn* 1762 (SP). Capivari, *Edwall* (SP). Cubatão, *Gonçalves* (SP). Ribeirão Pires, *Edwall* (SP).

6. ***Quesnelia edmundoi*** L. B. Smith, p. 34, fig. 113.

Rio de Janeiro: Barreiras, Baixada Fluminensis, at the base of the Serra de Teresópolis, *Pereira & Duarte* 1522 (US, type; RB).

7. ***Quesnelia lateralis*** Wawra, Oesterr. Bot. Zeitschr. 30: 149. 1880.

Quesnelia centralis Wawra, Oesterr. Bot. Zeitschr. 30: 150. 1880.

Billbergia enderi Regel, Gartenflora 35: 97, *pl. 1217.* 1886.

Quesnelia enderi Gravis & Wittm. Gartenflora 37: 195, *figs. 41–43.* 1888.

Rio de Janeiro: Serra dos Orgãos, *Brade* 16695 (RB, US); *Gardner* 694 (BM, K (GH neg. 2714)); *Glaziou* 2838 (P); *Ule* 4138 (R); *Wawra* II-315 (W, type); II-376 (W, type of *Quesnelia centralis* Wawra). Petrópolis, *Glaziou*

16439 (P); 16440 (P). Morro da Bandeira, near Petrópolis, *Glaziou* 14336 (P). Teresópolis, *Foster* 992 (GH, US). Sete Quedas, Teresópolis, *Brade* 9303 (R).

8. ***Quesnelia blanda*** (Schott ex Beer) Mez in Mart. Fl. Bras. 3, pt. 3: 383. 1892.

Bromelia blanda Schott ex Beer, Bromel. 43. 1857.

Quesnelia strobilispica Wawra, Oesterr. Bot. Zeitschr. 30: 149. 1880.

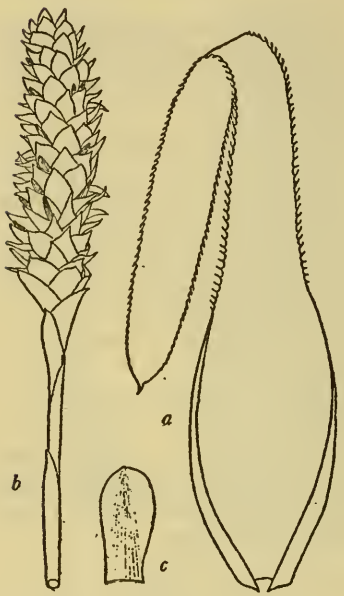

FIG. 113.

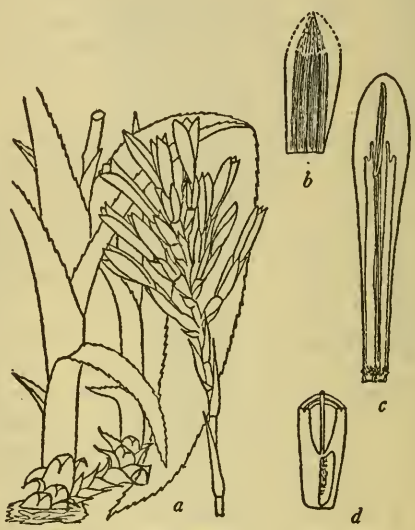

FIG. 114.

FIG. 113.—*Quesnelia edmundoi: a,* Leaf, × ¼; *b,* scape and inflorescence, × ¼; *c,* sepal, × 1.

FIG. 114.—*Quesnelia liboniana: a,* Habit (after Botanical Magazine) × ¼; *b,* sepal, × 1; *c,* petal and stamen, × 1; *d,* longitudinal section of ovary, × 1.

ESPÍRITO SANTO: Santa Teresa, *Foster* 272 (GH, R, US); 872 (GH). Mun. Castelo. Braço do Sul, *Brade* 19157 (RB, US).

MINAS GERAIS: Serra do Cipó, *Foster* 617 (GH).

RIO DE JANEIRO: Cantagallo, *Glaziou* 15483 (B, F neg. 11333); *Wawra* II-273 (W, type of *Quesnelia strobilispica* Wawra). Rio Paraíba, *Glaziou* 17820 (P).

DISTRITO FEDERAL: Cultivated (?), Quinta, *Glaziou* 16451 (P).

9. ***Quesnelia liboniana*** (De Jonghe) Mez, Bot. Archiv. 1: 66. 1922. FIGURE 114.

Billbergia liboniana De Jonghe, Journ. Hort. Prat. Belg. 9: 1, *pl. 1.* 1851.

BRAZIL: *Saint-Hilaire* (P). Morro Huniango, *Glaziou* 17284 (F). Cultivated, *Barry* 15 (BH); *Foster* 103 (GH); *Hennings* (US); *E. Morren* (GH); *Hort. Regimont.* (GH); *Reitz* 5653 (HBR).

Baía: *Wetherell* (! Mez).

Rio de Janeiro: Friburgo, *J. G. Kuhlmann* (RB). Restinga de Mauá, *Glaziou* 8015 (P). Meio da Serra, *Smith & Brade* 2294 (GH). Petrópolis to Raiz da Serra, *L. B. Smith* 1325 (B, GH, S). Correas, Petrópolis, *Goés & Constantino* 611 (RB, US). Serra dos Orgãos, *Ule* (R). Castelo de Agua, Serra dos Orgãos, *Pereira* 210 (RB). Teresópolis, *Sampaio* 2039 (R); 2308 (R).

Distrito Federal: Serra da Carioca, *Duarte* 150 (RB); *L. B. Smith* 2151 (GH). Corcovado, *Dusén* 15403 (S); *Glaziou* 9325 (P). Paineiras, Corcovado, *Glaziou* 9324 (P). Realengo, *Viana Freire* 399 (R). Rio de Janeiro, *Reitz* 5674 (HBR); *Schwacke* 23 (R). São Cristovão, *Lindman* A-1 (S). Tijuca, *Brade* 10412 (R); 22128 (R); *Foster* 23-A (GH, R, US); *Hoehne* (SP, GH neg. 7146); *Lutz* 1451 (R); *L. B. Smith* 2127 (GH); *Ule* 4045 (R); *Weddell* 704 (P).

10. ***Quesnelia morreniana*** (Baker) Mez, Engl. Pflanzenreich IV. 32:176. 1935.

Billbergia morreniana Baker, Handb. Bromel. 74. 1889.

Brazil: Described from living material at Kew. An unpublished plate by E. Morren at Kew is the only representation of the species now known.

11. ***Quesnelia indecora*** Mez in Mart. Fl. Bras. 3, pt. 3:384, *pl. 74.* 1892.

Brazil: *Saint-Hilaire* B-60 (P, GH neg. 2962); *Schott* 5506 (W, type); 5512 (! Mez). Cultivated, *Reitz* 4795 (HBR).

Minas Gerais: Serra do Caparao, *Brade* 17125 (RB); *Campos Porto* 1168 (RB). Ouro Preto, *Schwacke* 10488 (P). (Teixeira Soares), *Sampaio* 813 (R, US). Mun. Santa Barbara: Caraça, *Foster* 682 (GH, US).

12. ***Quesnelia augusto-coburgii*** Wawra, Oesterr. Bot. Zeitschr. 30:150. 1880.

Brazil: *Saint-Hilaire* (P).

Minas Gerais: Juiz de Fora, *Wawra* II-185 (W, type); II-196 (! Mez).

Rio de Janeiro: Itatiaia, *Brade* 10079 (R); *Foster* 120 (GH, R, US). Serra de José Vaz, near Rezende, *Glaziou* 7500 (P, GH neg. 2963).

31. *Billbergia* Thunb.

Billbergia Thunb. Decad. Pl. Brasil. 3:30. 1821.

Southern Mexico to Bolivia and northern Argentina.

It seems probable that in *Billbergia,* simple inflorescences have evolved from compound ones by reduction, and that the spirally recurved petals of subgenus *Helicodea* are an advanced character. The following species are arranged accordingly. Mez's subgenus *Jonghea* is merged with subgenus *Billbergia* since its characters are no better than specific.

1. Petals zygomorphic by position at anthesis and afterward erect and contorted; inflorescence either compound or simple..... Subgenus Billbergia
2. Inflorescence compound with obvious branches, at least at its base.
3. The inflorescence lepidote at least on the bracts or sepals.
4. Ovaries not more than twice as long as the upper floral bracts.

5. Floral axes glabrous; inflorescence compound nearly to its apex. 1. **B. sanderiana**
5. Floral axes minutely lepidote; inflorescence compound only near its base.
6. Upper scape-bracts imbricate; sepals narrowly elliptic; petals yellow-green except for the blue apex..... 2. **B. elegans**
6. Upper and lower scape-bracts shorter than the internodes; sepals broadly elliptic; petals wholly blue..... 3. **B. bradeana**
4. Ovaries several times as long as the upper floral bracts.
7. Inflorescence subcorymbose with the lower branches elongate; scape-bracts large, densely imbricate..... 4. **B. tweedieana**
7. Inflorescence longer than broad or the scape-bracts short and lax.
8. Ovaries, axes and sepals densely lepidote.
9. Sepals oblong, four times as long as wide..... 5. **B. pohliana**
9. Sepals elliptic, twice as long as wide..... 6. **B. laxiflora**
8. Ovaries and axes sparsely lepidote, sepals soon glabrous.
10. Scape-bracts remote; branches of the inflorescence elongate; petal-blades dark blue..... 7. **B. reichardtii**
10. Scape-bracts imbricate; branches of the inflorescence short; petals wholly green..... 8. **B. chlorantha**
3. Inflorescence completely glabrous.
11. Sepals with a soft setiform apex, oblong, 20–24 mm. long; petal-blades dark violet; flowers spreading; axes pale when dry; inflorescence usually pendulous. (Fig. 115.)..... 9. **B. vittata**
11. Sepals acute to emarginate or obtuse and apiculate but not setiform at the apex, narrowly elliptic, 20–30 mm. long; petal-blades dark blue or green or the two combined; flowers merely divergent; axes dark when dry; inflorescence erect.
12. Petal-blades blue at the apex only or wholly green. (Fig. 116.) 10. **B. amoena**
12. Petal-blades wholly blue..... 11. **B. buchholtzii**
2. Inflorescence simple or pseudosimple with very short one-flowered branches (distinguished by the apical floral bract).
13. The inflorescence completely glabrous.
14. Flowers sessile or on very short pedicels or branches.
15. Scape erect or ascending; inflorescence truly simple with sessile flowers.
16. Sepals 20–30 mm. long; inflorescence lax with divergent flowers in few rows.
17. Petal-blades blue at the apex only or wholly green. 10. **B. amoena**
17. Petal-blades wholly blue..... 11. **B. buchholtzii**
16. Sepals 13–15 mm. long; inflorescence dense with subspreading flowers in many rows..... 12. **B. horrida**
15. Scape decurved; inflorescence often pseudosimple with short one-flowered branches.
18. Floral bracts all large, acuminate. (Fig. 117.) 13. **B. iridifolia**
18. Floral bracts much reduced toward the apex of the inflorescence.
19. Petals blue at the apex or completely green; leaf-blades to 50 mm. wide. (Fig. 118.)..... 14. **B. distachia**

19. Petals blue on the margins; leaf-blades 6–17 mm. wide. (Fig. 119.) ..... 15. **B. nutans**

14. Flowers on long slender pedicels.

20. Petals blue on the margins; upper floral bracts minute; leaf-blades 6–17 mm. wide. (Fig. 119.) ..... 15. **B. nutans**

20. Petals blue at the apex only.

21. Upper floral bracts minute. (Fig. 120.) ..... 16. **B. minarum**

21. Upper floral bracts large, acuminate.

22. Sepals acute; leaves concolorous ..... 17. **B. lietzei**

22. Sepals broadly rounded and minutely apiculate; leaves marked with pale spots ..... 18. **B. leptopoda**

13. Inflorescence densely lepidote except for the petals.

23. Flowers sessile on the axis or at the ends of very short branches; sepals 10–18 mm. long.

24. Sepals 10 mm. long; inflorescence 20 cm. or longer, pendent, dense. 19. **B. brasiliensis**

24. Sepals 12–18 mm. long.

25. Inflorescence erect or suberect, truly simple with sessile suberect flowers, dense; petals mostly or wholly red. (Fig. 121.) 20. **B. pyramidalis**

25. Inflorescence pendent, generally pseudosimple at the base with flowers at the ends of very short branches; petals pale green below the apex.

26. Lower floral bracts bright red, large, ample, concealing most of the dense inflorescence; leaves concolorous. 21. **B. morelii**

26. Lower floral bracts roseate or more often almost white, small, narrow; leaves banded or spotted. ..... 22. **B. euphemiae**

23. Flowers on long slender pedicels; sepals 20–35 mm. long.

27. Leaves concolorous; axis of the erect inflorescence stout; sepals 24–35 mm. long ..... 23. **B. macrocalyx**

27. Leaves spotted or banded; axis of the inflorescence slender; sepals 20 mm. long.

28. Inflorescence erect; leaves transversely banded. (Fig. 122.) 24. **B. fosteriana**

28. Inflorescence pendent; leaves spotted ..... 25. **B. saundersii**

1. Petals spirally recurved at anthesis; inflorescence almost always simple; flowers sessile. (Fig. 123.) ..... Subgenus **Helicodea**

29. Sepals narrow, triangular or lance-triangular, more or less acuminate, 11–20 mm. long.

30. Floral bracts all exceeding the ovary, the lowest exceeding the sepals, ample; sepals 15–20 mm. long ..... 26. **B. meyeri**

30. Floral bracts shorter than the ovary or the lowest slightly exceeding it; sepals 11–14 mm. long.

31. Epigynous tube 3–4 times shorter than the ovary; sepals nearly or quite equal.

32. Inflorescence 3–4 dm. long, lax except near the apex; lower floral bracts equaling the ovary ..... 27. **B. rupestris**

32. Inflorescence not over 15 cm. long including the petals, subdense; floral bracts all minute ..... 28. **B. brachysiphon**

31. Epigynous tube as long as the ovary; sepals subequal. **29. B. oxysepala**

29. Sepals broad, oblong, ovate or elliptic, broadly acute to truncate or retuse, sometimes apiculate, 5–13 mm. long.

33. The sepals deeply retuse and apiculate, essentially tridentate, 11 mm. long; floral bracts minute; petals green; inflorescence elongate, lax. **30. B. alfonsi-joannis**

33. The sepals truncate to acute.

34. Ovary slightly or not at all sulcate, wholly white-farinose.

35. Petal-blades green, strongly spiralled; species of the Amazon Basin. **31. B. decora**

35. Petal-blades dark blue, only slightly spiralled, then contorted; species of eastern Brazil..... (19. **B. brasiliensis**)

34. Ovary sulcate with the ridges glabrous and dark.

36. The ovary broadly turbinate with large protuberances at the apex, much broader than the epigynous tube at anthesis. (Fig. 123.) **32. B. zebrina**

36. The ovary ellipsoid or subcylindric, lacking protuberances, slightly if at all wider than the epigynous tube at anthesis.

37. Floral bracts well developed, the lowest resembling the scape-bracts in size and shape..... 33. **B. magnifica**

37. Floral bracts all much reduced or even lacking.

38. Axis of the inflorescence farinose or flocculose at anthesis; sepals 5–10 mm. long.

39. Petals wholly green; scape and floral axis slender. **34. B. porteana**

39. Petals violet or blue, at least apically.

40. Sepals broadly rounded and apiculate; floral axis stout. **35. B. cylindrostachya**

40. Sepals acute; floral axis slender..... 36. **B. kuhlmannii**

38. Axis of the inflorescence glabrous at anthesis; sepals 8–13 mm. long; petals green with blue apices..... 37. **B. rubicunda**

Subgenus *Billbergia*

1. ***Billbergia sanderiana*** E. Morr. Belg. Hortic. 34: 17, *pls. 1, 2.* 1884.
Billbergia amoena sensu L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: *pl. 102.* 1943.

Brazil: Cultivated, *Glaziou* 15477 (P); *Hort. Liége* (GH); *Sander* 1 (LG, type).

Espírito Santo: Santa Teresa, *Foster* 305 (GH, US).

Minas Gerais: *Handro* (SP, US); *Hoehne* (SP). Serra de Rola Moça, near Belo Horizonte, *Foster* 526 (GH).

Rio de Janeiro: Serra de Nova Friburgo, *Glaziou* 2731 (P). Teresópolis, *Bessa & Sampaio* 2696 (R).

Distrito Federal: Cultivated (?), São Cristovão, *Glaziou* 16430 (K, GH neg. 2720).

2. ***Billbergia elegans*** Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1265. 1830.

Minas Gerais: Itabira, *Weddell* (P). Serra de Caraça, *Saint-Hilaire* (P). Pico de Itacolomi, near Vila Rica, *Martius* (M, type); *Sellow* 79 (P); 1099 (B, F neg. 11338). Ouro Preto, *Glaziou* 12229 (P). Mun. Nova Lima: Serra da Mutuca, *Williams* 5615 (GH); 5622 (GH).

3. ***Billbergia bradeana*** L. B. Smith, Arquiv. Jard. Bot. Rio de Janeiro 10: 143, *fig. 3.* 1950.

