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STUDIES IN THE GESNERIACEAE OF THE OLD WORLD  
XXVI: A CONTRIBUTION TO THE STUDY OF *CHIRITA*

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*Chirita* undoubtedly has one of its main centres of distribution in Upper Burma and the first part of this paper is concerned chiefly with the very rich collection of the genus made in this area by F. Kingdon Ward on his 1926 expedition. These species all belong to Section *Chirita* itself. There are also included some records from specimens collected in India's North East Frontier Agency by members of the staff of the Botanical Survey and kindly sent for my examination by its director Dr. H. Santapau. Including the new species now described, these are probably 22 species of the genus on record for Burma as a whole, and of these 18 belong to Section *Chirita*, 1 to Section *Microchirita*, while the sectional position of *C. monophylla* C.B.Cl., *C. oblongifolia* (Roxb.) Sinclair and *C. lacei* (W. W. Sm.) B. L. Burtt is somewhat doubtful.

It is to be noted that these species of Section *Chirita* are all plants of the forest, forest margins or shady soil banks and similar habitats: where the underlying rock is recorded it is granite. This is in sharp contrast with the species of Section *Microchirita* and the two species of uncertain affinity, *C. lacunosa* and *C. cyanea*, mentioned in the second part of the paper. These all come from further south (Lower Burma, Thailand and Malaya) and here *Chirita* is most often, and characteristically, a genus of the limestone, the exceptions (such as *C. elata* Ridley) being of somewhat uncertain affinity.

*Chirita* Section *Chirita*

***Chirita adenocalyx*** Chatterjee in Kew Bull. 1948, 63.

TYPE: Upper Burma: Kampti, Nama Uka, Marao Uka, 770 m, xii 1911, Toppin 4251 (K).

The species was described from this one specimen. There is now quite a considerable number of specimens which seem referable to it:-

INDIA: North East Frontier Agency: Lohit F. D., Shoeliang to Paya, corolla yellowish along the tube, violet rosy tinge along corolla lobes and yellowish tinge along mouth of corolla, 15 xi 1957, R. S. Rao 10633 (CAL); Tirap F. D.,

Risa to Bimalpur, flowers large deep violet, 7 ix 1958, *G. Panigrahi* 16993 (CAL, E); Tirap F. D., Namchik to Chenglang, 550 m, yellow flowers, 15 x 1959, *R. S. Rao* 20212 (CAL, E).

UPPER BURMA: Nam Tamai valley, 900 m, 27°42' N, 97°54' E, flowers yellow, 27 viii 1938, *Kaulback* 93 (BM, E); Nwai valley, 1800–2400 m, flowers deep violet corolla lobes, marked with yellow and brown inside throat, 13 ix 1914 *Kingdon Ward* 1942 (E); *ibidem*, flowers yellow striped with dull red, *Kingdon Ward* 1932 (E); Valley of Nam Tamai, 27°45' N, 97°55' E, 1200–1500 m, flowers purple the tube striped, 19 viii 1926, *Kingdon Ward* 7320 (K); *ibidem*, 1500 m, flowers purple with 2 yellow stripes along the floor, and several purple stripes, sometimes with the yellow *Chirita* 7343, 11 ix 1926, *Kingdon Ward* 7393 (K); Mts. east of Fort Hertz, 27°20' N, 97°30' E, flowers yellow with thin purple regular lines, 9 ix 1926, *Kingdon Ward* 7343 (K); Eastern approaches from Sumprabum to Kumon Range, c. 26°40' N, 97°20' E, between Mache-Ga and Kanang, 1200–1500 m, flowers creamy yellow with orange blotch, 26 xii 1961, *Keenan, U Tun Aung and Tha Hla* 3051 (E).

The above citations show that this species is widespread in Upper Burma and just over the western boundary in India. They are given in some detail in order to draw attention to the variations in flower colour. Briefly, the corolla may be either predominantly violet or predominantly yellow. In the former case there are usually yellow lines between the lobes, in the latter there is very often a prominent reddish or purple patch at the opening of the tube.

These variations may be compared with those in *Chirita macrophylla* Wall., which typically has bright yellow flowers. Violet coloured forms with the throat light yellow are known from NE India, Burma, SW Yunnan and N Thailand.

