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Notes on the Geographical Races of Hesperilla Chrysotricha Meyrick and Lower (Lepidoptera-Hesperiidae)

By

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Plate I

A previous note (Couchman, 1947) reported the capture of specimens of both sexes of a race of *Hesperilla chrysotricha* M. and L., 1902, from Lunawanna, South Bruny Island, which I ascribed to ssp. *plebeia* Waterhouse. Twelve months later, A. M. Hewer presented to the Tasmanian Museum several worn specimens of a form of *chrysotricha* taken on 25th January, 1948, at Lutana, a riverside suburb of Hobart. In company with S. Angel a search was made of the western shores of the Derwent near Lutana, and a colony of this butterfly was found, of all places, on a City Council rubbish tip. A number of pupae were collected from clumps of *Cladium filum*, R.Br., from which ten females and two males emerged.

The differences in colour, markings and food plant when compared with the South Bruny specimens pointed to the existence in Tasmania of more than one race of *chrysotricha*. With the realisation that we had two distinct forms existing in Tasmania it became necessary to compare our material with the holotype male of ssp. *plebeia* in the Australian Museum, this comparison showed that Waterhouse's type was similar to the form discovered on the western banks of the Derwent, not to the specimens from Lunawanna, so that a correction is necessary to my earlier notes. As a result of the investigations of ourselves and others whose help has been enlisted in the search for further material, it has been possible for me to study specimens from several Tasmanian localities in some numbers, and thanks to the field work of F. M. Angel and N. B. Tindale I have seen more material from South Australia than was available to earlier writers, which has enabled me to separate as distinct a race from South Australia and another race from South Bruny.

As I noted in 1947, Waterhouse (1932*b*) used G. H. Hardy's Latrobe record for ssp. *plebeia* while apparently overlooking the fact that Hardy had recorded the capture of a female, so although it seems certain that Waterhouse actually had this specimen of the female, taken by Hardy, in his own collection, the published notes (1927, 1932*b*) refer to males as the only sex then known.

Curiously enough, while working through the *Hesperilla* material in the Waterhouse collection, my wife discovered the actual female taken by Hardy in 1915, which is recorded (1918) in these Papers and Proceedings for 1917, p. 67. The specimen carried three labels, the original, 'G. H. Hardy, Latrobe 1-1-15'; a second, 'Presented by G. H. Hardy C1055'; the third, 'Belongs to Hobart Museum'. G. H. Hardy *(in litt.)* informs me that this specimen, the only lepidopteron taken during one day's collecting at Latrobe, was donated to the Tasmanian Museum under the name of '*H. cyclospila*', and that Waterhouse must

have secured it after he (Hardy) left Tasmania in 1918. Thus it seems reasonably certain that Waterhouse had this female in his collection, under the name of the Port Phillip race, at a time when according to his published notes only the male of the race from Tasmania was known. This specimen has been returned to the Tasmanian Museum, and I describe it as the neallotype female of ssp. *plebeia* Waterhouse (1927), since it agrees with the race which we have now proved extends from south of Hobart along the western shores of the Derwent and the eastern and northern coasts of Tasmania.

The South Bruny specimens discovered in 1947 are recognisable as a distinct geographical race, much closer in appearance to the race here described from Port Lincoln, and to the typical ssp. *chrysotricha* from Albany, West Australia.

Hesperilla chrysotricha plebeia Waterhouse, 1927

H. chrysotricha cyclospila Waterhouse and Lyell, 1914 (nec Meyrick and Lower, 1902) Butt. Australia: 188 (part); 34, f. 632. *Hesperilla cyclospila* Hardy, 1918, Pap. Proc. Roy. Soc. Tasmania, 1917: 67. Turner, 1926, op. cit., 1925: 123. (nec *H. chrysotricha plebeia* Waterhouse, Couchman, 1947).

This race was described from two males, now in the Waterhouse coll., bearing labels 'Bridport, Tas. 27th Dec. 1902 H. L. Latta'.

Female. Forewing above, mummy-brown (Ridgway 15); cell spot and discal spots in areas 1*a*, 2 and 3 of equal size, a minute dot in upper half of 1*a*, light orange-yellow (Ridgway 3); three subapical spots of equal length, white, hyaline; cilia pale ochraceous-buff (Ridgway 15). Hindwing, as forewing; a central patch 4·5 mm. long, 2 mm. wide, deep chrome (Ridgway 3); cilia as forewing.

Beneath; apex of forewing and the hindwing warm buff (Ridgway 15); inner margin of hindwing broadly cream-buff (Ridgway 30); cell spot silver centred; a discal row of silver centred spots, that in area 6 twice as large as those in 2, 3 and 7; a faint elongate black dot in disc of area 5. Cilia as above.

Forewing length 17·5 mm.

Neallotype female labelled 'G. H. Hardy, Latrobe 1-1-15'; now in the Tasmanian Museum.

I have records of this race, mostly bred from pupae, from the western shores of the Derwent (Margate, Kingston, Lutana, Elwick to Granton, Bridgewater turn-off to the 19-mile post near New Norfolk); Carlton (N. B. Tindale); several spots near Swansea (S. Angel); as well as the earlier records from Bridport and Latrobe.