Espírito Santo: Mun. Castelo: Forno Grande, *Brade* 19720 (US, type (US neg. 3518, 3519), RB).

4. ***Billbergia tweedieana*** Baker, Handb. Bromel. 73. 1889.

1. Sepals broadly rounded or subtruncate.
   2. Sepals 16–20 mm. long, three times as long as wide; plant to 2 m. high. Var. a. **tweedieana**
   2. Sepals not over 13 mm. long, about twice as long as wide. Var. b. **latisepala**
1. Sepals acute, 24 mm. long; plant small..... Var. c. **minor**

4a. ***Billbergia tweedieana*** var. ***tweedieana***

Brazil: Cultivated, *Ule* (R).

Espírito Santo: Vitória, *Foster* 183 (GH); 868 (GH, US).

Distrito Federal: Rio de Janeiro, *Tweedie* 1313 (K, type, GH neg. 2719).

4b. ***Billbergia tweedieana*** var. ***latisepala*** L. B. Smith, p. 22.

Rio de Janeiro: Cantagallo, *Glaziou* 15476 (GH, type (US neg. 4215), P).

4c. ***Billbergia tweedieana*** var. ***minor*** L. B. Smith, p. 22.

Espírito Santo: Santa Teresa, *Foster* 277 (GH, type (US neg. 4216), R).

5. ***Billbergia pohliana*** Mez in Mart. Fl. Bras. 3, pt. 3: 403, *pl. 78.* 1892.

Brazil: *Pohl* 5508 (W, type).

Minas Gerais: Coronel Pacheco, *Heringer* (SP, US neg. 4253).

6. ***Billbergia laxiflora*** L. B. Smith, Arquiv. Jard. Bot. Rio de Janeiro 10: 145, *fig. 5.* 1950.

Espírito Santo: Mun. Castelo: Braço do Sul, *Brade* 19174 (RB, type, US neg. 3258).

7. ***Billbergia reichardtii*** Wawra, Oesterr. Bot. Zeitschr. 30: 115. 1880.

Espírito Santo: Guiomar, *Foster* 941 (GH).

Minas Gerais: Juiz de Fora, *Wawra* II-197 (W, type). Juiz de Fora to Serra de Mantiqueira, *Warming* 2172 (C, F neg. 22320).

8. ***Billbergia chlorantha*** L. B. Smith, Contr. Gray Herb. 154: 32, *pl. 3, figs. 3–6.* 1945.

Espírito Santo: Santa Teresa, *Foster* 287 (GH, type, US neg. 4059).

9. ***Billbergia vittata*** Brongn. ex Morel, Portef. Hort. 2: 353, *pl.* 1848. Figure 115.

Billbergia zonata Hort. Makoy Catal. 1850.

Brazil: Cultivated, *Morel* (P, type, GH neg. 2940); *Regel* (GH).

Espírito Santo: Santa Teresa, *Foster* 249 (GH).

Minas Gerais: Belo Horizonte, *Foster* 1217 (GH, US). Serra do Cipó, near Belo Horizonte, *Foster* 643 (GH); 1218 (GH). Santa Luzia, Serra do Cipó, *Sampaio* 6905 (R). Mun. Caete: Serra de Piedade, *Foster* 574 (GH). Mun. Conceição: Serra do Cipó, *Foster* 644 (GH, US). Mun. Jaboticatubas: Palacio, Serra do Cipó, *Smith & Mus. R* 6753 (US); 6754 (US). Mun. Nova Lima: Lagoa Grande, Serra de Mutuca, *Williams & Assis* 5786 (GH).

Rio de Janeiro: Itatiaia, *Foster* 125 (GH).

DISTRITO FEDERAL: Cultivated (?), Quinta, *Glaziou* 16424 (P). Rio de Janeiro, *Glaziou* 14339 (K, GH neg. 2718).

10. ***Billbergia amoena*** (Lodd.) Lindl. Bot. Reg. 13: sub *pl. 1068.* 1827.

1. Sepals green except for the dark blue apex.
   2. Petals dark blue at apex, elsewhere green..... Var. a. **amoena**
   2. Petals wholly green..... Var. b. **viridis**
1. Sepals red toward apex..... Var. c. **minor**

10a. ***Billbergia amoena*** var. ***amoena.*** FIGURE 116.

Tillandsia amoena Lodd. Bot. Cab. 1: *pl. 76.* Oct. 1818.

Bromelia pallida Ker, Bot. Reg. 4: *pl. 344.* Dec. 1818.

Tillandsia variegata Vell. Fl. Fluminensis 134. 1825; Icon. 3: *pl. 132.* 1835.

Billbergia pallida Beer, Bromel. 121. 1857.

Billbergia pallescens C. Koch & Bouché, Ind. Sem. Hort. Berol. for 1856, App.: 5. 1857.

Billbergia speciosa sensu Baker, Handb. Bromel. 73. 1889. Not Thunb. 1821.

Billbergia wiotiana De Jonghe ex Mez, Repert. Sp. Nov. 14: 241. 1916.

Billbergia wacketii Mez, Repert. Sp. Nov. 16: 7. 1919.

BRAZIL: *Saint-Hilaire* 149 (P); *Sellow bromel.* 34 (P). Praia de Fora, *Glaziou* 13254 (P). Cultivated, *Hort. Liége* (LG); *Lindley* (CGE); *Lindman* A-5 (S); *Platzmann* (B, *Billbergia wiotiana* De Jonghe, F neg. 11345); *Hort. Regimont.* (GH, isotype of *Billbergia wacketii* Mez); *Ule* (R).

BAÍA: Iturassu to Jequié, *Foster* 2447 in part (US).

ESPÍRITO SANTO: Santa Teresa, *Foster* 1219 (GH); 1220 (GH). Vitória, *Foster* 189 (GH, US); 190 (R); 199 (GH, R); 876 (GH). Mun. Cachoeiro de Itapemirim: Vargem Alta, Morro do Sal, *Brade* 19321 (RB, US).

MINAS GERAIS: Catas Altas, *Saint-Hilaire* C-270 (P). Serra do Cipó, *Foster* 606 (GH). Km. 148, Serra do Cipó, *Melo Barreto* 8324 (R). Serra de Ouro Preto, *Ule* (R). Mun. Santa Barbara: Caraça, *Foster* 683 (GH).

GOIÁS: Serra Geral, eastern Goiás, *Luetzelburg* (! Mez).

RIO DE JANEIRO: Ariró, *Glaziou* 2733 (P). Barra de São José to Campos Novos, *Pereira & Araujo* 508 (RB). Cantagallo, *Glaziou* 15478 (P); 16435 (P). Itatiaia, *Luetzelburg* (! Mez). Niteroi, *Smith & Brade* 2349 (B, F, GH, S). Serra dos Orgãos, *Luetzelburg* (! Mez). Petrópolis, *Foster* 332 (GH, US). Teresópolis, *Foster* 975 (GH, US). Guarani, Teresópolis, *Brade* 9581 (R). Mun. Cabo Frio: Praia do Pontal, *Smith & Mus. R* 6596 (US).

DISTRITO FEDERAL: Campo Grande, *Lutz* (R). Quinta da Boa Vista, *Glaziou* 14335 (P, US). Recreio dos Bandeirantes, *Emygdio* 496 (R); *Lutz* 617 (GH, US); 902 in part (R). Rio de Janeiro, *Gaudichaud* 364[3] (P); 364[4] (P); *Reitz* 4027 in part (HBR). São Cristovão, *Glaziou* 16433 (P). Tijuca, *Ule* 4177 (R). Praia de Sernambetiba, L. B. *Smith & Mus. R* 6822 (US).

SÃO PAULO: Alto da Serra, *Foster* 361 (GH); *Gehrt* (SP, GH neg. 7150); *Hoehne* (SP). Bertioga, Santos, *Hoehne & Gehrt* (GH, SP). Boracéa, *Blanco* (GH, IAC). Jaraguá, *Gehrt* (SP). Patrimonio, *Kuhlmann & Kühn* (SP). Pindamonhangaba, *Aragão in Reitz* 4045 (HBR). Santos,

Everett (GH). Iguapé, Santos, *Hoehne* (SP, GH neg 7147). Rio Tijuco, *Foster* 463 (GH, US). Tremembé, *Doering* (SP). Una, *Foster* 386 (GH, R).

PARANÁ: Caiobá, *Foster* 442 (GH, R). Morro Taguá, Caiobá, *Stellfeld & Freitas* 539 (Paran.). Desvio Ipiranga, Serra do Mar, *Dusén* 8224 (S, US). Paranaguá, *M. Kuhlmann* (SP). Serra da Prata, *Dusén* 15305 (GH, S); 17053 (S).

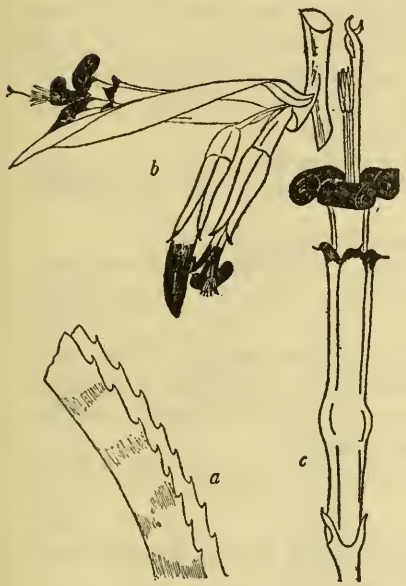

FIG. 115.

FIG. 116.

FIG. 115.—*Billbergia vittata: a,* Section of leaf, × ½; *b,* branch of inflorescence, × ½; *c,* flower, × 1. (All after Belgique Horticole.)

FIG. 116.—*Billbergia amoena* var. *amoena: a,* Upper habit (after Botanical Cabinet) × ½; *b,* sepal, × 1; *c,* base of petal, × 2.

SANTA CATARINA: Blumenau, *Reitz* 4064 (HBR); *Schwacke* 56 (R). Mun. Brusque: Azambuja, *Reitz* 1803 (HBR, US). Brusque, *Reitz* 4022 (HBR); 4032 (HBR). Ribeirão do Ouro, *Reitz* 3558 (HBR); 4033 (HBR). Mun. Jaraguá do Sul: Corupá, *Reitz* 4036 (HBR). Mun. São Francisco do Sul: São João, *Hatschbach* 2771 (US).

10b. ***Billbergia amoena*** var. ***viridis*** L. B. Smith, p. 20.

ESPÍRITO SANTO: Santa Teresa, *Foster* 246 (GH, type; US).

10c. ***Billbergia amoena*** var. ***minor*** (Antoine & Beer ex Beer) L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 104. 1943.

Billbergia speciosa Thunb. Dec. Pl. Brasil. 3: 30, *pl.* 1821.

Billbergia pyramidalis var. *minor* Antoine & Beer ex Beer, Bromel. 108. 1857.

Billbergia variegata sensu E. Morr. Belg. Hortic. 31:73. 1881. Not Schult. 1830.

Billbergia thunbergiana Hort. ex Baker, Handb. Bromel. 73. 1889.

Billbergia binotii Gerard, Journ. Soc. Hort. Rhône for 1896: 1. 1896.

Brazil: Cultivated, *Foster* (US).

Minas Gerais: Pico da Piedade near Belo Horizonte, *Foster* 575 (GH, US neg. 4058).

11. ***Billbergia buchholtzii*** Mez, Repert. Sp. Nov. Fedde 16:7. 1919.

Brazil: Cultivated, *Atkinson* 44 (US); *Missouri Bot. Gard.* (GH); *New York Bot. Gard.* (US); *Strauss* (B, type; F neg. 11335).

12. ***Billbergia horrida*** Regel, Ind. Sem. Hort. Petrop. for 1856: 17. 1857.

Billbergia horrida var. *tigrina* Hort. ex Baker, Handb. Bromel. 73. 1889.

Brazil: Cultivated, *New York Bot. Gard.* (US).

Espírito Santo: Santa Teresa, *Foster* 253 (GH); 286 (GH).

Minas Gerais: Dist. Ilheu, *Mexia* 4967 (GH, US). Juiz de Fora, *Hoehne* 26 (SP).

Rio de Janeiro: Serra de Estrella, *Brade & Kuhlmann* 13106 (RB).

Distrito Federal: Corcovado, *Glaziou* 12224 (P). Furnas, *Brade & Duarte* 18587 (RB). Cultivated (?), Quinta, *Glaziou* 16425 (P). Cultivated (?), São Cristovão, *Glaziou* 15479 (F).

13. ***Billbergia iridifolia*** (Nees & Mart.) Lindl. Bot. Reg. 13: *pl. 1068.* 1827.

1. Petals blue at apex, elsewhere pale yellow..... Var. a. **iridifolia**
1. Petals wholly pale yellow..... Var. b. **concolor**

13a. ***Billbergia iridifolia*** var. ***iridifolia.*** Figure 117.

Bromelia iridifolia Nees & Mart. Nova Acta Acad. Leop. Carol. 11:16. 1823.

Brazil: *Freyreis* (S).

Baía: Conquista, southwestern Baía, *Torrend* (FF Bahia). Felisberto, near Ilheus, *Wied-Neuwied* (BR, type, GH neg. 2797).

Espírito Santo: Serra da Caparao, *Mexia* 4046 (GH, UC). Linhares, *Foster* 776 (GH). Reeve, *Vidal* 3 (R). Mun. Collatina: Monte Claro, *Foster* 215 (GH, US).

Minas Gerais: Fazenda da Tabunha, Dist. Ilheu, *Mexia* 4975-a (UC); 4978-a (GH); 4998-a (GH). Mun. Guanhaes: Jacu, *Melo Barreto* 2105 (R).

Rio de Janeiro: Cabo Frio, *Brade* 12765 (GH, RB). Campos, *Sampaio* 8359 (R). Cantagallo, *Glaziou* 15475 (US). Serra da Estrella, *Glaziou* 16432 (F). Imbui, Niteroi, *Brade* 11057 (GH, R).

Distrito Federal: Serra da Carioca, *Pereira* 14 (RB). Gavea, *Wittig in Glaziou* 12228 (P, US). São Cristovão, *Glaziou* 16431 (P).

13b. ***Billbergia iridifolia*** var. ***concolor*** L. B. Smith, p. 21.

Espírito Santo: Itapemirim, *Foster* 160 (GH, type, US neg. 4275). Vitória, *Foster* 873 (GH, US).

14. ***Billbergia distachia*** (Vell.) Mez in Mart. Fl. Bras. 3, pt. 3:417. 1892. As "distacaia."

1. Leaves concolorous.
2. Sepals blue at the apex.
3. Petals blue at the apex..... Var. a. **distachia**
3. Petals wholly green..... Var. b. **straussiana**

2. Sepals and petals wholly green..... Var. c. **concolor**
1. Leaves flavous-spotted..... Var. d. **maculata**

14a. ***Billbergia distachia*** var. ***distachia***. FIGURE 118.
Tillandsia distachia Vell. Fl. Fluminensis 136. 1825.
Tillandsia distaceia Vell. Fl. Fluminensis Icon. 3: *pl. 141.* 1835.
Billbergia ensifolia Baker, Handb. Bromel. 74. 1889.
Billbergia burchellii Baker, Handb. Bromel. 76. 1889.

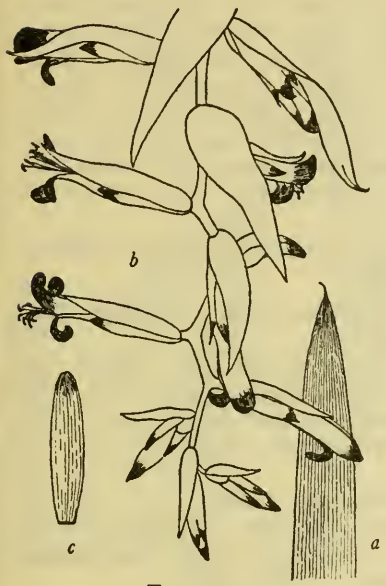

FIG. 117.

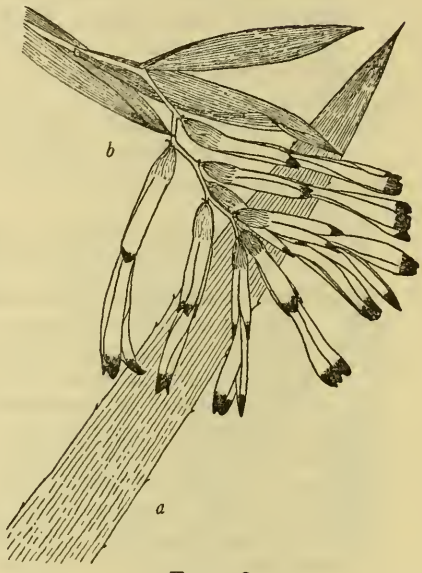

FIG. 118.

FIG. 117.—*Billbergia iridifolia* var. *iridifolia: a,* Apex of leaf, × ½; *b,* inflorescence (after Sertum Botanicum), × ½; *c,* sepal, × 1.
FIG. 118.—*Billbergia distachia* var. *distachia: a,* Apex of leaf, × ½; *b,* inflorescence, × ½.