It is far too seldom that collectors give any information on flower pollination. I would therefore like to print the full notes accompanying *Kingdon Ward* 7343—both for their intrinsic worth and as an encouragement to others:—"Flowers yellow with thin purple regular lines. Lateral petals outside in bud, lower middle inside. Stamens 2, cohering. Staminodes 2. Anthers at first directly under the wide trowel-shaped stigma. The filaments are provided with knobs which block the passage in the throat of the corolla and are hinged like levers. Pressure on the knob pulls the anthers slightly apart and on closing again they squirt out a jet of fine pollen dust from the elastic anthers and this catches a bumble bee exactly on the head. Later the anthers are drawn back from under the stigma, out of the way, and the stigma curves downwards till a bumble bee's head must (and in fact does) rub against it. Tiny flies visit the flowers besides bumble bees, but doubtless they are not welcome."

This species, *C. adenocalyx*, was compared by Chatterjee with *C. urticifolia* Ham. ex D. Don; it also comes close to *C. hookeri* C. B. Cl., which is distinguished by its very densely shaggy calyx.

***Chirita heterostigma* B. L. Burt, species nova** formosissima ab omnibus sectionis *Chiritae* stigmatis labio superiore semicirculari (haud abortivo) distinguitur. A *C. adenocalyce* Chatterjee rhizomate longo, foliis majoribus breviter petiolatis, floribus majoribus corollae tubo intus superne bilamellato

recedit. A *C. speciosa* Kurz caulibus erectis, foliis breviter petiolatis, floribus axillaribus breviter pedunculatis.

*Herba* rhizomatosa; rhizoma (teste K.W.) 1–2 ped. longum caules erectos  $1\frac{1}{2}$ – $2\frac{1}{2}$  ped. altos promittens; caules, ut videtur, haud ramosi, superne dense brunneo-piloso-pubescentes, inferne glabrescentes. *Folia* opposita, aequalia vel inaequalia; petiolus ad 2 cm longus, dense piloso-pubescent; lamina late elliptica, 20 cm usque longa et 8 cm usque lata, leviter inaequalateralis, apice breviter acuminata, basi abrupte angustata vel (in uno latere) subrotundata, marginibus leviter serratis, utrinque parce (subtus ad nervos densiuscule) piloso-pubescent; nervi laterales utrinsecus c. 13, subtus prominuli. *Inflorescentia* omnino piloso-pubescent, subsessilis, axillaris, pauciflora (flore singulo solum evoluto?); bractae primae lineari-oblancoolatae, 1.2 cm  $\times$  2.25 mm; *pedicellus* c. 2 cm longus. *Calyx* etiam piloso-pubescent, tubo 1 cm longo, segmentis 5 lineari-lanceolatis trinervis 1.5 cm longis. *Corolla* 7 cm longa, tubo c. 4.5 cm ore aperto intus supra bilamellato; limbus ut videtur leviter bilabiatus, lobis inferioribus c. 1.4 cm  $\times$  1.2 cm late rotundatis, superioribus paullo minoribus. *Staminum* fertilium filamenta 2 cm supra tubi basi orientia, basi contorta plus minusve complanata, c. 1 cm longa, apices versus minute glandulosa; antherae coram cohaerentes, late reniformes, 4 mm latae, dorso leviter barbatae. *Staminodia* c. 3 mm apice curvata. *Gynoeceum* lineare, dense pubescent, c. 4 cm longum; stigma (fig. 1b) labio inferiore in lobos duos divergentes 4 mm longos 2.25 mm latos divisum, superiore minore semicirculari. *Capsula* ignota.

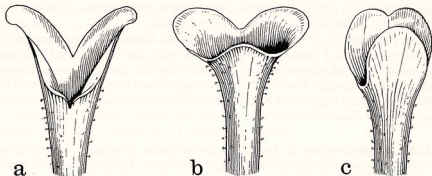


FIG. 1

Series showing interrelation of different stigmatic types. a, *Chirita urticifolia* D. Don; b, *Chirita heterostigma* B. L. Burtt; c, *Didissandra sesquifolia* C. B. Cl.