Whereas the Lunawanna race of the butterfly, as noted in 1947, was attached to *Gahnia trifida* Lab., the only food plant at Lutana proved to be *Cladium filum* R.Br. In company with my friend A. Meston, my wife and I made an intensive search of the western shores of the Derwent during December, 1948, in an effort to check the range of the foodplant, and, it was hoped, of the butterfly. From Kingston to the 10½-mile post at Granton, the only plant to be found was *Cladium filum* R.Br., always within a few yards of the shore line, often rooted below the tidal level of the river, and usually consisting of a single line of plants fringing the river edge. We found the early stages of the butterfly in every locality throughout this reach of the river, and although owing to its position at Lutana it faces extermination there within a few years, there are a number of other spots near Hobart in which ssp. *plebeia* should be able to survive.

From Granton westwards there is a complete break in the food plant, no *Cladium* was found; but from the 13-mile post at least to the 19-mile post near New Norfolk *Gahnia trifida* Lab. alone is to be found, usually well back from the river edge,

bordering the swamps that are to be found along this stretch of the Derwent. It would seem that the salinity of the river must govern the extent of the two species of swordgrass, since no *G. trifida* was found from Lutana to Granton, and no *C. filum* between the Bridgewater turn-off and New Norfolk.

Because the correct determination of these foodplants seemed important, specimens were submitted to Miss W. M. Curtis, and on her advice to S. T. Blake, of the Botanic Museum, Brisbane, to whom I am indebted for help in the final determination of Tasmanian and South Australian plant material. *In litt.* my friend notes that '*G. trifida* and *C. filum* have been much confused. Kükenthal . . . has recently treated *Cladium filum* as a species of *Gahnia*, and I think this is the best disposition of the species. It is closely similar to *Gahnia trifida* and does not closely resemble any undisputed species of *Cladium*'.

Nevertheless, ssp. *plebeia* was found wherever we searched on either foodplant along the Derwent, and the specimens subsequently bred from pupae taken from *G. trifida* and *C. filum* are indistinguishable from the specimen taken by Hardy at Latrobe.

This race has been noted, from captured and bred examples, as emerging from 27th December, Bridport (H. L. Latta); 1st January, Latrobe (G. H. Hardy); 7th January, Lutana (L. E. Couchman); to 23rd February, Lutana (S. Angel).

Until the third instar the larva lives in a slender straight shelter, about three inches in length, formed from the tips of two or at most three leaves of its foodplant; after this it spins a spiral shelter lower down in the plant four inches or more in length, in which three, four or even five leaves may be incorporated, one leaf being looped over and woven into the shelter in a quite distinctive manner. The larva feeds at night on the tips of the leaves it has spun together, eating its way back towards the shelter.

The third instar larva from *G. filum* at Margate on September 4th was noted as being light yellowish-green in colour, lightening to yellowish at the joints of the segments, a darker green dorsal line, the body and anal plate covered with thinly scattered short black hairs. Head 3 mm. long, 2 mm. wide, buff, shading to greenish-buff towards the collar, central cleft black, thoracic legs brown, prolegs flesh coloured. Of the five larvae examined, two were 20 mm. in length, the other three, one of which had just shed its skin, 17 mm. in length. The full fed larva differs only in size, a specimen from Swansea taken on September 18th (an unusually early date, even for the East Coast) was 40 mm. in length, the head 4·5 mm. long, 3·5 mm. wide, in colour and marking agreeing with specimens from the Derwent estuary.

Although the larva usually lives, and later pupates, head upwards, this is by no means always true. My wife and I examined 68 larvae at Prince of Wales Bay, Hobart, on September 20th, 1948, of which seven were head down in their shelters, the rest head upwards as usual. Our count showed roughly every tenth larva head downwards, and this proportion has been noted on other occasions.

The larva lines the shelter with silk, and spins a pad to close the shelter above itself when ready to pupate, but there is a rather remarkable difference in the amount and quality of the silk lining the shelters found on the two foodplants in the Hobart district. On *G. filum* the shelter is thinly lined with silk, and the pupa rests with an appreciable amount of freedom within the shelter, but larvae on *G. trifida* spin a thick lining of tough silk, which enfolds the pupa so closely as to make movement difficult, and the removal of the pupa from its shelter without damage a somewhat delicate operation.

Hesperilla chrysotricha lunawanna n.ssp.

H. chrysotricha plebeia Waterhouse, Couchman, 1947 (nec Waterhouse, 1927), Pap. Proc. Roy. Soc. Tasmania, 1946: 29-30, I, f. 1-4.

Male and female are as described and figured in 1947, for comparison I now give a more detailed description.

Male. Forewing above mummy-brown (Ridgway 15), subapical spots white, hyaline; cell, and discal spots in areas 3 and 2, the latter half the size of the former, light orange-yellow (Ridgway 3); the sex brand composed of a series of crescents from vein 4 to below 1*a*. Hindwing as forewing, slightly darker in tone, the central patch extending towards the outer margin, 4 mm. long, 1·5 mm. wide, deep chrome (Ridgway 3). Cilia of forewing and hindwing pale pinkish-buff (Ridgway 29).