Billbergia bakeri sensu Lindm. Svensk. Akad. Handl. 24: no. 8: 34, *pl. 8, figs. 47–50.* 1891.
Billbergia caespitosa Lindm. Svensk. Akad. Handl. 24: no. 8: 35, *pl. 8, figs. 41–46.* 1891.
? *Billbergia regeliana* Mez, Repert. Sp. Nov. Fedde 14: 243. 1916.

BRAZIL: *Sellow* bromel. 4 (US); 78 (P); 81 (P); *Widgren* (S). Rio de Janeiro or Minas Gerais, *Glaziou* 16437 (B, isotype of *Billbergia ensifolia* Baker, F neg. 11337). Ruiz Jordão near Rio Gelado, *Glaziou* 13255 (P). Cultivated, *Hort. Regimont* (GH); *Strauss* (B, F neg. 11342); *Ule* 546 (R).

MINAS GERAIS: Caldas, *Lindberg in Regnell* 564 (S); *Mosén* 757 (S); *Regnell* I-438 1/2 (S, US). Palmira, *Brade* 15920 (RB).

RIO DE JANEIRO: Itatiaia, *Brade* 10078 (R); *Dusén* 721 (R); 724 (R); *Fostet* 136 (GH, R); *Rose & Russell* 20587 (US); *L. B. Smith* 1628 (GH).

DISTRITO FEDERAL: Barra da Tijuca, *Reitz* 4755 (! Reitz). São Cristovão, *Glaziou* 12227 (P).

SÃO PAULO: Serra da Bocaina, *Duarte & Brade* 21196 (RB). Campinas, *Mosén* 3930 (S); *Novaes* 1207 (US); *Viegas* (SP); *Zagatto* (IAC). Campos do Jordão, *Campos Porto* 3362 (RB); *Eugenio* 3506 (GH); *Hoehne* (SP). Serra da Caracol, *Mosén* 1728 (S). Cotia to Una, *M. Kuhlmann* (GH, SP). Fonte Sanatoria, *Foster* 389 (GH). Itapira, *Hoehne* (GH, SP). Limeira, *Santos Pires* (SP). Monte Alegre do Sul, *Kuhlmann & Kühn* 1813 (SP). Taubaté, *Loefgren & Edwall* (GH, SP). Una, *Foster* 388 (GH). Mun. Amparo: Monte Alegre, *M. Kuhlmann* 512 (SP). Mun. Oleo: *Edwall* (SP). Mun. São Paulo: Butantã, *Hoehne* (GH, SP). Observatorio, *Foster* 351 (GH, R). Orchidario, *Foster* 341 (R). Santo Amaro, *Krieger* 180 (SP). São Paulo, *Edwall* (SP); *Foster* 1130 (GH).

PARANÁ: Carvalho, *Dusén* 12188 (S). Curitiba, *Foster* 458 (GH, R); 460 (GH); *M. Kuhlmann* (SP, US). Jaguariaíva, *Dusén* (S); 10056 (S, US). Pinhaes, *Dusén* (S, US). Mun. Piraquara: Pinhal, *Hatschbach* 1443 (US).

SANTA CATARINA: Ribeirão Grande, Taió, *Reitz* 4034 (HBR); 4060 (HBR). Mun. Biguaçú: Fachinal, *Reitz* 4096 (HBR).

14b. ***Billbergia distachia*** var. ***straussiana*** (Wittm.) L. B. Smith, Anais Bot. Herb. Barbosa Rodrigues 2: 13. 1950.

Billbergia pallescens sensu Baker, Bot. Mag. 104: *pl. 6342.* 1878.

Billbergia bakeri E. Morr. Belg. Hortic. 30: 166, *pl. 8.* 1880.

Billbergia bakeri var. *straussiana* Wittm. Gartenzeit. 4: 487. 1885.

BRAZIL: Cultivated, *E. Morren* (LG); *Hort. Regimont.* (GH).

SÃO PAULO: Bragança, *Duarte* (SP).

PARANÁ: Guaratuba, *Inst. Malariologia in Reitz* 3594 (HBR).

SANTA CATARINA: Mun. Araquari: Barra do Sul, *Reitz & Klein* 780 (HBR, US). Inferninhos, *Reitz* 4035 (HBR). Mun. Pôrto Belo: Canto Grande, *Reitz* 3626 in part (HBR); 3705-a (HBR); 4039 (HBR).

14c. ***Billbergia distachia*** var. ***concolor*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 33. 1952.

SANTA CATARINA: Mun. Biguaçú: Fachinal, *Reitz* 4152 (HBR, type). Mun. Palhoça: Anitápolis, *Reitz* 4535 (HBR).

14d. ***Billbergia distachia*** var. ***maculata*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 33. 1952.

SANTA CATARINA: Mun. Pôrto Belo: Canto Grande, *Reitz* 4763 (HBR, type).

15. ***Billbergia nutans*** H. Wendland ex Regel, Gartenflora 18: 162, *pl. 617.* 1869.

1. Leaves serrulate; petals green at extreme apex..... Var. a. **nutans**
1. Leaves entire; petals blue at apex as well as margins. Var. b. **schimperiana**

15a. ***Billbergia nutans*** var. ***nutans.*** FIGURE 119.

Billbergia linearifolia Baker, Handb. Bromel. 72. 1889.

Billbergia bonplandiana Gaud. ex Mez in Mart. Fl. Bras. 3, pt. 3: 421, *pl. 76.* 1892.

? *Billbergia minuta* Mez, Repert. Sp. Nov. 14: 244. 1916.

BRAZIL: *Sellow* bromel. 60 (P); bromel. 77 (P); 4001 (B, F neg. 11334). Cultivated, *Regimont.* (GH); *Vratislaw* (GH).

DISTRITO FEDERAL: Cultivated (?), Quinta, *Glaziou* 16436 (P). Cultivated (?), São Cristovão, *Glaziou* 11678 (P).

PARANÁ: *Tessmann* (US). Alto da Serra, *Foster* 408 (GH). Castro, Socavão, *Stellfeld* (Paran). Curitiba, *Foster* 461 (GH, R). Iguaçu, *J. G. Kuhlmann* (RB). Jaguariaíva, *Dusén* 15196 (GH, S); 16733 (S). Pato Branco, *Reitz* 4694 (! Reitz). Pinhaes, *Dusén* 17695 (GH, S). Rio Negro, *Dusén* 6968 (S); *Hoehne* (SP). Tibagi, *Reiss* 58 (GH, US). Vila Velha, *Foster* 423 (GH).

FIG. 119.

FIG. 120.

FIG. 119.—*Billbergia nutans* var. *nutans: a,* Scape and inflorescence, × ½; *b,* sepal, × 1; *c,* petal and stamen, × 1.

FIG. 120.—*Billbergia minarum: a,* Leaf-blade, × ½; *b,* inflorescence (after M. B. Foster) × ½; *c,* sepal, × 1; *d,* petal and stamen, × 1; *e,* longitudinal section of ovary, × 1.

SANTA CATARINA: Mun. Chapecó: Itapiranga, *Reitz* 4156 (HBR).

RIO GRANDE DO SUL: Kapesberg, near Montenegro, *Rambo* (LIL, US). Nova Wurtemburg, *Bornmueller* 564 (GH). Pareci Novo, *Sehnem* 1548 (LIL). Reutersberg, Dois Irmãos, *Rambo* (IAN). Santo Angelo, *Lindman* A-1087 (S). São Salvador, *Eugenio* (GH); *Sehnem* 2068 (LIL). Silveira Martins, *Lindman* A-1381 (S); A-1393 (S).

ALSO: URUGUAY, PARAGUAY, ARGENTINA.

15b. ***Billbergia nutans*** var. ***schimperiana*** (Wittm. ex Baker) Mez in DC. Monogr. Phan. 9: 328. 1896.

Billbergia schimperiana Wittm. ex Baker, Handb. Bromel. 79. 1889.

Billbergia nutans var. *schimperiana* forma *rupestris* Hassler, Ann. Conserv. & Jard. Bot. Genève 20: 297. 1919.

SANTA CATARINA: Corupá, *Reitz* 4756 (! Reitz); *Reitz & Klein* 800 (HBR, US); *Seidel* 4042 (HBR).
ALSO: PARAGUAY.

16. ***Billbergia minarum*** L. B. Smith, p. *22*, fig. 120.
MINAS GERAIS: Gobernador Valadores, Figueiro, Rio Doce, *Foster* 766 (GH, type, US neg. 4056).

17. ***Billbergia lietzei*** E. Morr. Belg. Hortic. 31: 97, *pls. 5–7.* 1881.
BRAZIL: Cultivated, *Lietze* 6 (LG, type).

18. ***Billbergia leptopoda*** L. B. Smith, Contr. Gray Herb. 154: 33, *pl. 3, figs. 7, 8.* 1945.
BRAZIL: Cultivated, *Foster* (US).
ESPÍRITO SANTO: Santa Teresa, *Foster* 304 (GH).
MINAS GERAIS: Gobernador Valadores, Figueira, Rio Doce, *Foster* 765 (GH, type, US neg. 4060).

19. ***Billbergia brasiliensis*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 105. 1943.
Billbergia leopoldii Linden ex Houllet, Rev. Hortic. 41: 87, *fig. 21.* 1869. Not C. Koch. 1857.
DISTRITO FEDERAL: Tijuca, *Glaziou* 16421 (K, GH neg. 2717).

20. ***Billbergia pyramidalis*** (Sims) Lindl. Bot. Reg. 13: sub *pl. 1068.* 1827.
1. Petals blue toward apex, red elsewhere..... Var. a. **pyramidalis**
1. Petals red throughout..... Var. b. **concolor**

20a. ***Billbergia pyramidalis*** var. ***pyramidalis.*** FIGURE 121.
Bromelia pyramidalis Sims, Bot. Mag. 42: *pl. 1732.* 1815.
Billbergia pyramidalis var. *bicolor* Lindl. Bot. Reg. 14: *pl. 1181.* 1828.
Billbergia thyrsoidea Mart. ex Schult. in R. & S. Syst. 7, pt. 2: 1260. 1830.
Billbergia longifolia C. Koch & Bouché, Ind. Sem. Hort. Berol. for 1856, App.: 5. 1857.
Billbergia thyrsoidea var. *"B." longifolia* Baker, Handb. Bromel. 71. 1889.
BRAZIL: *Blanchet* (G); *Widgren* 1015 (S). Cultivated, *Lindman* A-25 (S); *Rosa* (R).
BAÍA: Serra das Almas, central Baía, *Luetzelburg* (! Mez). Santa Amaro, eastern Baía, *Luetzelburg* (! Mez).
RIO DE JANEIRO: Frade de Macaé, *Brade* 15836 (RB). Itatiaia, *Luetzelburg* (! Mez). Niteroi, *Foster* 1034 (GH). Serra dos Orgãos, *Brade* 12083 (GH, R); *Luetzelburg* (! Mez); *Ule* (R). Pico Magestoso, Serra dos Orgãos, *Pereira* 255 (RB). Petrópolis, *Diogo* 431 (R); *Sampaio* 7792 (R). Serra da Estrela, Petrópolis, *Diogo* 498 (R). Old road below Petrópolis, *Smith & Mus. R* 6495 (US). (Represa São Pedro), *Brade* 10825 (R). Suruí, *Foster* 20-A (GH, R). Teresópolis, *Brade* 9681 (R); *Sampaio* 1710 (R); 2094 (R). Ubá, *Saint-Hilaire* A^2-546 (P).
DISTRITO FEDERAL: Corcovado, *Apparicio & Rizzini* 3 (RB); *Glaziou* 2729 (P). Pedra Dois Irmãos, *L. B. Smith* 2146 (B, BA, BM, F, GH, K, P, S, US). Engenho Novo, *Glaziou* 11690 (F). Realengo, *Freire* 402 (R); 403 (R). Rio de Janeiro, *Gaudichaud* (P); *Glaziou* 12226 (P); *Regnell* 211-a (S); 211-b (S); *Reitz* 4026 (HBR); 4475 (HBR); *Wilkes Expedition* (GH). Tijuca, *Glaziou* 3128 (P); *Hoehne* 175 (GH, SP). Barra da Tijuca, *Brade* 15483 (RB).

20b. ***Billbergia pyramidalis*** var. ***concolor*** L. B. Smith, Bromel. Soc. Bull. 4:6. 1954.

Billbergia thyrsoidea sensu Lindl. Paxton Fl. Gard. 3: *pl. 74.* 1852–53. Not Mart. 1830.

Billbergia paxtonii Beer, Bromel. 113. 1857.

BRAZIL: Cultivated, *Barry* (GH, type, US neg. 4062).

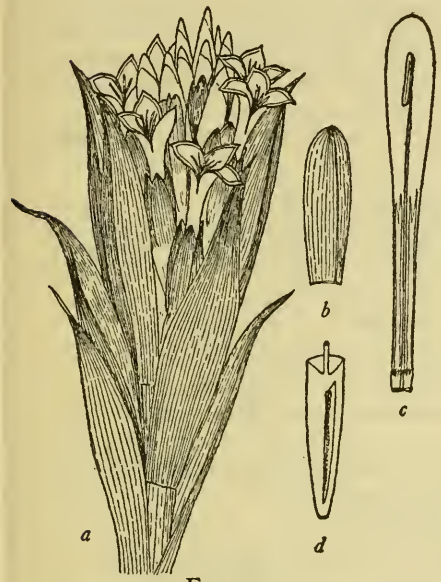

FIG. 121.

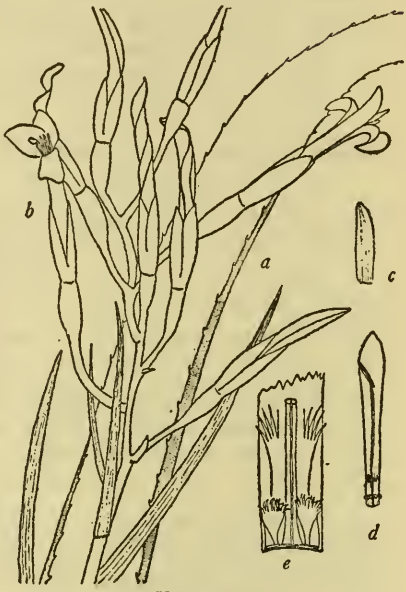

FIG. 122.

FIG. 121.—*Billbergia pyramidalis* var. *pyramidalis: a,* Inflorescence (After Botanical Magazine), × ½; *b,* sepal, × 1; *c,* petal and stamen, × 1; *d,* longitudinal section of ovary, × 1.

FIG. 122.—*Billbergia fosteriana: a,* Leaf-blade, × ½; *b,* inflorescence, × ½; *c,* sepal, × ½; *d,* petal and stamen, × ½; *e,* base of petal, × 2. (All after M. B. Foster.)

21. ***Billbergia morelii*** Brongn. Portef. Hort. 2:97, *pl.* 1848.

PERNAMBUCO: Tapera, *Pickel* 931 (IPA).

BAÍA: *Foster* 2448 (US). Cultivated, *Porte* (P, type, GH neg. 2941). Rio Grungogi, *Curran* 127 (US).

ESPÍRITO SANTO: Mun. Cachoeiro de Itapemirim: Vargem Alta, *Brade* 19964 (RB, US). Mun. Castelo: Braço do Sul, *Brade* 19202 (RB).

RIO DE JANEIRO: Cantagallo, *Peckolt* (BR, GH neg. 2796).

DISTRITO FEDERAL: Cultivated, Quinta da Boa Vista, *Glaziou* 16438 (P).

SÃO PAULO: Alto da Serra, *Handro* (SP, GH neg. 3374).

22. ***Billbergia euphemiae*** E. Morr. Belg. Hortic. 22:11, *pls. 1, 2.* 1872.

1. Leaves with pale cross-bands or nearly concolorous.
   2. Inflorescence lax or sublax; axis geniculate; lower floral bracts like the scape-bracts..... Var. a. **euphemiae**

2. Inflorescence subdense; axis nearly straight; floral bracts all minute or only the lowest large..... Var. b. **nudiflora**

1. Leaves pale-spotted but not banded..... Var. c. **saundersioides**

22a. ***Billbergia euphemiae*** var. ***euphemiae***

Brazil: Cultivated, *Atkinson* 22 (BH); *Barry* (GH); *Hort. Liége* (LG, ? type); *Ule* (R).

Espírito Santo: Cobiça, *Foster* 895 (GH). Collatina, Monte Claro, *Foster* 231 (GH). Estrada da Colonia, 61 km. from Collatina, *J. G. Kuhlmann* 311 (RB). Domingos Martins, *Foster* 238 (GH). Santa Teresa, *Foster* 250 (GH). Vitória, *Foster* 184 (GH, R, US). Mun. Cachoeiro de Itapemirim: Pedra Branca, *Brade* 19381 (RB). Vargem Alta, Corrego d'Ouro, *Brade* 19409 (RB). Mun. Castelo: Forno Grande, *Brade* 19232 (RB, US).

Rio de Janeiro: Campos, *Sampaio* 8561 (R). Sertão de Cacimbas, right bank of Rio Ita, *Sampaio* 1004 (R).

22b. ***Billbergia euphemiae*** var. ***nudiflora*** L. B. Smith, p. 20.