BURMA: Nam Tamai valley, 900 m, big coarse herb of 1–2 ft. on well-shaded banks in the jungle, flowers pale violet with three darker guide lines on each of the lower lobes and a stripe of pale yellow between each lobe, 9 xi 1922, *Kingdon Ward* 5528 (E); Nam Hat, 600–750 m, grows socially on shady banks where it is always more or less damp and dark, rhizome 1–2 ft. long sending up one or more erect flowering stems  $1\frac{1}{2}$ – $2\frac{1}{2}$  ft. high, flowers pale violet with white throat and a few guide lines, 27 iv 1926, *Kingdon Ward* 6655 (holo. K).

Although *C. heterostigma* is by no means the only upright species of *Chirita*, it is, as far as I know, the only one which produces erect unbranched stems to a height of  $1\frac{1}{2}$ – $2\frac{1}{2}$  ft. from a long rhizome. With this habit and a

flower about 7 cm long it must certainly be the most striking species of the genus yet discovered.

Botanically, however, *C. heterostigma* has a greater claim to interest in the structure of its stigma. The fish-tail like stigma of a typical *Chirita* has long been well known and it is over 120 years since Robert Brown (in Horsfield, Pl. Jav. Rar. 113; 1841) pointed out that both lobes belong to the lower lip of the stigma, the upper lip being aborted. In *C. heterostigma* (fig. 1b) it is seen that though the lower lip is well-developed and bilobed in the typical *Chirita* fashion, the upper lip is still present, albeit much smaller than the lower.

Now one of the gesneriads most puzzling as to generic position has long been *Didissandra sesquifolia* C. B. Clarke (in Hook. Ic. Pl. 18, t. 1797: 1888). In habit it resembles *Chirita bifolia* but it has 4 fertile stamens and both lips of the stigma developed into thin lamellae, the upper smaller than the lower (fig. 1c). K. Fritsch made a new section, *Chiritoides* of *Didissandra* for this plant. It is not obviously related to any other species of that genus and I had already been tempted to regard it as a tetrandrous *Chirita* but had been dissuaded by the form of the stigma. Now, however, *C. heterostigma* shows a clear link in stigmatic morphology between *Chirita urticifolia* (fig. 1a) and *Didissandra sesquifolia*. The latter species remains anomalous in having four stamens and it would not be immediately helpful to include it in *Chirita*. Nevertheless I now consider that its affinity to that genus is clearly shown and in working towards a redefinition of *Chirita* it will be necessary to remember that *Didissandra sesquifolia* comes closer to the type species, *C. urticifolia*, than do for instance *C. sinensis* or *C. asperifolia*.

The position of *C. heterostigma* in section *Chirita* is confirmed by a character to which I have already drawn attention (see Notes R.B.G. Edinb. 21, 210-211: 1954), the possession on the roof of the corolla tube of internal flanges between which lies the style. Although absent in *C. urticifolia* and *C. adenocalyx*, these are present in a number of allied species such as *C. speciosa*, *C. trailliana*, *C. anachoreta*, etc.

***Chirita longipedicellata*** B. L. Burtt, *species nova* e sectione *Chirita* flore breviter et late infundibuliformi *C. stoloniferam* Fischer & Kaul et *C. umbricolam* W. W. Smith revocans, ab ambabus caule erecto foliis aequalibus ovario pilis glandulosis recte patentibus parce instructo distinguitur.

*Herba* e rhizomate tenui erecta ad 30 cm alta, caulibus densiuscule piloso-pubescentibus. *Folia* opposita, aequaliter evoluta; petiolus 2.5 cm longus, piloso-pubescentibus; lamina late elliptica, 5-6 cm longa et 3-4 cm lata, apice acuta vel brevissime abrupte acuminata, basi cuneata, marginibus crenato-serratis, supra densiuscule infra parcius piloso-pubescentibus, nervis lateralibus utrinsecus circa 5. *Flores* axillares, solitarii, pedicellis ad 7 cm longis piloso-pubescentibus suffulti. *Calyx* c. 1.5 cm longus, extra pilosus, lobis paulo inaequalibus; tres posteriores 1 cm longi, basi 3 mm lati, in apicem longe acuminatum attenuati, duo anteriores 1.4 cm longi, vix 3 mm lati. *Corolla* 4 cm usque longa, extra parce pilosa; tubus (ad sinus laterales) 2.3 cm longus, basi 5 mm latus sursum ampliatus ore fere 2 cm diametro, intus lateraliter glandulosus; lobi labii posterioris 7 mm longi et 8 mm lati, ei labii anterioris 1 cm longi et 5 mm lati. *Stamina* fertilia 2, 4 mm supra basin tubi orientia;