Espírito Santo: Cachoeiro de Itapemirim, *Foster* 969 (GH, US). Itapemirim, *Foster* 159 (GH, type; R). Monte Claro, Collatina, *Foster* 217 (GH, US).

Minas Gerais: Coronel Pacheco, *Heringer* 1159 (SP).

22c. ***Billbergia euphemiae*** var. ***saundersioides*** L. B. Smith, p. 21.

Baía: Jequié, *Foster* 2458 (US). Maracás, *Foster* 2470 (US, type).

23. ***Billbergia macrocalyx*** Hook. Bot. Mag. 85: *pl. 5114.* 1859.

Billbergia quintusiana Wittm. Gartenflora 39: 202, *fig. 49.* 1890.

Brazil: Cultivated, *Cutak* (GH).

Minas Gerais: Belo Horizonte, *Foster* 542 (GH, (US neg. 4057), US).

24. ***Billbergia fosteriana*** L. B. Smith, p. 21, fig. 122.

Baía: Maracás, *Foster* 2447 in part (US, type).

25. ***Billbergia saundersii*** Hort. Bull. ex Dombrain, Floral Mag. new ser. *pl. 106.* 1874.

Billbergia saundersii Hort. Bull. ex C. Koch, Wochenschr. 12: 116. 1869, nomen.

Brazil: Cultivated, *Atkinson* (GH); *Cutak* (US).

Baía: Agua Preta, *Foster* 48 (GH (US neg. 4061), R).

Subgenus *Helicodea* (Lem.) Baker

26. ***Billbergia meyeri*** Mez, Bot. Jahrb. 30: 148. 1902.

Billbergia leucantha Hoehne in Comm. Linh. Telegr. Estrat. Matto-Grosso [Publ. 47], Annexo 5, Bot. pt. 9: 8, *pl. 160.* 1919.

Minas Gerais: Mun. Ituiutaba: Cachoeira Dourada, *Macedo* 3223 (US).

Mato Grosso: Buritizinho, near Serra Itapirapuã, *Lindman* A-2919 (S). Rio Coxim, *Hoehne in Rondon* 3554 (R, type of *Billbergia leucantha* Hoehne); 3555 (R). Mato do Curupira, *Lindman* A-3043 1/2 (S). Upper Rio Kuliseu, *Pilger* 705 (B, type, F neg. 11340). Palmeiras, *Lindman* A-2593 (S).

São Paulo: Itapura, Rio Tietê, *Foster* 1102 (GH, US).

27. ***Billbergia rupestris*** L. B. Smith, Caldasia [1], No. 5: 6, *fig. 1.* 1942.

Acre: Rio Macauã on the Rio Iaco, basin of the Rio Purus, *Krukoff* 5647 (GH, NY).

Also: Colombia.

28. ***Billbergia brachysiphon*** L. B. Smith, Arquiv. Jard. Bot. Rio de Janeiro 10: 142, *fig. 2.* 1950.

MATO GROSSO: Papagaios, Upper Rio Jamari, *J. G. Kuhlmann* (US, type (US neg. 3513), R, RB).

29. ***Billbergia oxysepala*** Mez, Bull. Herb. Boiss. II. 4: 621. 1904.
Billbergia oxypetala Ule, Verh. Bot. Ver. Brand. 48: 137. 1907.

ACRE: Rio Tejo on upper Rio Juruá, *Ule* 40-b (B, type, F neg. 11341).

30. ***Billbergia alfonsi-joannis*** Reitz, Anais Bot. Herb. Barbosa Rodrigues 4: 31, *pl. 9.* 1952.

SANTA CATARINA: Serra do Mirador, Ribeirão Grande, Taió, *Reitz* 4674 (HBR, type).

31. ***Billbergia decora*** Poepp. & Endl. Nov. Gen. & Sp. 2: 42, *pl. 157.* 1838.
Billbergia baraquiniana Lem. Ill. Hortic. 11: *pl. 421.* 1864.
Billbergia boliviensis Baker, Handb. Bromel. 81. 1889.

PARÁ: Cultivated material described as *Billbergia baraquiniana* Lem. No herbarium material from Brazil known.

ALSO: PERÚ, BOLIVIA.

32. ***Billbergia zebrina*** (Herb.) Lindl. Bot. Reg. 13: sub *pl. 1068.* 1827. FIGURE 123.
Bromelia zebrina Herb. Bot. Mag. 53: *pl. 2686.* 1826.
Billbergia canterae André, Rev. Hortic. 69: 60, *pl.* 1897.

BRAZIL: *Freyreis* (S); *Saint-Hilaire* A^1-143 in part (P); C^2-60 (P). Cultivated, *Bretton* (K, GH neg. 2716); *Lindman* A-3 (S).

MINAS GERAIS: Contendas, *Saint-Hilaire* (P).

RIO DE JANEIRO: Niteroi, *Foster* 104 (GH).

DISTRITO FEDERAL: Corcovado, *Dusén* 17059 (SP). Gavea, *Freire & Vidal* (R). Quinta, *Glaziou* 16428 (P). Rio de Janeiro, *Gaudichaud* 363 (P); *Glaziou* 8020 (P); *Regnell* 210 (S). Tijuca, *Foster* 323 (GH); *Lutz* 1446 (R); *Mosén* 4663 (S); *Smith & Brade* 2240 (GH).

SÃO PAULO: Apiai, Rio Tijuco, *M. Kuhlmann* (SP). Canna Verde to Retiro de Lagem, *Regnell* III-1256 (S). Lorena, *Delfarge* (RB). Mogi-Mirim, *Mosén* 1730 (S). Monte Japui, São Vicente, *L. B. Smith* 2101 (GH). São João de Boa Vista, *Mosén* 4430 (S). Mun. Amparo: Monte Alegre, *Kuhlmann & Kühn* 408 (SP).

PARANÁ: Mun. Curitiba: Rio Tijuca, *Foster* 401 (GH).

SANTA CATARINA: Mun. Araranguá: Jundiá, *Reitz* C-437 (GH, HBR). Mun. Chapecó: Itapiranga, *Reitz* 3824 (HBR). Mun. Jaraguá do Sul: Corupá, *Reitz* 5708 (! Reitz). Mun. Palhoça: Campo do Massiambú, *Reitz* 5663 (! Reitz).

RIO GRANDE DO SUL: Hamburger Berg, *Lindman* A-663 (S). São Leopoldo, *Eugenio* 313 (SP); 2046 (GH).

33. ***Billbergia magnifica*** Mez, Bull. Herb. Boiss. II. 3: 133. 1903.

ESPÍRITO SANTO: Santa Teresa, *Foster* 834 (US).

PARANÁ: Bocaiuva do Sul, *Hatschbach* 1610 (US). Jaguariaíva, *Dusén* 10780 (GH, S, US); 11591 (GH, S); 15612 (GH, S, US).

ALSO: PARAGUAY.

34. ***Billbergia porteana*** Brongn. ex Beer, Bromel. 115. 1857.

BRAZIL: *Saint-Hilaire* B^1-939 (P); *Sellow* bromel. 39 (P). Central Brazil, *Weddell* 2518 (P). Rio or São Paulo, *Weir* (K, GH neg. 2715).

Piauí: Upper Rio Gurgueia, southern Piauí, *Luetzelburg* (! Mez).
Ceará: Serra do Araripe, southern Ceará, *Luetzelburg* (! Mez).
Baía: Jocobina, *Foster* 85 (GH, R). Jequié, *Zehntner* 638 (RB). Santo Amaro, eastern Baía, *Luetzelburg* (! Mez).
Espírito Santo: Santa Teresa, *Foster* 285 (GH).
Minas Gerais: *Claussen* 150 (P). Belo Horizonte, *Gehrt* (SP); *Melo Barreto* 4126 (R); *Sampaio* 7245 (R). Serra da Rola Moça, Belo Horizonte, *Foster* 550 (GH). Km. 110 from Belo Horizonte, Lagoa Santa to Serra do Cipó, *Chase* 9101 1/2 (US). Caxambú, *Sampaio* 6042 (R). Contendas, *Saint-Hilaire* A^1-143 in part (P). Fazenda do Diamante, Correo Manuel Agustin, *Mexia* 5563 (GH, US). Ouro Preto, *Glaziou* 16426 (P). Papagaios to Pompéo, *Williams & Coadman* 8103 (GH).

35. ***Billbergia cylindrostachya*** Mez in Mart. Fl. Bras. 3, pt. 3: 395. 1892.
? *Billbergia maxima* Ch. Chevalier, Bull. Soc. Nat. d'Hort. France V. 4: 209. 1931.
Distrito Federal: Cultivated (?), São Cristovão, *Glaziou* 16427 (B, type, F neg. 11336).

36. ***Billbergia kuhlmannii*** L. B. Smith, Arquiv. Jard. Bot. Rio de Janeiro 10: 144, *fig. 4.* 1950.
Mato Grosso: *Foster* 1091 (GH); *J. G. Kuhlmann* (RB, type, US neg. 3265).

37. ***Billbergia rubicunda*** Mez, Repert. Sp. Nov. Fedde 14: 244. 1916.
Brazil: Cultivated in Vienna, *Schoenbrunn Bot. Gard.* (GH, US neg. 4063).

32. *Neoglaziovia* Mez

Neoglaziovia Mez in Mart. Fl. Bras. 3, pt. 3: 426. 1894.

Endemic to northeastern Brazil.

1. Leaf-blades glabrous above, marked with broad white cross-bands beneath. **1. N. variegata**
1. Leaf-blades densely white-lepidote on both sides, not banded. **2. N. concolor**

1. ***Neoglaziovia variegata*** (Arr. Cam.) Mez in Mart. Fl. Bras. 3, pt. 3: 427, *pl. 80, fig. 1.* 1894. Figure 124.
Bromelia variegata Arr. Cam. Diss. Pl. Brasil. 7. 1810.
Dyckia glaziovii Baker, Handb. Bromel. 133. 1889.
Brazil: *Glaziou* 15671 (K, type of *Dyckia glaziovii* Baker, GH neg. 2722).
Piauí: Southern part of state, *Luetzelburg* (! Mez).
Ceará: Aurora, *Loefgren* (R).
Rio Grande do Norte: *Luetzelburg* (! Mez).
Paraíba: Campina Grande to Pernambuco, *Foster* 2417 (US).
Alagoas: *Luetzelburg* (! Mez).
Sergipe: *Luetzelburg* (! Mez).
Baía: Iracema, by Rio Paraguassú, *Fróes* 20222 (IAN, NY, US). Jacobina, *Foster* 87 (GH). Itumirim to Joazeiro, *Campos Porto* (RB). Joazeiro, *Rose & Russell* 19733 (US); *Zehntner* 728 (R). Morro da Lapa, *Zehntner* 570 (R).
Minas Gerais: São Miguel, *Pohl* 3657 in part (BR, GH neg. 2794).

2. ***Neoglaziovia concolor*** C. H. Wright, Bot. Mag. 136: *pl. 8348.* 1910.
Baía: Cultivated, *Kew* (K, type, GH neg. 2721). Mun. Gloria: *Schery* 528 (GH).

33. *Portea* C. Koch

Portea C. Koch, Ind. Sem. Hort. Berol. for 1856, App.: 7. 1857.

Endemic to Brazil.

1. Inflorescence dense; primary bracts large, erect, nearly concealing the branches; floral bracts ample, equaling the sepals..... 1. **P. kermesina**

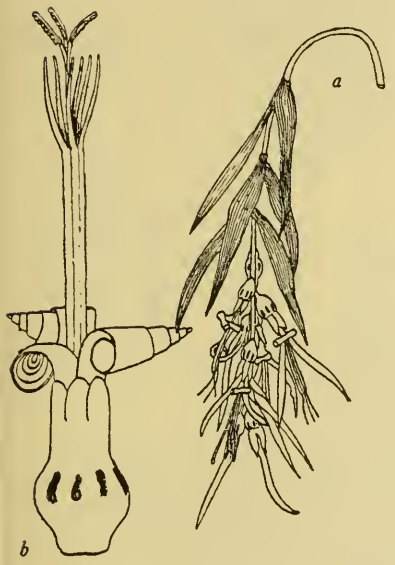

Fig. 123.

Fig. 124.

Fig. 123.—*Billbergia zebrina: a,* Inflorescence, × ¼; *b,* flower, × 1. (Both after Belgique Horticole.)

Fig. 124.—*Neoglaziovia variegata: a,* Habit (after M. B. Foster), × 1/10; *b,* floral bract and flower, × 1; *c,* longitudinal section of ovary, × 5. (*b* and *c* after Flora Brasiliensis.)

1. Inflorescence lax; primary bracts not concealing the branches; floral bracts very narrow, surpassed by the sepals.
   2. The inflorescence corymbose, as broad as long; sepals short-connate. (Fig. 125.)..... 2. **P. leptantha**
   2. The inflorescence much longer than broad; sepals connate for about half their length.
      3. Floral bracts high-connate with the pedicels and exceeding them. 3. **P. filifera**
      3. Floral bracts slightly if at all connate with the pedicels and much shorter than they.

4. Inflorescence soon glabrous; pedicels 10–40 mm. long. **4. P. petropolitana**

4. Inflorescence white-furfuraceous; pedicels 6–10, rarely to 15 mm. long. **5. P. silveirae**

1. ***Portea kermesina*** C. Koch, Ind. Sem. Hort. Berol. for 1856, App.: 7. 1857.
BRAZIL: Cultivated, *Paris* (P).
BAÍA: *Blanchet* 2997 (BM, US neg. 4012); *Lesson* (P).

2. ***Portea leptantha*** Harms, Notizblatt 10: 786. 1929. FIGURE 125.
PARAÍBA: Areia, *Vasconcellos* 207 (RB, US). Campina Grande, *Loefgren* 797 (R).
PERNAMBUCO: Russinha, *Pickel* 3536 (GH). Tapera, *Pickel* 1919 (B, F neg. 11285).

3. ***Portea filifera*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 58, *pl. 75.* 1941.
BAÍA: Agua Preta, *Foster* 62 (GH, type; R); 63 (GH).

4. ***Portea petropolitana*** (Wawra) Mez in Mart. Fl. Bras. 3, pt. 3: 296, *pl. 64.* 1892.
1. Branches of the inflorescence elongate.
2. Pedicels 10–15 mm. long..... Var. a. **petropolitana**
2. Pedicels 35–40 mm. long..... Var. b. **extensa**
1. Branches of the inflorescence short; pedicels 20–40 mm. long. Var. c. **noettigii**

4a. ***Portea petropolitana*** var. ***petropolitana***
Aechmea petropolitana Wawra, Oesterr. Bot. Zeitschr. 30: 116. 1880.
Portea gardneri Baker, Handb. Bromel. 21. 1889.
Streptocalyx podantha Baker, Handb. Bromel. 32. 1889.
ESPÍRITO SANTO: Vitória, *Foster* 194 (GH).
RIO DE JANEIRO: Petrópolis, *Glaziou* 12230 (K, type of *Portea glaziovii* Baker (GH neg. 2690), US); 16417 (GH, P); *Wawra* II-63 (W, type).
DISTRITO FEDERAL: Morro Queimado, *Brade* 11271 (R); 18787 (RB, US).

4b. ***Portea petropolitana*** var. ***extensa*** L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 113, *pl. 116.* 1943.
ESPÍRITO SANTO: Vitória, *Foster* 196 (GH, type; R).
RIO DE JANEIRO: Petrópolis, *Foster* 498 (GH).

4c. ***Portea petropolitana*** var. ***noettigii*** (Wawra) L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1: 113. 1943.
Aechmea noettigii Wawra, Oesterr. Bot. Zeitschr. 30: 117. 1880.
Portea gardneri Baker, Handb. Bromel. 21, 1889.
Aechmea microthyrsa Baker, Kew Bull. 198. 1892.
Streptocalyx orthopoda Baker, Kew Bull. 198. 1892.
Portea noettigii Mez in Mart. Fl. Bras. 3, pt. 3: 296. 1892.
BRAZIL: *Reitz* 4202 (HBR).
MINAS GERAIS: Juiz de Fora, *Hoehne* (SP). São Caetano, *Gardner* 5234 (BM, type of *Portea gardneri* Baker, US neg. 4013).
RIO DE JANEIRO: Entre Rios, *Wawra* II-108 (W, type). Mauá, *Glaziou* 18565 (P, US, isotypes of *Streptocalyx orthopoda* Baker); *Ule* 4042 (R, US).
DISTRITO FEDERAL: Recreio dos Bandeirantes, *Lutz* (GH, R, US); 827 (R). Restinga da Tijuca, *Glaziou* 6454 (P).

5. ***Portea silveirae*** Mez, Bot. Jahrb. 30, Beibl. 67: 4. 1901.
ESPÍRITO SANTO: Santa Teresa, *Foster* 194-A (GH, R, US); 313 (GH).
MINAS GERAIS: Coronel Pacheco, *Heringer* 1301 (SP); 1744 (SP). Ipatinga, *Foster* 729 (GH). Juiz le Fora, *Brade* 14103 (RB, US neg. 4201). Serra de Mantiqueira, *Silveira* 8 (B, type, F neg. 11286).