filamenta 6 mm longa, dimidio superiore pilis eglandulosis et glandulis verrucosis intermixtis dense vestita; antherae coram cohaerentes, reniformes, 1.5 mm longae 3 mm latae paullo barbatae. *Staminodia* 3; medium minutum, 2 lateralia 1.5 mm longa. *Discus* parvus, anularis. *Ovarium* 1 cm longum, pilis glanduloso-capitatis distanter vestitum, in stylum 5 mm longum parce glandulosum sensim attenuatum; stigma lobo inferiore late bilobo.

UPPER BURMA: Valley of Seinghku, 2100 m, flowers more or less violet, darker above than below and outside than inside, amongst high herbaceous undergrowth beneath Alder copse, 5 viii 1926, *Kingdon Ward* 7241 (holo. K).

An erect species, but with flowers reminiscent in shape of the creeping *C. stolonifera* and *C. umbricola*. In both these species one leaf at each node tends to be greatly reduced.

***Chirita peduncularis* B. L. Burtt, species nova ex affinitate *C. dimidiatae* C. B. Cl.** sed inflorescentiis bifloris bracteis basi connatis semper distinguenda.

*Herba* 30–45 cm alta e basi decumbente; caules striati pubescentes. *Folia* opposita, subaequalia, petiolis 4 cm usque suffulta; lamina ovato-elliptica, c. 12.5 cm longa et 7.25 cm lata apice breviter acuminata, basi paullo inaequalis, marginibus crenato-serratis serraturis apice glandulis (hydatiodiis?) instructis, utrinque parce piloso-pubescent, nervis lateralibus utrinsecus c. 8. *Pedunculi* axillares 4 cm longi, parce piloso-pubescent, biflori, apice bracteis duo suborbicularibus 6 × 6 mm parte quarta inferiore connatis ciliato-denticulatis et glandulis paucis nigris prope apicem instructi. *Pedicelli* 12 mm longi, apicem versus tenuiter hirsuto-pilosi. *Calyx* late cylindricus, 2 cm longus (in sicco 8 mm latus), lobis 5 triangularibus 5–6 mm longis (summo paullo longiore) hirsuto-ciliatis. *Corolla* 4.5 cm longa, alba, lineis duo luteis elevatis in fauce instructa; tubus 3.25 cm sursum ampliatus, lobis rotundatis 5, mediano 6 mm × 5 mm. *Stamina* fertilia 2, c. 2 cm supra corollae basin orientia; filamenta complanata 1 cm longa, glabra; antherae 2.5 mm latae glabrae. *Staminodia* parva. *Discus* parvus anularis. *Ovarium* lineare, glabrum. *Capsula* 10–11 cm longa, glabra.

UPPER BURMA: Valley of the Nam Tamai, 27°15' N, 97°55' E, 900–1200 m, plant of 12–18 inches growing in colonies in the shade, flowers white with 2 raised yellow ribs along the floor—very similar to those of No. 7401, 12 ix 1926, *Kingdon Ward* 7402 (holo. K).

This species stands very much alone. The partial union of the bracts is a character of Section *Microchirita*, but there is nothing in the broadly tubular corolla to suggest it otherwise. I think the suggested affinity with *C. dimidiata* C. B. Cl. is the true one.

***Chirita pumila* D. Don, Prod. Fl. Nepal. 90 (1825).**

UPPER BURMA: Valley of the Seinghku, 1800–2100 m, on banks in the meadow smothered beneath other vegetation, the leaves are mottled with large brown patches, tube white with a broad band of yellow inside along the floor; lobes pale violet, 3 viii 1926, *Kingdon Ward* 7240 (K).

***Chirita reptans* B. L. Burtt & Panigrahi, species nova sectionis *Chiritae* ex affinitate *C. trailliana* Forrest & W. W. Sm. et *C. brevipedis* C. B. Cl. ab**



ambabus caule tenui longe reptante et foliis calycibusque minoribus facile distinguitur.

*Herba* caulibus repentibus radicanibus molliter brunneo-pilosis. *Folia* opposita sed uno cujusque paris fere abortivo pseudo-alternantia; petioli longitudine variabiles, nunc 1.75 cm nunc 20 cm longi, uti caules patenter brunneo-pilosi; lamina ovata, 5–10 cm longa, 4–9 cm lata, acuta vel abrupte acuminata, basi cordata, marginibus crenato-serratis, utrinque piloso-pubescentis, venis lateralibus utrinsecus 6–9 subtus prominulis. *Pedunculus* axillaris uniflorus, 3.5–6.5 cm longus, superne bracteolatis (bracteolis c. 5 mm longis linearibus aut spatulatis). *Calyx* 1 cm longus fere ad medium in lobos lanceolato-acuminatos corniculatos divisus, extra piloso-pubescentis, intus glaber. *Corolla* 6 cm longa, tubo 4 cm longo, lobis late rotundatis, extra parce pilosa. *Stamina* 1.5 cm supra corollae basin orientia; filamenta 5 mm supra basin incrassata et geniculata, in toto 1.5 cm longa; antherae coram cohaerentes, late reniformes, 5 mm latae, in dorso breviter barbatae. *Discus* anularis. *Gynoeceium* stigmatibus incluso 4 cm longum, ovario breviter pubescente stylum ad apicem pilis glandulosis instructum aequante; stigma labio superiore abortivo, inferiore bilobo 8 mm lato.

INDIA: North East Frontier Area, Tirap Frontier District, Chenglang to Khela, 666 m, creeper on the ground on moist soil slopes, not rare and fairly abundant where found, flowers bell-shaped, lower portion of petals white, upper portion sky-blue, stem and leaves with small woolly hairs, 12 iii 1958, G. K. Murthy 12953 A (CAL).

BURMA: Nyitadi, head of Akhyang Valley, c. 27°15' N, 98°45' E, 1800 m, trailing about in damp rocky (non-calcareous) steep places and little bluffs, flowers fine violet blue, 30 iv 1920, Farrer 1526 (holo. E); Tanga Bum, 27°28' N, 97°42' E, 1650 m, creeping plant growing over rocks and tree trunks in deep shade in the jungle, flowers pale violet with guide lines, 19 iv 1926, Kingdon Ward 6637 (K).

Even in Farrer's collecting there is quite a considerable variability in size of flower, 4–6.5 cm, and calyx 1–1.5 cm. Kingdon Ward's specimen is altogether more robust, with longer petioles and larger leaves; yet the flowers are of the same size as the larger ones on Farrer's specimen. The differences are presumably just those between a vigorously growing plant and one on a more barren piece of ground.

The specimen collected by Murthy was sent on loan to Edinburgh, together with other specimens of Gesneriaceae, after it had been carefully examined and annotated by Dr. Panigrahi, who suggested it was a new species. Farrer's plant had long been lying in the Edinburgh herbarium with a note that it was undescribed. The new species is therefore published jointly. The distribution suggests that this species may prove to be not uncommon in a belt right across northern Burma.

**Chirita stolonifera** Fischer & Kaul in Kew Bull. 1940, 196.

UPPER BURMA: Valley of the Nam Tamai, 27°45' N, 97°55' E, 1800 m, creeping plant growing in colonies on banks in the forest, flowers pale violet, 19 viii 1926, Kingdon Ward 7317 (K).

This species was originally described from the Delei valley (KW 8462).

**Chirita umbricola** W. W. Smith in Notes R.B.G. Edinb. 10: 172 (1918).

UPPER BURMA: Nam Tisang—Mali divide, 27°30' N, 97°50' E, 1800 m, on rocks and clay banks in shady places on the ridge, flowers pale violet, the upper lip white and curled back, occasionally the whole flower is white, 24 viii 1926, *Kingdon Ward* 7330.

This specimen is a good match of the type (KW 1824 from the ridge of the Naung-Chaung—Nwai divide). Some material (e.g. *Forrest* 24838) deviates in having the calyx more deeply divided. This character is, however, rather unreliable and the species of this group often seem to have the calyx lobes cohering laterally rather than formed as a distinct tube.

#### OTHER SPECIES

**Chirita cyanea** (Ridl.) B. L. Burtt, **comb. nov.**

Syn.: *Didymocarpus cyaneus* Ridl. in Journ. of Bot. 38: 68 (1900); Sprague in Bot. Mag. t. 8204 (1908); Bois in Rev. Hort. N.S. 11: 448 (1911).