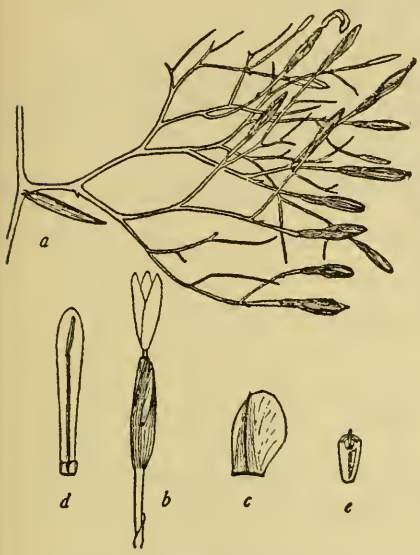

FIG. 125.

FIG. 126.

FIG. 125.—*Portea leptantha: a,* Branch of inflorescence, × ½; *b,* floral bract and flower, × 1; *c,* sepal, × 1; *d,* petal and stamen, × 1; *e,* longitudinal section of ovary, × 1.

FIG. 126.—*Pseudananas sagenarius: a,* Inflorescence, × ½; *b,* petal and stamens, × 1. (Both after Belgique Horticole.)

34. *Pseudananas* Hassler ex Harms

Pseudananas Hassler ex Harms, Engl. & Prantl, Pflanzenfam. ed. 2. 15a: 153. 1930.
Ananas section *Pseudananas* Hassler, Ann. Conserv. & Jard. Bot. Genève 20: 280. 1919.

Monotypic. Brazil, Paraguay.

1. ***Pseudananas sagenarius*** (Arr. Cam.) Camargo, Rev. Agric. Piracicaba 14: nos. 7, 8: reprint page 4. 1939. FIGURE 126.
Bromelia sagenaria Arr. Cam. Diss. Pl. Brasil. 13. 1810.
Bromelia sylvestris Vell. Fl. Fluminensis 129. 1825; Icon. *pl. 113.* 1835.
Ananas macrodontes E. Morr. Belg. Hortic. 28: 140, *pls. 4, 5.* 1878.
Ananas sylvestris Fritz Mueller, Bericht Deutsch Bot. Gesellsch. 14: 4. 1896. In part, as to basonym.

Pseudananas macrodontes Harms, Engl. & Prantl. Pflanzenfam. ed. 2. 15a: 153. 1930.

Pseudananas sagenarius var. *macrodontes* Camargo, Bol. Técn. Inst. Agron. Norte, Pará no. 1:21, *fig. 4.* 1943.

It has not been possible to find on what basis Camargo subdivides this species.

BAÍA: Maracás, *Foster* 2467 (US).

ESPÍRITO SANTO: Vitória, *Foster* 178 (GH, R).

MINAS GERAIS: Santa Rosa to Alfenes, *Regnell* III-1262 (S). Mun. Santa Barbara: Caraça, *Foster* 677 (GH, US).

MATO GROSSO: East of Bella Vista 73 km., *Baker & Collins* (GH). Bodoquena, *Santos* (R). South of Colonia Miranda 34 km., *Baker & Collins* (GH). Lagoa Sêca, Corumbá, *Baker & Collins* (GH). São Domingos, Corumbá, *Baker & Collins* (GH). Urucum, Corumbá, *Baker & Collins* (GH). Pôrto Felicidade, *Baker & Collins* (GH).

DISTRITO FEDERAL: Jacarepaguá, *J. G. Kuhlmann* 6145 (RB, US).

SÃO PAULO: Capão Redondo, *Gehrt* (SP).

SANTA CATARINA: Mun. Araranguá: Sombrio, *Reitz* (! Reitz). Mun. Itajaí: Praia Braba, *Reitz* 2289 (HBR, US).

35. *Ananas* Mill.

Ananas Mill. Gard. Dict. Abr. ed. 4. 1754.

Brazil, Guiana, Paraguay. Widely distributed by cultivation throughout the tropics.

No attempt is made here to cover the numerous cultivated varieties and forms of pineapple, since others working with living material are much better qualified to do so.

1. Syncarp over 15 cm. long at maturity, succulent; scape stout, usually short.
   2. Floral bracts conspicuous, imbricate and covering the ovaries, coarsely serrate.
      3. Leaf-spines all ascending; floral bracts colored at maturity; petals bearing scales..... 1. **A. bracteatus**
      3. Leaf-spines toward the base recurved; floral bracts pale green at maturity; petals bearing vertical folds. (Fig. 127.) 2. **A. fritzmuelleri**
   2. Floral bracts inconspicuous, not imbricate nor covering the ovaries at maturity, serrulate..... 3. **A. comosus**
1. Syncarp less than 15 cm. long at maturity, dry or nearly so; scape elongate, slender.
   4. Leaves straight, erect, unarmed except for the large terminal spine, 35 mm. wide..... 4. **A. erectifolius**
   4. Leaves recurved, serrate, not more than 25 mm. wide. (Fig. 128.) 5. **A. ananassoides**

1. ***Ananas bracteatus*** (Lindl.) Schult. in R. & S. Syst. 7, pt. 2: 1286. 1830.

Ananassa bracteata Lindl. Bot. Reg. 13: *pl. 1081.* 1827.

Ananas sagenaria sensu Mez, Engl. Pflanzenreich IV. 32: 104. 1934. Not Schult. 1830.

BRAZIL: Cultivated, *W. Hoehne* (SP); *M. Kuhlmann* (GH, SP); *Reitz* 2293 (HBR, US); 3685 (HBR); 4010 (HBR).

ESPÍRITO SANTO: Santa Teresa, *Foster* 291 (GH, R).
DISTRITO FEDERAL: Ipanema, *J. G. Kuhlmann* (RB).
SÃO PAULO: Caraguatatuba, *Hoehne & Gehrt* (GH (US neg. 3955, 3956), SP). Ipiranga, *Luederwaldt* (SP). São Sebastião, *Camargo* (IAN). Tatuí to Sorocaba, *Baker & Collins* (GH).
PARANÁ: Morrêtes, *M. Kuhlmann* (GH, SP). 41 km. from Paranaguá, *Foster* 453 (GH, R). Serra da Prata, 25 km. south of Paranaguá, *Tessmann* (US).
SANTA CATARINA: São Francisco do Sul, *Reitz* 3875 (HBR). Araranguá: Meleiro, *Reitz* C-35 (GH, HBR).
RIO GRANDE DO SUL: São Leopoldo, *Eugenio* 446 (NY); 1897 (GH).

2. ***Ananas fritzmuelleri*** Camargo, Bol. Técn. Inst. Agron. Norte, Pará No. 1: 16, *figs. 2, 3.* 1943. FIGURE 127.
Ananas sylvestris Fritz Mueller, Bericht. Deutsch. Bot. Gesellsch. 14: 4. 1896. In part, not as to *Bromelia sylvestris* Vell. 1825.
Ananas bracteatus var. *albus* L. B. Smith, Bot. Mus. Leafl. Harvard 7: 76. 1939.
BRAZIL: *Telles* (GH, SP).
SÃO PAULO: Itapecerica, *Camargo* (GH); *Hoehne & Gehrt* (GH, type of *Ananas bracteatus* var. *albus* L. B. Smith; SP).
PARANÁ: *Dusén* 15469 (S).
SANTA CATARINA: Brusque, *Reitz* 3957 (HBR, US); 4011 (HBR). Itajaí, *Reitz* 4157 (HBR). Mun. Araranguá: Sombrio, *Reitz* C-1344 (HBR).

3. ***Ananas comosus*** (L.) Merrill, Interpr. Rumph. Amb. 133. 1917.
Bromelia ananas L. Sp. Pl. 285. 1753.
Bromelia comosa L. Herb. Amboin. 21. 1754; Amoen. Acad. 4: 130. 1759.
Ananas sativus Schult. in R. & S. Syst. 7, pt. 2: 1283. 1830.
Ananassa sativa Lindl. ex Spach, Hist. Vég. 12: 400. 1846.
Ananas ananas Voss, Vilm. Blumeng. ed. 3. 1: 964. 1895.
BRAZIL: Cultivated, *Baker & Collins* (GH); *Reitz* 3654-b (HBR).
BAÍA: Machado Portella, eastern Baía, *Luetzelburg* (! Mez). Serra de São José, *Luetzelburg* (! Mez).
MATO GROSSO: Cuiabá, *Lindman* A-2351 (S).

4. ***Ananas erectifolius*** L. B. Smith, Bot. Mus. Leafl. Harvard 7: 78, *pl. 1.* 1939.
Ananas sp. Ducke, Arch. Jard. Bot. Rio de Janeiro 5: 81. 1930.
BRAZIL: Cultivated, *Baker & Collins* 9 (GH); *Foster* 1114 (GH).
AMAZONAS or PARÁ: Amazon Basin, *Ducke* (GH, type, US neg. 3953).
PARÁ: Belterra, *Pires* 4072 (IAN, US). Santarém, *Carr* (F); *Ginzberger & Zerny* 393 (F).

5. ***Ananas ananassoides*** (Baker) L. B. Smith, Bot. Mus. Leafl. Harvard 7: 79, *pl. 2.* 1939.
1. Apex of the scape weak and easily broken; syncarp many-flowered, up to 15 cm. long..... Var. a. ananassoides
1. Apex of the scape tough; syncarp few-flowered, only about 4 cm. long. Var. b. nanus

5a. ***Ananas ananassoides*** var. ***ananassoides.*** FIGURE 128.
Acanthostachys ananassoides Baker, Handb. Bromel. 25. 1889.
Ananas microstachys Lindm. Svensk. Akad. Handl. 24: no. 8: 39, *pl. 7, figs. 20–23.* 1891.

Ananas sativus var. *microstachys* Mez in Mart. Fl. Bras. 3, pt. 3: 294. 1892.
Ananas guaraniticus Bertoni, Monogr. Gen. Ananas in An. Cient. Parag. II. No. 4: 274. 1919.
Ananas comosus var. *microstachys* L. B. Smith, Contr. Gray Herb. 104: 72. 1934.

Pará: Santarem, *Archer* 8328 (IAN, US). Vigia, *Black* 50–8832 (IAN). Campina do Palha, Vigia, *Black* 48–3266 (IAN).

Fig. 127.

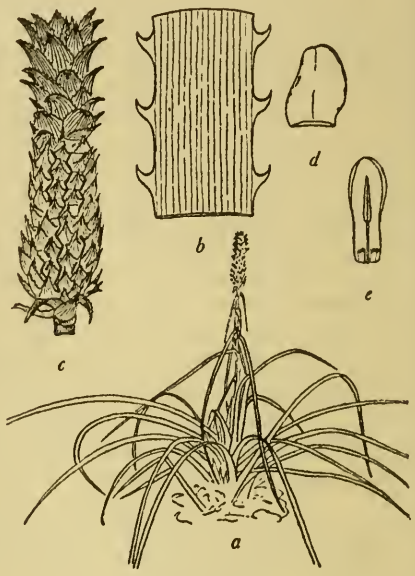

Fig. 128.

Fig. 127.—*Ananas fritz-muelleri: a,* Inflorescence, × 1/10; *b,* petal and stamen, × 1. (Both after Camargo.)

Fig. 128.—*Ananas ananassoides* var. *ananassoides: a,* Habit, × 1/40; *b,* section of leaf, × 1; *c,* inflorescence, × ⅙; *d,* sepal, × 1; *e,* petal and stamen, × 1. (All after Botanical Museum Leaflets, Harvard.)

Minas Gerais: *Pires & Black* 2941 (IAN). Lapinha, Lagoa Santa, *Palacios* 3392 (LIL). La Rosa to Alfenes, *Regnell* III-1261 (S). Mun. Conceição: Serra do Cipó, *Foster* 639 (GH, US).

Mato Grosso: Braco, Rio Arinos, *Baldwin* 3086 (US). Camizão, *Foster* 1089 in part (GH, US). Livramento, southwest of Cuiabá, *Baker & Collins* (GH). Guia, *Baker & Collins* (GH). Nioac to Rio Formiga, *Baker & Collins* (GH). East of Pôrto Felicidade 3 km., *Baker & Collins* (GH). Rosario Oueste, *Baker & Collins* (GH).

São Paulo: Itapura, *Camargo* (GH). Mogi-Mirim, *Gehrt* (GH, SP). Sorocaba to Itapetininga, *Baker & Collins* (GH). Tatuí to Sorocaba, *Baker & Collins* (GH). Mun. Santa Izabel: Igaratá, *M. Kuhlmann* 1956 (SP); 2551 (SP).

5b. ***Ananas ananassoides*** var. ***nanus*** L. B. Smith, Bot. Mus. Leafl. Harvard 7:79, *pl. 3.* 1939.
BRAZIL: Cultivated, *Baker & Collins* (GH); *Camargo* (IAN).
AMAZONAS: São Gabriel, Rio Negro, *Baldwin* 3468-a (US).
PARÁ: Tapari, Rio Tapajoz, *Dahlgren & Sella* 28 (F).
BAÍA: *Foster* 43 (GH).
MATO GROSSO: Camizão, *Foster* 1089 in part (GH, US).

EXCLUDED AND DOUBTFUL TAXA

The majority of the following cases in need of clarification come from the Flora Brasiliensis. It should be noted that this work includes a number of Bromeliaceae not attributed to Brazil and it does not seem necessary to exclude these when they were never claimed.

Aechmea regularis Baker, Journ. Bot. 17:229. 1879; Mart. Fl. Bras. 3, pt. 3:324. 1892.

This is a synonym of *Aechmea bracteata* (Sw.) Griseb., a species ranging from Mexico to Colombia. There is no authentic record of its occurrence in or near Brazil.

Billbergia viridiflora H. Wendl. Allg. Gartenz. 22:154. 1854; Mart. Fl. Bras. 3, pt. 3:424. 1892.

This was described from cultivated material of unknown origin and doubtless ascribed to Brazil because the center of the genus is there. However, the species is now known to be native to southern Mexico, British Honduras, and Guatemala.

Bromelia fastuosa Lindl. Coll. Fasc. 1: *pl. 1.* 1821; Mart. Fl. Bras. 3, pt. 3: 193. 1891.

This name applies to either *B. pinguin* or *B. sylvestris* because of its narrowly triangular sepals and is Mexican, not Brazilian. See under *B. antiacantha* Bertol.

Catopsis nutans (Sw.) Griseb. Fl. Brit. West Ind. 599. 1864; Mart. Fl. Bras. 3, pt. 3:576. 1894.
Tillandsia nutans Sw. Prodr. 56. 1788.

In Flora Brasiliensis this species was confused with *C. sessiliflora* (R. & P.) Mez. Actually it ranges from Mexico and the West Indies to Venezuela and Ecuador.

Deuterocohnia longipetala (Baker) Mez in Mart. Fl. Bras. 3, pt. 3:506. 1894.
Dyckia longipetala Baker, Handb. Bromel. 135. 1889.

The supposed record for this species in Brazil is a Humboldt and Bonpland collection from the Rio Marañon. However, a study of

their route discloses the collection was made in Peru more than a thousand kilometers from where the river enters Brazil.

Dyckia altissima Lindl. Bot. Reg. 27:84. 1841; Mart. Fl. Bras. 3, pt. 3:473. 1894.

This species was described from Argentina and then extended to Brazil by the erroneous inclusion of *D. princeps* Lem. and other distinct species.

Hohenbergia gnetacea Mez in Mart. Fl. Bras. 3, pt. 3:272. 1891.

The species is native to Jamaica, not to Brazil as originally stated.

Hohenbergia pycnantha (Baker) Mez in Mart. Fl. Bras. 3, pt. 3:273. 1891.
Aechmea pycnantha Baker, Handb. Bromel. 41. 1889.

This is a synonym of *Hohenbergia polycephala* (Baker) Mez, an endemic species of Jamaica.

Pitcairnia inermis (Meyer) Meyer ex Schult. f. in R. & S. Syst. 7:1238. 1830; Mart. Fl. Bras. 3, pt. 3:440. 1894.
Pourretia inermis Meyer in Presl, Rel. Haenk. 1:123. 1827.

In Flora Brasiliensis Mez states categorically that this species is in Brazil ("In fines Brasiliae septentrionalis descendit"), yet gives no citation to corroborate. In the Pflanzenreich he drops the claim completely and none of the collections are near enough to make it seem probable.

Pitcairnia nigra (Carr.) André, Rev. Hortic. 60:365. 1888; Mart. Fl. Bras. 3, pt. 3:461. 1894.
Neumannia nigra Carr. Rev. Hortic. 53:390. 1881.

This species was described from cultivation and its origin surmised as Brazil. Subsequently it has been collected in Colombia and Ecuador far from the Brazilian boundary and at altiudes that make its occurrence in the Amazon Basin appear most unlikely.

Pitcairnia poeppigiana Mez in Mart. Fl. Bras. 3, pt. 3:461. 1894.

The only collection of this species is from Peru. Mez's suggestion that the species may also occur in Brazil is not too improbable although the type locality is about three hundred kilometers distant.

Pitcairnia recurvata (Scheidw.) K. Koch, Ind. Sem. Hort. Berol. for 1857: App. 4. 1858; Mart. Fl. Bras. 3, pt. 3:460. 1894.
Puya recurvata Scheidw. Allg. Gartenz. 10:275. 1842.