S THAILAND: Kasum (i.e. near Phangnya), *Curtis* (holo.)

For notes see under the following species.

**Chirita lacunosa** (Hook. fil.) B. L. Burtt, **comb. nov.**

Syn.: *Didymocarpus lacunosus* Hook. fil. in Bot. Mag. t. 7236 (1892); Ridley in Journ. Roy. As. Soc. Str. Br. 43: 54 (1905), in Journ. As. Soc. Bengal, 74 (2): 762 (1907) et Fl. Malay Penins 2: 510 (1923).

S THAILAND: Pulau Terutau,\* *Curtis*. Surat, Khao Phra Rahu, c. 200 m, succulent herb common in limestone rock crevices, flowers blue, 20 ix 1963, *Smitinand & Sleumer* 1151.

MALAYA: Upper Perak: Gua Badak, Lenggong, c. 90 m, a colony of 30–40 plants on a great vertical limestone cliff where their only real associates are *Pyrrosia stigmosa* and a *Cycas*, 12 xii 1962, *Mrs. B. Molesworth Allen* 4844; *ibidem*, *Mrs. P. Bradford*, cult. in Hort. Bot. Reg. Edinb. fl. 1964, C. 4283.

Mrs. Allen's discovery of this plant in Upper Perak is a most interesting extension of its range and emphasises the floristic affinity of the Northern Malayan limestone with that of southern Thailand. Mrs. Bradford subsequently returned to Gua Badak and sent living plants to Edinburgh, where they flowered well during the summer of 1964.

Examination of all this material confirms the earlier impression that this plant should be placed in *Chirita*. The stigma may show a small fish tail or it may be merely emarginate, but these descriptions refer to the lower stigmatic lobe in both cases: the upper is not developed. Another character of *Chirita* found in *C. lacunosa* is the pair of intruding lamellae on the roof of the corolla tube (already mentioned above under *C. heterostigma*).

\* Hooker's gives the island of Langkawi itself as the locality for this species, but it is clear from *Curtis'* herbarium specimens collected in the wild that it came from Pulau Terutau, the northernmost of the Langkawi group and on the Thai side of the international boundary.

*C. lacunosa* seems to be related to *C. cyanea* (see above) which has the stigma, so far as is known, more definitely linguiform. This type, also representing the lower stigmatic lobe, is found in *C. sinensis* Lindl. and *C. cynostyla* B. L. Burtt (see Notes R.B.G. Edinb. 23: 97: 1960).

The transfer of *C. lacunosa* and *C. cyanea* receives ecological confirmation. In Thailand and in Malaya *Chirita* is a genus of the limestone rocks, *Didymocarpus* of granite and sandstone. Certain rare exceptions there may be, but the fact that these two species grow on limestone accords with their new position in *Chirita*. Their sectional position within that genus must remain in doubt for the present: the neat rosette habit, dark purple flowers and linguiform or slightly lobed stigma are very different from anything in section *Chirita*, to which the lamellae of the corolla would otherwise point. The tendency to a linguiform stigma, on the other hand, indicates Section *Gibbosaccus*. Further investigation is needed. *C. lacunosa* has a small appendage to the connective of a type similar to that found in *Lysionotus*, *Streptocarpus fanniniae* and one or two other species.

The subdivision of *Chirita* proposed by C. B. Clarke may need some emendment when all the later discoveries are critically examined. One species about which he was himself doubtful was the Malayan *C. caliginosa* C. B. Cl. He placed it with the true *Chiritas*, but remarked on its resemblance to *C. fusca* C. B. Cl. in Sect. *Microchirita*. In this Clarke was quite correct. *C. caliginosa* and *C. fusca* are certainly closely allied, and in the same group belong *C. viola* Ridl., *C. sericea* Ridley and, almost certainly, *C. mollissima* Ridley. These species form a distinct group within Section *Microchirita* characterised by a beard of beaded hyaline hairs which hangs from the roof of the corolla just inside its mouth; it may be difficult to observe in dried specimens, but is conspicuous on the living plant. These species occupy the south-eastern area of Section *Microchirita* (southern Thailand to Sarawak) and may eventually prove worth the rank of an independent section.