This species was described from cultivation with Brazil as its supposed origin. Subsequent collections from the wild have been limited to southern Mexico, British Honduras, and Guatemala.

Pitcairnia xanthocalyx Mart. Hort. Monac. Sem. for 1848: 4. 1848; Mart. Fl. Bras. 3, pt. 3: 438. 1894.

The species is native of Mexico. Here again Brazil seemed the probable origin for an ornamental cultivated species.

Quesnelia chacoensis Rojas, Bull. Geogr. Bot. 26: 159. 1918; Pflanzenreich IV. 32: 176. 1935.

Only written evidence is available on this species but the description indicates the genus *Dyckia,* not *Quesnelia,* and "Chaco" would indicate Paraguay, Argentina, or Bolivia, not Brazil.

Quesnelia lamarckii Baker, Handb. Bromel. 85. 1889.

This is a synonym of *Musa coccinea* Andr. Being from Guiana it would not require noting here except that *Quesnelia* has been indicated as endemic to Brazil in the systematic treatment above.

Quesnelia tillandsioides (Baker) Mez in Mart. Fl. Bras. 3, pt. 3: 386, *pl. 75.* 1892.
Billbergia tillandsioides Baker, Handb. Bromel. 84. 1889.

This supposed species consists of a rosette of a *Vriesia* (probably *V. corcovadensis* (Britten) Mez) and the scape and inflorescence of *Quesnelia liboniana* (De Jonghe) Mez in close juxtaposition. Whether it is an error of attempted reconstruction in preparing the specimen or a deliberate hoax as some would claim, it has been the source of no small confusion and embarrassment.

Tillandsia bandensis Baker, Journ. Bot. 25: 235. 1887; DC. Monogr. Phan. 9: 858. 1896.

This species has been cited from Brazil on the basis of the type, which actually came from Uruguay.

Tillandsia bracteata Vell. Fl. Fluminensis 132. 1825; Icon 3: *pl. 125.* 1835.

It has not been possible to link this name with any known species. From the illustration it appears to be an *Aechmea* like *Ae. fasciata* (Lindl.) Baker but with sepals too large and pointed for that species.

Tillandsia brasiliensis Larrañaga, Escritos D. A. Larrañaga 1: 396. 1922.

The description given the above is so vague and general that it is impossible to identify it. No material is known to exist.

Tillandsia comata Vell. Fl. Fluminensis 136. 1825; Icon. 3: *pl. 140.* 1835.

The illustration indicates an *Aechmea* with the habit of *Ae. cariocae* L. B. Smith, but the floral bracts are much too long for that species.

Tillandsia imbricata Vell. Fl. Fluminensis 133. 1825; Icon 3: *pl. 131.* 1835.

This must be a *Vriesia* but its combination of lax simple inflorescence and long straight acute bracts are not duplicated in any known species.

Tillandsia saxatilis Vell. Fl. Fluminensis 136. 1825; Icon. 3: *pl. 139.* 1835.

There must be an error in this illustration as everything indicates *Aechmea nudicalis* (L.) Griseb. or a close relative, but the ovary is shown as superior.

Tillandsia tetrasticha Vell. Fl. Fluminensis 135. 1825; Icon. 3: *pl. 137.* 1835.

As suggested by Mez this may be an aberrant form of an *Aechmea* with a dense many-flowered simple inflorescence. However, those it most nearly resembles have ranges too far south for the area covered by Vellozo.

Tillandsia vernicosa Baker, Journ. Bot. 25: 241. 1887.

The type of this species is a cultivated plant labeled "Christie. Paraná," but no trace has been found of this collector and no subsequent collection has been made in or near Brazil.

Vriesia albescens Alv. Silveira, Fl. Montium 2: *pl. 131, fig. 2.* 1931. Nomen.

This appears to be an error for his *V. glauca.*

Vriesia atro-purpurea Alv. Silveira, Fl. Montium 2: Add. 3, *pl. 131, fig. 1.* 1931.

It has not been possible to examine material of any of Silveira's species and the description and illustration of the above are inadequate for classification.

Vriesia decipiens F. Mueller, Gartenflora 42: 737. 1893. (See under *V. erythrodactylon.*)

Vriesia glauca Alv. Silveira, Fl. Montium 2: Add. 3. 1931.

It has not been possible to classify this species.

Vriesia macropoda (Baker) Mez in Mart. Fl. Bras. 3, pt. 3: 554. 1894.
Tillandsia macropoda Baker, Handb. Bromel. 218. 1889.

Mez identifies this with *V. inflata* Wawra, a species with sepals completely covered by the floral bracts, while Baker describes the sepals as much exceeding the floral bracts. It has not been possible to explain the contradiction as yet.

LOCALITIES CITED

The following localities are defined because of their absence from the "Index to Map of Hispanic America 1: 1,000,000" published by

the American Geographical Society. In a few cases names found there are included here because of ambiguity as in the use of the same name for two or more localities in the same state.

Bearings are mostly given in the same style as in the Index. That is, the nearest full degree of latitude is given, then a dash and the nearest full degree of longitude, followed by the letter a, b, c, or d. The quadrant lying northwest of the intersection of the degree lines is a; northeast, b; southwest, c; and southeast, d. A capital "N" or "S" indicates the latitude.

Usually localities in the Distrito Federal are not defined further since their position is already sufficiently definite for plotting range maps.

Agua, Ilha de. Distrito Federal. Baía da Guanabara.

Albino Souza, Morro. Paraná. Mun. Piraquara.

Alcatrazes, Ilha das. São Paulo. Near Santos, 24–46d. S.

Alexio. Amazonas. Mun. Manaus.

Alfenes. Minas Gerais. Near Santa Rosa.

Almada. Baía. Near Ilheus.

Almas, Serra das. Baía. The range at 14–42b. S.

Alto da Serra. Paraná. The crest of the Serra do Mar, east of Curitiba on the road to Paranaguá.

Alto dos Marins. São Paulo. Between Piquete and the boundary with Minas Gerais. ! Hoehne.

Andaraí Grande. Distrito Federal. ! Brade.

Angelim, Cascata do. Mato Grosso. Near Buritizinho.

Anhangava, Morro. Paraná. Mun. Piraquara.

Araguai (Araguaya of Index). Espírito Santo. Near Vitória.

Araquari. Santa Catarina. Município immediately south of Joinvile and São Francisco do Sul, formerly Paraty.

Arará. Ceará. North of Araripe.

Aratuba. Ceará. Formerly Coite, 4–39b. S.

Archer, Morro de. Distrito Federal.

Aricá. Mato Grosso. Near Cuiabá.

Ariro, Serra de. Rio de Janeiro or São Paulo, 23–44a. S.

Armação de Piedade. Santa Catarina. The same as Armação do Sul, Ilha de Santa Catarina.

Arpoador, Praia do. Distrito Federal. Between Copacabana and Pedra Dois Irmãos.

Atafona. Rio de Janeiro. East of São João de Barra on the south side of the Rio Paraiba do Sul.

Aurá. Pará. The name of a farm in Belém.

Azambuja. Santa Catarina. Not the one listed in the Index. Part of Brusque.

Babilônia, Morro da. Distrito Federal.

Baependy. Minas Gerais. Município, now Baipendi.

Baixada Fluminense. Distrito Federal, Rio de Janeiro. The lowland about Rio.

Bananal. São Paulo. The locality at 23–44a. S. ! Brade.

Bandeira, Morro da. Rio de Janeiro. Serra dos Orgãos, west side of the Parque Nacional. ! Brade.

Banhado. Paraná. Mun. Morrêtes, on the Serra do Mar.

Barra de São José. Rio de Janeiro. Somewhat north of Cabo Frio, 22° 45′ S. ! Brade.

Barração. Paraná. Southwest corner of the state. ! Reitz.

Barreira. Rio de Janeiro. At the foot of the Serra dos Orgãos in the Parque Nacional. ! Brade.

Barro, Espigão de. Santa Catarina. Near Araranguá.

Bateia, Morro da. Santa Catarina. Near Brusque.

Berberibe. Pernambuco. The same as Beberibe, just north of Recife.

Betim. Minas Gerais. Município, including the former município of Contagem, 20–44a. S. ! L. O. Williams.

Bica, Serra da. Distrito Federal.

Bico Alto. Ceará. In the Serra de Baturité.

Biribiri. Minas Gerais. The same as Beribéri of the Index, 18–44d. S.

Blei (Bley). Paraná. Mun. Lapa.

Boa Vista. Rio de Janeiro. The locality at 22–42b. S., collection by Glaziou on the Rio Paraíba do Sul.

Boa Vista, Alto da. Distrito Federal.

Bôca da Mata. Minas Gerais. Mun. Serro.

Bôca do Rio. Baía. Just south of Salvador, 13–38b. S.

Bocaiú. Minas Gerais. Near Pomba, 21–43c. S. ! Hoehne.

Bom Gosto. Baía. Near Olivença, 15–39a. S.

Bom Jardim. Santa Catarina. Near Biguaçú.

Bom Jesus. Rio Grande do Sul. Northeastern highlands, about 28° 30′ S., 50° W., alt. 1000 m. ! Rambo.

Bom Jesus da Lapa. The same as Lapa.

Bom Retiro. Santa Catarina. The locality at 28–50b. S., Município.

Bom Socorro, Morro do. Santa Catarina. Near Nova Trento.

Boracéa. São Paulo. Near Salesópolis.

Borda do Campo. Paraná. Mun. Piraquara, 25–49c. S.

Bosque da Saude. São Paulo. Mun. São Paulo. ! Brade.

Botafogo. Distrito Federal.

Braco. Mato Grosso. A mining camp on the Rio Arinos, about 12° south. ! Baldwin.

Braco do Sul. Espírito Santo. Mun. Castelo, 20° 40′ S. ! Brade.

Bragança. São Paulo. Now Bragança Paulista, 23–47b. S.

Brajatúba, Morro de. Paraná. Mun. Guaratuba, 2 km. southeast of Guaratuba. ! Stellfeld.

Brejo. Serra do. Piauí. 7–42 to 43. S.

Bussuquara. Pará. In Belém on the grounds of the water reserve. ! Black.

Butantan (Now Butantã). São Paulo. Mun. São Paulo. ! Hoehne.

Buturoca, Rio. São Paulo. Near Santos.

Caapoeira. Not a locality but a habitat indicating secondary woods. ! Hoehne.

Caaró. Rio Grande do Sul. Near São Luiz, northwestern highlands, about 28° S., 55° W., alt. 300 m., campo, wood islets. ! Rambo.

Cabeça de Boi. Mato Grosso. Near Cuiabá.

Cabritos, Morro dos. Distrito Federal. Between Jardim Botânico and the ocean. ! Brade.

Cabritos, Serra dos. Minas Gerais. Near Capivari.

Caceres. The same as São Luiz de Caceres.

Cachoeira do Rancho Frio. Rio de Janeiro. Serra dos Orgãos, on the Rio Paquequer in the Parque Nacional, alt. 1400 m. ! Brade.

Cachoeira Dourada. Minas Gerais. Mun. Ituiutaba, 60 km from Ituiutaba on the boundary with Goiás.

Cacupé. Santa Catarina. On the Ilha de Santa Catarina, 28–49b. S.

Caeté. Minas Gerais. The locality at 20–44b. S., collection by Martius.

Caiobá. Paraná. Mun. Paranaguá, 35 km south of Paranaguá on the coast.

Cajazeiras. Paraíba. The locality at 7–38a. S.

Cajurú. São Paulo. The locality at 21–47c. S., collection by Regnell.

Caldeirão. Amazonas. Less than 30 km west of Manaus but on the Amazon. Collection by Martius.

Camizão. Mato Grosso. Near Aquiduana.

Campina do Palha. Pará. Near Vigia.

Campininha. Paraná. Mun. Piraquara, 8 km from Quatro Barras toward the sea, 25–49c. S. ! Hatschbach.

Campo Bonito. Rio Grande do Sul. Near Tôrres.

Campo dos Padres. Santa Catarina. Near Bom Retiro.

Campo Grande. Mato Grosso. The locality at 20–55d. S., collection by Foster.

Campo Largo. Paraná. Município, the locality at 25–50d. S., collection by Hatschbach.

Canna Verde. São Paulo. Near Cajurú, collection by Regnell.

Canoas. Rio Grande do Sul. 15 km northeast of Pôrto Alegre, near Esteio. ! Rambo.

Cantareira, (Serra da). São Paulo. Mun. São Paulo, Horto Florestal. ! Hoehne.

Canto Grande. Santa Catarina. Near Pôrto Belo.

Capão Redondo. São Paulo. Near Sorocaba. ! Hoehne.

Capela, Estação. Rio Grande do Sul. Now Estação Azevedo, 50 km northeast of Pôrto Alegre, near Montenegro, campo, arenitic hills, wood islets, alt. 50 m. ! Rambo.

Carioba. São Paulo. On the Rio Piracicaba between Campinas and Limeira, 22° 41′ S. and 47° 19′ W. ! M. Kuhlmann.

Carioca, Serra da. Distrito Federal.

Cariri. Ceará. Near Imbuzeiro. Collection by Loefgren.

Carmo. Minas Gerais. Mun. Ituiutaba, 5 km south of Ituiutaba, 19–49a. S. ! Macedo.

Carmo. Rio de Janeiro. The locality on the Rio Paquequer near Teresópolis.

Caruá-açu. Rio Branco. Evidently a peak in the Serra da Lua, 2–60a. N.

Caruarú. Pernambuco. Near the Paraíba boundary. ! D. A. Lima. About 50 miles west of Campo Grande, Paraíba. ! Foster.

Carvalho. Paraná. Near Ipiranga. ! Asplund.

Cascadura. Distrito Federal. City of Rio de Janeiro. ! Brade.

Cascata. Rio Grande do Sul. Apparently the same as Cascata da Hermenegilda. ! Rambo.

Casino Aú. Paraná. In Curitiba. ! Stellfeld.

Castanho, Rio. Amazonas. Upper Rio Negro basin, about 1° 22′ N., 64° 38′ W.

Castelo, Mun. Espírito Santo. 20° 40′ S., 41° W. ! Brade.

Castelo de Agua. Rio de Janeiro. Serra dos Orgãos, in the Parque Nacional. ! Brade.

Catuni. Baía. Not listed in the Index but shown on the Map. 10–40 c. S.

Caumba Nova. Ceará. Error for Cacimba Nova, 5–40c. S.

Caxias. Rio de Janeiro. Just north of the Distrito Federal on the Baía da Guanabara.

Chapeu de Sol. Minas Gerais. Mun. Jaboticatubas, 19° 40′ S., 43° 57′ W. ! Segadas-Vianna.

Chuquê, Serra de. Baía. Apparently the same as Serra do Jacú, 10–38a. S.

Cidade Jardim. São Paulo. Mun. São Paulo.

Cipó, Serra do. In the Index as Sipó, northeast of Belo Horizonte.

Cochrane, Monte do. Distrito Federal.

Cocui. Amazonas. A large mountain on the point of the Rio Negro where Brazil, Colombia, and Venezuela meet. Most collections are from the Brazilian army post of

the same name a few miles below the mountain. ! Schultes.

Cocuruto (not Cocuruté). Rio Grande do Sul. Near Pelotas. ! Rambo.

Coite. Ceará. Now Aratuba.

Collatina, Mun. Espírito Santo. 20–41b. S.

Colonia. Piauí. The same as Floriano, 7–43a. S.

Colonia São Pedro. Rio Grande do Sul. Mun. São Pedro, 20 km north of Tôrres. ! Schultz.

Conceição. Goiás. The locality at 12–47c. S., collection by Burchell.

Conceição de Itanhaen. São Paulo. Now simply Itanhaém.

Conchas. São Paulo. The locality at 23–48d S., on the Sorocabana railroad line between Laranjal and Botucatú, near Tietê. ! Hoehne.

Conselheiro Matta-Rodeador. Minas Gerais. Now Conselheiro Mata.

Contas, Rio das. Santa Catarina. Near São Joaquim.

Copacabana. Distrito Federal.

Corcovado. Distrito Federal.

Coronel Pacheco. Minas Gerais. Experiment Station, now Agua Limpa, 22–43a. S. ! Hoehne.

Correas. Rio de Janeiro. North of Petrópolis between Cascatinha and Nogueira, 23–43a. S.

Corrego Alegre, (Fazenda). Minas Gerais. Mun. Delfim Moreira, 22° 32′ S., 45° 13′ W. ! M. Kuhlmann.

Corupá. Santa Catarina. Near Jaraguá.

Cosme Velho. Distrito Federal.

Cotia. São Paulo. Now Ibiuna, near Una, 23° 38′ S., 47° 05′ W. ! M. Kuhlmann.

Cresciuma. Santa Catarina. Now Criciúma, 29–49a. S.

Cristais, Serra dos. Minas Gerais. Near Diamantina. ! Brade.

Cruzeiro, Morro do. Minas Gerais. Mun. Ouro Preto, 1 km south of Ouro Preto. ! Macedo.

Cuibiça. Espírito Santo. The same as Cobiça, south of Vitória. ! Foster.

Cume do Bico. Ceará. In the Serra de Baturité.

Cunha, Serra da. São Paulo. Near the Serra Geral in Cunha, 23° 06′ S., 44° 56′ W. ! M. Kuhlmann.

Curral, Serra do. Minas Gerais. About 25 km southwest of Belo Horizonte. ! Foster.

Curralinhos. Santa Catarina. 29–50d. S.

Curupira, Mato do. Mato Grosso. Near Cuiabá.

Curupira, Morro do. São Paulo. Near Santos, collection by Mosén.

Delfim Moreira, Mun. Minas Gerais. Region of the Serra da Mantiqueira near the São Paulo boundary, 22° 35′ S., 45° 24′ W. ! M. Kuhlmann.

Demora, Rio. Paraná. Near Antonina.

Desengano. Rio de Janeiro. Mun. Santa Maria Madalena, 22° S., 2° east of Rio de Janeiro. ! Brade.

Desterro. Santa Catarina. Now Florianópolis.

Desvio Ypiranga. Paraná. Apparently the same as Ipiranga.

Deuses, Terra dos. Minas Gerais. In Lavras. ! Black.

Diamente, Fazenda do. Minas Gerais. Near Corinto. ! Bracelin.

Dimití, Serra. Amazonas. Near Rio Dimití, 1–67d. N.

Dionisio Cerqueira. Santa Catarina. Extreme northeast corner of the state.

Dois Irmãos. Rio Grande do Sul. Southern slope of the highlands, about 50 km northeast of Pôrto Alegre, alt. 100 m., rain forest belt. ! Rambo.

Dois Irmãos, Pedra. Distrito Federal.

Dona Castorina, Estrada. Distrito Federal.

Dona Francisca, Estrada. Santa Catarina. In Joinvile.

Dourada, Serra. Goiás. The locality at 16–50c. S., collections by Schott and Ule.

Douro, Mision. Goiás. The same as São José do Duro, 11–46c. S., collection by Gardner.

Ega. Amazonas. Now Tefé.

Engenho Novo. Distrito Federal. In Rio de Janeiro. ! Brade.

Escola. Pernambuco. São Bento, near Tapera. ! D. A. Lima.

Esperança. Amazonas. Near Peruvian border, across from Leticia, 4–70d. S. ! Black.

Esperança. Paraná. About 10 km northwest of Prudentópolis, 25–51c. S. ! Stellfeld.

Espigão do Curupira. São Paulo. Near Santos, collection by Mosén.

Esteio. Rio Grande do Sul. 20 km northeast of Pôrto Alegre, lowlands with campos, swamps, and wood islets, alt. 20 m. ! Rambo.

Estreito do Uruguai. Santa Catarina. Near Concordia.

Excelsior. Distrito Federal. Probably part of Pico da Tijuca.

Fabriciano, Coronel. Minas Gerais. Mun. Antônio Dias. ! Foster.

Fachinal. Santa Catarina. Near Biguaçú.

Feira. Baía. The same as Feira de Santana, 12–39c. S.

Felisberto. Baía. Near Ilheus.

Figueiredo. Santa Catarina. Near Bom Retiro.

Flamengo, Morro. Distrito Federal.

Flores, Ilha das. Rio de Janeiro. Just off the northern end of Niteroi.

Flores, Pedra das. Rio de Janeiro. Mun. Santa Maria Madalena, 22° S., 1° 10′ east of Rio de Janeiro. ! Brade.

Florestal. Paraná. Mun. Piraquara, 29 km east of Curitiba. ! Hatschbach.

Florestal, Estação. São Paulo, on the grounds of the Instituto de Botânica. ! Foster.

Fonseca, Chacara de. Distrito Federal. ! Brade.

Fonte Sanatoria. São Paulo. About 150 km from São Paulo on the road to Curitiba. ! Foster.

Formiga, Rio. Mato Grosso. The one at 21–56d. S.

Forno Grande. Espírito Santo. Mun. Castelo, 20° 40′ S., 2° east of Rio de Janeiro. ! Brade.

Furquilha, Serra da. Rio de Janeiro. Mun. Santa Maria Madalena, 22° S., 1° 10′ east of Rio de Janeiro. ! Brade.

Garrafão, Morro do. Santa Catarina. Near Jaraguá.

Gavea, Pedra da. Distrito Federal.

Geral, Serra. Goiás. Luetzelburg collections near São José do Duro.

Gloria, Mun. Baía. 9–39d. S. ! Schery.

Governador Valadares, Mun. Minas Gerais. 19–42b. S.

Governo, Mato do. São Paulo. Mun. São Paulo, former name of the Parque do Estado including the Instituto de Botânica and its Jardim Botânico. ! Hoehne.

Grongogy, Rio. Baía. The same as Rio Grungogi.

Guaíba, Rio. Rio Grande do Sul. The mouth of the Rio Jacui. 30–51c. S. ! O'Donell.

Guapi (Guapi Mirim). Rio de Janeiro. Due south of Teresópolis on the railroad.

Guaribas. Piauí. Between São João do Piauí and Raimundo Nonato.

Guiomar. Espírito Santo. Southwest of Vitória. ! Foster.

Gurupi, Rio. Pará-Maranhão. 1–46c. S.

Heitor Legrú. São Paulo. Interior of São Paulo. ! Hoehne.

Hermenegilda, Cascata. Rio Grande do Sul. Near Pelotas, about 32° S., 52° W. ! Rambo.

Herval. Santa Catarina (not Paraná). 27–51c. S., collections of Dusén, March 7–9, 1911. ! Asplund.

Humaïta. Amazonas. 8-63a. S.

Humaïta. Ceará. Now Senador Pompeu, 6–39a. S. ! Ducke.

Humaïta. Mato Grosso. Near Rio dos Bugres, collection of Lindman.

Igarapé. See second capitalized word of title.

Ilha. See also the second capitalized word of title.

Ilha Comprida. São Paulo. Includes Iguapé, 48–25b. S.

Ilheu, Dist. Minas Gerais. Includes Viçosa in drainage basin of Rio Doce. ! Bracelin.

Imbé, Santo Antonio de. Rio de Janeiro. Evidently the same as Imbé, 22–42b. S.

Imbetiba. Rio de Janeiro. A small harbor (enseada) south of Macaé, 22–42d. S.

Imbuzeiro, (? Riacho). Ceará. 5–41b. S., collection by Loefgren.

Indaial. Santa Catarina. Near Encano.

Inferninhos. Santa Catarina. Near Itajuba.

Ipanargna. Paraíba. 10 or 15 miles north of Campina Grande. ! Foster.

Ipanema. Distrito Federal.

Ipero. São Paulo. Near Sorocaba. ! Hoehne.

Ipiranga. Paraná. Just below the crest of the Serra do Mar on the eastern slope east of Curitiba, on the railroad. Collections by Dusén.

Iracema. Baía. On the road to Serra de Sincorá, 13–41d. S. ! Fróes.

Irá Igarapé. Amazonas. Affluent of the Rio Tiquié, which is the first large affluent of Vaupés in Brazil below the boundary Rio Papuri. ! Schultes.

Isana, Rio. Amazonas. The same as Içana.

Itabapoana. Espírito Santo. About 21° S., 41° W.

Itabapoana, Ponte de. The same as Itabapoana, separated merely by the river dividing Rio de Janeiro and Espírito Santo. ! Hoehne.

Itacorubí. Santa Catarina. 28–48a. S.

Itamarati. Rio de Janeiro. Near Petrópolis. ! Brade.

Itambé. Minas Gerais. The locality at 19–43c. S., collection by Saint-Hilaire.

Itapeba, Restinga de. Distrito Federal. Near Recreio dos Bandeirantes.

Itapemirim. See Cachoeiro de Itapemirim.

Itapiranga. Santa Catarina. Mun. Chapecó, 27–54d. S.

Itapirapuã (Itapirapuan), Mount. Mato Grosso. Near Buritizinho and Diamantino. Collection by Lindman.

Itapoan. Rio Grande do Sul. 50 km south of Pôrto Alegre at the northern end of the Lagoa dos Patos, granitic hills, campos, woods, swamps, alt. 30 m. ! Rambo.

Itararé. Paraná. Across the river from Itararé in São Paulo, 24–49c. S. ! Asplund.

Itatinga. Baía. 15° 05′ S., 39° W. ! Fróes.

Itubira, Serra de. Baía. Near Serra das Almas, 14–42b. S.

Itumirim. Baía. The locality at 10–40c. S. ! Campos Porto.

Iturassu. Baía. About 40 miles southeast of Maracás, midway between Maracás and Jequié. ! Foster.

Izidoro, Mato do. Minas Gerais. Possibly a limestone sinkhole near Diamantina. ! L. O. Williams.

Jabaquara. São Paulo. Mun. São Paulo, near the Jardim Botânico and the Instituto de Botânica. ! Hoehne.

Jacareí (Jacarehy). Paraná. Near Ipiranga. ! Asplund. Collections

of Duséu. The citation of "restinga" as a habitat on some labels indicates a coastal locality.

Jacarepaguá, Restinga de. Distrito Federal.

Japui, Monte. São Paulo. In São Vicente.

Japuiba (Japuhyba). Rio de Janeiro. A few kilometers northeast of Angra dos Reis on the railroad. ! Hoehne.

Jaraguá, Morro da. São Paulo. Some 25 km northwest of the city of São Paulo. ! Brade.

Jarau. Rio Grande do Sul. 25 km west of Quarai, southwestern Rio Grande do Sul on the Uruguayan frontier, about 30° 30′ S., 56° W., arenitic ranges, campos, woods, alt. 200 m. ! Rambo.

Jeremoabo. Baía. The same as Geremoabo.

João Coelho. Pará. The same as Santa Isabel.

João Pessoa. Paraíba. Formerly Paraíba.

José Vaz, Serra de. Rio de Janeiro. Near Campo Belo, Itatiaia. ! Brade.

Jucú, Rio. Espírito Santo. About 30 miles southwest of Vitória. ! Foster.

Juruema, Riosinho. Amazonas. Right bank of the Rio Jutai, 6° S., 69° W. ! Fróes.

Juruena, Rio. Mato Grosso. Not listed in the Index but shown as 13–59b. S.

Kappesberg. Rio Grande do Sul. 100 km northeast of Pôrto Alegre, southern rim of the highlands, rain forest, alt. 600 m., about 29° S., 51° W. Now Estação São Salvador. ! Rambo.

Km 279 (toward Curitiba). São Paulo. Nearest Apiai, collection of Foster.

Lagem (Lagen or Layen), Retiro de. São Paulo. Region of Cajurú, collection of Regnell.

Lago, Igarapé do. Amapá. Mun. Macapá, 1° N., 52° W. ! Fróes.

Lagoa de Piri. Santa Catarina. Evidently the same as Lagoa, Ilha de Santa Catarina.

Lagoa Grande. Minas Gerais. Mun. Nova Lima, in Serra de Mutuca, 6–7 km south of Belo Horizonte. ! L. O. Williams.

Lagoa, Ribeirão da. São Paulo. May be an affluent of the Rio Feio, interior of São Paulo. ! Hoehne. Collection of Edwall.

Lapa (Bom Jesus de Lapa). Baía. 13–43c. S. ! Campos Porto.

Lapinha. Minas Gerais. 10–15 km south of Lagoa Santa. ! O'Donell.

Laranjeiras. Distrito Federal.

Layen. Error for Lagem, see above. ! Asplund.

Leblon, Praia do. Distrito Federal.

Leopoldina. Espírito Santo. The same as Cachoeira de Santa Leopoldina, 20–40c. S. Collection of Luetzelburg.

Luiz de Melo, Mata. Paraíba. Northeast of Campina Grande. ! Foster.

Macieiras. Rio de Janeiro. On Itatiaia.

Mãe Catira, Rio. Paraná. Mun. Morrêtes, by the Estrada da Graciosa, near São João. ! Hatschbach.

Mairori, Serra de. Rio Branco. Near Rio Surumú, 4–60a. N.

Majestoso, Pico. Rio de Janeiro. Serra dos Orgãos, in the Parque Nacional. ! Brade.

Mandioca. Rio de Janeiro. Below Petrópolis, collection by Glaziou. ! Brade.

Manga. Piauí. Near Floriano. 7–43a. S.

Mantiqueira, Serra da. Minas Gerais. The boundary between Minas Gerais and Rio de Janeiro, collection by Magelhães.

Manuel Agustin, Corrego. Minas Gerais. Near Corinto. ! Bracelin.

Mar, Serra do. São Paulo, Paraná. The main north-south range and drainage divide in both states.

Maracajá. Santa Catarina. 29–49a. S.

Maracanã. Santa Catarina. Evidently the same as Maracajá.

Maracassumé, Rio. Maranhão. 2° S., 47° W. ! Fróes.

Maracujá, Rio. Santa Catarina. Near Anitápolis.

Marambaia, Ilha de. Rio de Janeiro. West of the Distrito Federal, 23–44d. S.

Marapendi, Lagoa. Distrito Federal.

Marari. Amazonas. On the Rio Juruá, 6–68b. S.

Marco da Legua. Pará. Near Belém. ! Black.

Maromba, Ponte. Rio de Janeiro. On Itatiaia.

Massiambú. Santa Catarina. Mun. Palhoça, 27° 49′ S., 48° 40′ W.

Mata Luiz de Melo. Paraíba. Northeast of Campina Grande. ! Foster.

Matinhos. Paraná. Between Paranaguá and Guaratuba, near Caiobá, 25° 51′ S., 48° 32′ W. ! M. Kuhlmann.

Mato Dentro, Mun. Minas Gerais. Between Belo Horizonte and the Serra do Cipó, about 50 km from Conceição de Mato Dentro. ! Macedo.

Mauá. Rio de Janeiro. The locality at 23–43a. S.

Meio da Serra. Rio de Janeiro. Halfway up the serra to Petrópolis.

Meio, Rio do. Paraná. Mun. Antonina, 25–49d. S.

Miguel Burnier. Minas Gerais. The same as the railroad station, Burnier. ! Hoehne.

Milho Verde. Minas Gerais. The locality at 18–43c. S., collection by Saint-Hilaire.

Mirador, Rio. Santa Catarina. Near Orleães.

Moinho Velho. São Paulo. Between São Paulo and Osasco, near Butantã.

Monte Claro. Espírito Santo. Northwest of Collatina 35 miles. ! Foster.

Montenegro. Rio Grande do Sul. 60 km northeast of Pôrto Alegre, foothills of the Serra Geral (southern slope of the highlands), campo, rain forest, 30 m. alt. ! Rambo.

Monte Serrat. Rio de Janeiro. On Itatiaia.

Mooça. São Paulo. Mun. São Paulo. ! Brade.

Morin. Rio de Janeiro. Near Petrópolis. ! Brade.

Morro. See also second capitalized word of title.

Morro Grande. Paraná. Coastal. ! M. Kuhlmann.

Morro Velho. Minas Gerais. Now Vila Nova Lima, an English gold mine near Sabará and Belo Horizonte. ! Hoehne.

Morungava (Morungaba). Paraná. A district including Itararé, 24–49c. S.

Muguentaua. Amazonas. Right bank of the Rio Tefé, 3–65d. S. ! Fróes.

Mutuca, Serra da. Minas Gerais. Mun. Nova Lima, 20° 03′ S., 44° W. ! L. O. Williams.

Nariz do Frade. Rio de Janeiro. Serra dos Orgãos, Parque Nacional, alt. 1800 m. ! Brade.

Nataia, Igarapé. Amapá. Right bank of the Rio Oiapoque, 2° 05′ N. ! Fróes.

Negra, Serra. Pernambuco. Not one of those listed, near the Paraíba line. ! Foster.

Neu Württemberg. Rio Grande do Sul. Now Panambi; northwestern highlands, 28° S., 54° W., alt. 500 m., rain forest, campo. ! Rambo.

Niemeier, Avenida. Distrito Federal.
Nordeste, Escola Agronomica do. Paraíba. At Areia.
Nova Granja. Minas Gerais. Mun. Santa Luzia, near Santa Luzia on the east. ! L. O. Williams.
Nova Wurtemburg. See Neu Württemberg.

Olho d'Agua, Serra d'. Paraíba. Near 7° S., 37° W.
Olimpo, Pico. Paraná. Mun. Morrêtes, the same as Pico do Marumbi, 25–49d. ! Hatschbach.
Osório. Rio Grande do Sul. Município, near Lagoa de Pinguela (30–50a S.). Probably Conceição do Arroio of the Map.

Paduiri, Rio. Amazonas. From the Sierra Parima, 1° 22′ N., 64° 38′ W.
Pae Ricardo, Matas do. Distrito Federal.
Paineiras. Distrito Federal. On the Corcovado.
Palacios. Minas Gerais. Mun. Jaboticatubas, 19° 10′ S., 43° 35′ W., alt. 1200 m. ! Segadas-Vianna.
Palmarco. Pernambuco. Evidently an error for Palmares, 9–35a.
Palmeira. Rio Grande do Sul. Northeastern highlands, about 27° 30′ S., 54° W., alt. 600 m., campo, woods. ! Rambo.
Palmeiras. Mato Grosso. The locality at 16–56b. S., near Cuiabá. Collection by Lindman.
Palmeiras. Paraná. Between Curitiba and Ponta Grossa, 25° 24′ S., 50° W. ! M. Kuhlmann.
Panuré. Amazonas. The same as Ipanuré, Ipanoré, and São Jeronimo; on the Rio Uaupés, 0–68a. N. ! Pires.
Pão d'Assucar. Distrito Federal. Peak at the west side of the entrance to the bay.
Papagaio, Pico do. Distrito Federal.
Papagaio, Rio. Mato Grosso. Near Utiariti.
Paraíba. Paraíba. Now João Pessoa.
Paraíba do Norte. The same as the state of Paraíba.
Paraibana. Minas Gerais. The same as Rio Paraibuna in Juiz de Fora. ! Hoehne.
Paramirim dos Creoulos. Baía. The same as Paramirim at 13–42c. S.
Pardo, Rio. Rio Grande do Sul. The locality at 30–52a. S., collection by Sellow.
Parecí Novo. Rio Grande do Sul. 60 km northeast of Pôrto Alegre, 10 from Montenegro, foothills of the Serra Geral, rain forest region, alt. 50 m. ! Rambo.
Parque do Estado. São Paulo. Mun. São Paulo, surrounds the Instituto de Botânica. ! Hoehne.
Parque Nacional. Minas Gerais. Mun. Antônio Dias, near Ipatinga. ! Foster.
Parque Nacional. Rio de Janeiro. Near Teresópolis.
Patrimonio. São Paulo. Between Piedade and Juquiá, 23° 50′ S., 47° 27′ W. ! M. Kuhlmann.
Pedra Bonita. Distrito Federal.
Pedra Branca. Espírito Santo. Mun. Cachoeiro de Itapemirim, 20° 40′ S., 2° east of Rio de Janeiro. ! Brade.
Pedra Grande. São Paulo. The same as Pedra Grande de Atibaia. ! Hoehne.
Pedra, Serra da. Santa Catarina. Near Araranguá.
Pedras, Morro das. São Paulo. Mun. Iguapé, near the coast about 15 km north of Iguapé. ! Brade.
Pelado, Morro. São Paulo. Near Lindóia, 23–47b. S. ! Hoehne.
Pereque, Rio. Paraná. Mun. Paranaguá, 26–48a. S. ! Hatschbach.
Peroba. Santa Catarina. Near Araranguá.

Pharmacópolis (of Vellozo). Rio de Janeiro. Now Parati, 23–45d. S. ! Brade.

Piaçaguera (Piassaguera). São Paulo. An island in the delta just north of Santos.

Picu, Serra do. Minas Gerais. The Serra lying south of Itatiaia, collections by Glaziou. ! Brade. Near the boundary with São Paulo and with Rio de Janeiro.

Piedade, Pico da. Minas Gerais. Near Caete, 20–44b. S.

Pilão, Serra do. Santa Catarina. Near Araranguá.

Pilões. Santa Catarina. Near Palhoça.

Pinhaes. Paraná. São José dos Pinhaes, collections of Dusén, 26–49a. S.

Pinhal. Rio Grande do Sul. Possibly the railroad station at 30–54b. S., collection of Palacios and Cuezzo.

Pinheiral. Rio de Janeiro. Indicates a spontaneous stand of Araucaria on Itatiaia, alt. 2000–2200 m., between Macieiras and Agulhas Negras. ! Brade.

Pirajussara. São Paulo. Mun. São Paulo, by Butantã. ! Hoehne.

Piraquara, Mun. Paraná. 29 km east of Curitiba.

Piratininga, Restinga da. Rio de Janeiro. South of Niteroi, collection of J. G. Kuhlmann.

Poção. Pernambuco. The locality at 8–37d. S., 28 km north of Pesqueira. ! Pickel.

Pontanarrí, Igarapé. Amapá. About 20 km west of Oiapoque on the Brazilian side. ! Black.

Ponte de Pedra. Mato Grosso. The locality at 14–57a. S., collection by Hoehne.

Portoa. Baía. Across the bay from Ilheus. ! Foster.

Pôrto da Caixa. Rio de Janeiro. Near Niteroi on the Baía da Guanabara. ! Brade.

Pôrto das Canoas. Santa Catarina. Mun. São Francisco do Sul, between Joinvile and the Paraná line.

Pôrto Dom Pedro II. Paraná. On the Baía de Paranaguá. ! Asplund.

Pôrto União. Santa Catarina. On the Map at 26–51c. S., incorrectly indexed.

Pouso Alegre. Minas Gerais. The locality at 22–46d. S. ! Hoehne.

Praia. See also the second capitalized word of the title.

Praia Braba (Brava). Santa Catarina. South of Itajaí.

Praia Grande. São Paulo. The same as the station of Moncaguá or Mongaguá on the Sorocabana railroad line. ! Hoehne.

Prateleiras. Rio de Janeiro. On Itatiaia.

Prazeres, Serra dos. Paraíba. Near Triumfo.

Queimada Grande, Ilha da. São Paulo. South of Itanhaém, 24–47d. S.

Queimado, Morro. Distrito Federal.

Quilombo, Rio. São Paulo. The locality at 24–46a. S., collection by Doering.

Quinta da Boa Vista. Distrito Federal.

Quintas. Goiás. Mun. Goiás, 25 km from Goiás on the slopes of Serra Dourada. ! Macedo.

Rats, Isle aux. Distrito Federal. Baía da Guanabara.

Recreio dos Bandeirantes. Distrito Federal.

Redentor, Estrada do. Distrito Federal.

Republica, Alto da. Rio de Janeiro. Mun. Santa Maria Madalena, 22° S., 1° 10′ east of Rio de Janeiro. ! Brade.

Retiro. Minas Gerais. Probably just a shelter on the Fazenda do Diamante, collection by Mexia. ! Bracelin.

Retiro, Morro do. Rio de Janeiro. Near Petrópolis, collection by Glaziou. ! Brade.

Retiro, Rio. Minas Gerais. In the Serra da Mantiqueira south of Itatiaia. ! Brade.

Retiro da Lagem (Lagen or Layen). See Lagem.

Reutersberg. Rio Grande do Sul. 70 km from Porto Alegre, 10 from Dois Irmãos, alt. 400 m., rain forest. ! Rambo.

Ribeirão do Ouro. Santa Catarina. Near Brusque.

Ribeirão do Tijuco. São Paulo. The same as Rio do Tijuco, Apiai, 24° 33′ S., 48° 55′ W. ! M. Kuhlmann.

Ribeirão Grande. Santa Catarina. Near Taió.

Ribeirão Pires. São Paulo. Mun. Santo Andre, on the Santos to São Paulo railroad. ! Hoehne. Not in the Index but shown on the Map, 24–46a. S. Collection by Edwall.

Ribeirão, Ilha do. Distrito Federal. In the city of Rio de Janeiro. ! Brade.

Ricardo Franco, Pico. Pará. 2° 17′ 59″ N., 55° 56′ 47″ W., collection of Sampaio.

Rio do Restro, Serra do. Santa Catarina. Near Orleães.

Rodrigo de Freitas, Lagoa. Distrito Federal.

Rola Moça, Serra de. Minas Gerais. Boundary between Mun. Betim and Mun. Brumadinho, 20 km from Belo Horizonte. ! Foster.

Salto. Santa Catarina. Near Blumenau. Collection by Reitz.

Salto Alegre. Rio Grande do Sul. Near Neu Württemberg, collection by Bornmueller. ! Rambo.

Salvador. Rio Grande do Sul. The same as Estação São Salvador, formerly Kappesberg. ! Rambo.

Sanga da Anta. Santa Catarina. 29–50d. S.

Sanga do Engenho. Santa Catarina. 29–50b. S.

Sanitaria, (Fonte). São Paulo. About 150 km from São Paulo on the road to Curitiba. ! Foster.

Santa Cruz. Mato Grosso. None of those listed in the Index. On the Rio Paraguai and evidently the same as Barra dos Bugres on the map, 15–57c. S. Collection by Moore.

Santa Felicidade. Paraná. Mun. Curitiba, 25–49c. S. ! Hatschbach.

Santa Isabel. Pará. Now João Coelho on the Belém-Bragança railroad line, 1–48c. S.

Santa Luzia, Morro. Santa Catarina. Near Brusque.

Santa Teresina. Pernambuco. Mun. Palmares, 9–35a. S.

Santa Terezinha. Minas Gerais. Mun. Ituiutaba, north of Ituiutaba on the Rio Paranaíba, 19–50b. S. ! Macedo.

Santo Antonio. Santa Catarina. Evidently the same as Santo Antonio da Ilha and Santo Antonio de Lisboa, 28–49b. S.

Santos Dumont. Ceará. Now Aratuba.

São Bento. Pernambuco. The locality at 8–35b. S., near Tapera.

São Bento (do Sul). Santa Catarina. The locality at 26–49c. S.

São Caetano. Minas Gerais. The locality at 21–44b. S., collection by Gardner.

São Cristovão. Distrito Federal.

São Francisco dos Campos. Minas Gerais. Region of the Serra da Mantiqueira, almost on the São Paulo line, 22° 35′ S., 45° 24′ W. ! M. Kuhlmann.

São Gabriel, Rio. Espírito Santo. Meets the northern Rio Doce at about 19° 30′ S., 41° W. ! Brade.

São Ignacio, Serra do. Baía. Near São Ignacio, 11–43d. S.

São João. Amazonas. 7–72c. S. Collection by Ule.

São João. Paraná. The locality at 25–49d. S., collection by Dusén.

São João do Piauí. Piauí. The locality at 9–43b. S.

São João dos Barreiros. São Paulo. Now simply São João, near São Roque, 24–47ab. S. ! Hoehne.

São João, Pedra. Rio de Janeiro. On the Rio Paquequer in the Parque Nacional, 22–43d. S. ! Brade.

São Joaquim, Mun. Santa Catarina. The same as São Joaquim da Costa da Serra on the Map, 50–28d. S. Collection by Reitz.

São Jose, Serra de. Baía. North of Geremoabo, 10–38a. S.

São José del Rei, Serra. Minas Gerais. Error for São João del Rei, collection by Glaziou.

São Luiz. Paraná. Near Ponta Grossa. ! Foster.

São Luiz de Purunã, Serra. Paraná. Mun. Campo Largo, 49 km from Ponta Grossa, the beginning of the campos of the planalto, 25–50d. S. ! Hatschbach.

São Marcelino. Amazonas. The same as Marcellino, 1–67c. N. On the left bank of the Rio Negro opposite the Rio Xié. ! Schultes.

São Miguel. Minas Gerais. Near Viçosa, collection by Mexia. ! Bracelin.

São Pedro. Amazonas. On the Rio Paduiri, 1° N. ! Fróes.

São Sebastião. São Paulo. The locality at 23–46c. S., near Campinas.

São Vicente, Campos de. Minas Gerais. 8 km south of Ituiutaba. ! Macedo.

Saquarema. Paraná. Between Morrêtes and Alexandra. ! Stellfeld.

Sernambetiba, Restinga de. Distrito Federal.

Serra. São Paulo. The same as Alto da Serra.

Serra. See second capitalized word of title.

Sertão da Lagoa. Santa Catarina. On the Ilha de Santa Catarina and evidently near or the same as Lagoa.

Sete Lagoas. Minas Gerais. 60 km northwest of Belo Horizonte, 19° 30′ S. ! Brade.

Silvestre. Distrito Federal. On the Corcovado.

Sipó. See Cipó.

Sitio. Minas Gerais. On the railroad south of Barbacena. Not indexed but on the Map, 21–44d. S. Collection of Sampaio.

Soberbo. Rio de Janeiro. Just south of Teresópolis and below the divide of the Serra dos Orgãos, 22–43d. S.

Socavão. Paraná. 30 km east of Castro, 25–50b. S. ! Stellfeld.

Spitzkopf. Santa Catarina. Two different peaks, one near Blumenau, a collecting locality of F. Mueller and others, the other near Brusque, a collecting locality of R. Reitz.

Suarão. São Paulo. Coast near Itanhaém, 24–47d. S. ! Hoehne.

Sumare. Distrito Federal.

Tabunha, Fazenda da. Minas Gerais. Viçosa in the drainage basin of the Rio Doce, collection by Mexia. ! Bracelin.

Taguá, Morro. Paraná. About 2 km west of Caiobá, 26–49b. S. ! Stellfeld.

Taimbe. Rio Grande do Sul. More usually Taimbesinho, 190 km northeast of Pôrto Alegre, about 29° 30′ S., 50° W., alt. 930 m., Araucaria woods, campo, cloud forests, peat bogs. ! Rambo.

Taió. Santa Catarina. Evidently the same as the Rio Itayo of the Map, 27–50cd. S.

Taipú, Ponte de. São Paulo. The same as Itaipú and Morro de Taipú, 24–46c. S.

Tambe (Itambe), Taboleiro de. Paraíba-Pernambuco. 7–35c. S.

Tapari. Pará. About 25 miles up the Rio Tapajoz from Santarém, 3–55a. S. ! Dahlgren.

Tapera. Pernambuco. Railroad station, 8–35c. S., collections by Pickel. ! D. A. Lima. Not in Index but on Map.

Taperinha. Pará. Near Santarém, collection by Ginzberger & Zerny, probably a farm where they stayed. ! Rechinger.

Tapes, Serra dos. Rio Grande do Sul. Granitic range, north of Pelotas and south of the Rio Camaquam, about 31° 30′ S., beginning at the Lagoa dos Patos. ! Rambo.

Taquaril, Serra de. Minas Gerais. Mun. Belo Horizonte, collection by Oliveira.

Taraira, Rio. Amazonas. Part of the Brazil-Colombia boundary, flowing south into the Rio Apaporis about 50 km above its mouth, 1–70b. S. ! Schultes.

Taraqua. Amazonas. The locality at 0–68c. S., collection by Pires.

Taruva. Santa Catarina. Near Araranguá.

Tavares, Rio. Santa Catarina. On the Ilha de Santa Catarina south of Lagoa.

Theewald. Rio Grande do Sul. 70 km northeast of Pôrto Alegre, foothills of the Serra Geral, rain forest region, alt. 500 m. ! Rambo.

Tijuca, (Pico da). Distrito Federal.

Tijuca, Barra da. Distrito Federal.

Tijuca, Restinga. Distrito Federal. The coast west of Gavea.

Tijuco, Rio. São Paulo. Near Apiaí, 24° 33′ S., 48° 55′ W. ! M. Kuhlmann.

Timoneira. Paraná. The same as Tamandaré, 25–49c. S.

Tinga, Rio. Pará. On the Rio Cupari about 45 miles from its mouth. ! Black.

Toca do Tigre. Rio Grande do Sul. 5 km from Itapoan. ! Rambo.

Tomé Assú. Pará. Japanese colony on the Rio Acará and its tributary the Tomé Assú, 2–48c. S., collection by Mexia. ! Bracelin.

Trinidade. Santa Catarina. On the Ilha de Santa Catarina, collection by Rohr.

Turma 23. Paraná. Near Ponta Grossa. ! Asplund. Probably a railroad installation.

Uanari. Amazonas. The same as the Serra do Uranari, near São Gabriel, 0–67b. S. ! Pires.

Ubatuba. São Paulo. The locality at 23–45c. S., on the coast north of Caraguatatuba and the Ilha de São Sebastião. ! Hoehne.

Umuarama. São Paulo. On the Planalto da Mantiqueira, 22° 46′ S., 45° 34′ W. ! M. Kuhlmann.

Utinga. Pará. In Belém. ! Black.

Vaccaria. Minas Gerais. 106 km north of Belo Horizonte near Cipó. ! Foster.

Val Veneto. Rio Grande do Sul. Near Santa Maria, about 29° 45′ S., 53° W., southern slope of the highlands, rain forest region. ! Rambo.

Varadouro. Pará. Probably refers to a low habitat with a little water rather than a locality. Collection of Sampaio.

Vargem Alta. Espírito Santo. Mun. Cachoeiro de Itapemirim, 60 km northeast of Cachoeiro do Itapemirim. ! Foster.

Vargem do Cedro. Santa Catarina. The same as Vargem do Cerro on the Map, 28–49d. S.

Vargem Grande. Goiás. On the upper Rio Tocantins, 15–48d. S.

Victoria. Espírito Santo. Now Vitória.

Viera. Rio Grande do Sul. Near Rio Grande, collection by Archer.

Vila Ema. São Paulo. Mun. São Paulo, by Ipiranga. ! Brade.

Vila Friburgo. São Paulo. Mun. São Paulo. ! Hoehne.

Vila Mariana. São Paulo. Mun. São Paulo, collection by Usteri. ! Hoehne.

Vila Nova. Santa Catarina. The locality at 28–49d. S., collection by Reitz.

Vila Velha. Paraná. A castlelike geological formation, not a settlement, southeast of Ponta Grossa.

Vista Chineza. Distrito Federal.

Vitória. Pernambuco. The locality at 8–35c. S. Collection by Pickel.

Viuva, Morro da. Distrito Federal.

Volta Grande. Paraná. km 39 from Curitiba on the road to Paranagua, 25–49d. S. Not indexed but on the Map.

Vossoroca. Paraná. Mun. São José dos Pinhaes, a reserve of the light and power company, 26–49a. S. ! Hatschbach.

Xiborem, Rio. Amazonas. Evidently the same as Xiborena of the Index, collection by Luetzelburg.

Ypiranga. See Ipiranga.

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