Beneath; apex of forewing and the hindwing snuff-brown (Ridgway 29), fold of hindwing cream-buff (Ridgway 30), cell spot silver centred, a discal row of brown spots, that in 6 silver centred.

Forewing length 15 mm.

Female. Forewing and hindwing above as in the male, three subapical spots of equal size, white, hyaline; cell and discal spots as in male, but the spots in areas 2 and 3 of equal size, and in addition a smaller spot in the lower half of 1*a*, light orange-yellow; cilia as in male.

Beneath; the apex of forewing and the hindwing tawny-olive (Ridgway 29), hindwing fold cream-buff; cell and discal spots of hindwing as in male, that in area 2 faintly, those in 3, 6 and in the cell clearly silver centred.

Forewing length 17 mm.

Holotype male and allotype female labelled 'Lunawanna, Tas. 12-Jan.-47 L. E. Couchman', in the Tasmanian Museum, paratypes in the Australian Museum, the South Australian Museum, and in my own collection. The name of this race forms part of the former aboriginal tribal name for the island.

I have captured and bred examples dated 12th January to 28th January, all from one locality on South Bruny Island; here, unlike ssp. *plebeia* in the Hobart district which is confined to an extremely narrow strip of the shore line, ssp. *lunawanna* ranges from the actual sea shore inland for several hundred yards.

Larvae and pupae have been taken only on *G. trifida* Lab. as previously noted, they are similar in every way to those of ssp. *plebeia* feeding on both *G. trifida* and *G. filum* in the Derwent estuary. At Lunawanna, as perhaps elsewhere, this butterfly survives despite very heavy losses in the early stages. During the first week in January, 1948, we examined 63 pupal shelters, of which 29 contained dipterous parasites, 30 pupae had been killed by a fungus disease, one pupa had emerged, and one shelter only was found to contain a live pupa.

Hesperilla chrysotricha naua n.ssp.

Telesto cyclospila Meyrick and Lower, 1902, Trans. Proc. Roy. Soc. South Australia, 26 (2): 63-64 (part); *Hesperilla cyclospila* Lower, 1911, *ibid.* 35: 121 (part); *Hesperilla chrysotricha cyclospila* Waterhouse and Lyell, 1914, Butt. Australia: 188-189 (part); Waterhouse, 1932, What Butt. is that?: 242 (part).

Waterhouse (1932*a*, 1933) discusses the Port Lincoln and Melbourne specimens first recorded by Meyrick and Lower in 1902, and restricts the name *cyclospila* to specimens from the eastern shores of Port Phillip. However, although he noted the differences between the Port Lincoln race and that from Port Phillip, Waterhouse did not name Lower's specimens from the former locality, and when describing the South Australian race (1938) attached the name *leucosia* to specimens from Mount Compass, leaving the race from Port Lincoln, which Meyrick and Lower in 1902, and later Lower (1911) had indicated as being distinct, still without a name. Actually the Port Lincoln specimens can be separated from the races taken elsewhere in South Australia and Victoria, as Lower believed; they are in fact much closer to ssp. *chrysotricha* from Albany, West Australia, than to specimens from the Mount Compass locality. Examples from the latter district and in particular those from Robe, South Australia, come very close indeed to the Victorian race, and I think will be hard to separate when we have specimens from intermediate localities along the Victorian shoreline.

Thanks to my friends F. M. Angel and N. B. Tindale I have been able to examine twelve males and three females taken near Port Lincoln.

Male. Forewing and hindwing above mummy-brown, forewing with a few basal hairs, yellow; cell spot 1·25 mm. square, a smaller spot in disc of area 3 and a trace of a spot below it in 2, maize-yellow (Ridgway 4); three minute subapical spots, white; a narrow black sex band from before vein 1 to vein 4. Hindwing, as forewing, a basal suffusion of yellow hairs, a central rectangular patch, 2·5 mm. long, 1·5 mm. wide, cadmium yellow (Ridgway 3). Cilia fore and hindwing, pale ochraceous-salmon (Ridgway 15).

Beneath; apex of forewing and the hindwing Saccardo's umber (Ridgway 29), lightening in tone towards the apex of the forewing. Hindwing with brown ringed cell and discal spots, that in area 1*a*, half the size of those in 2, 3, 6 and cell, all silver centred; those in areas 4 and 5 only faintly centred with silver.

Forewing length 15 mm.

Female. Forewing and hindwing above as in male, the three subapical spots larger and of equal size; an additional spot in area 2, of the same size as that in 3, and a small spot in the lower half of 1*a*, maize-yellow.

Beneath; apex of forewing and the hindwing as in male, though as in other races tending to be a tone lighter in colour. Cell and discal spots as in male, that in area 1 of hindwing one-third the size of those in 2, 3, 6 and the cell, all silver centred; in area 4 a brown dot, in 5 a brown elongate spot. Cilia as above.

Forewing length 16·5 mm.

Holotype male and allotype female labelled 'Wanilla Fount, Pt. Loncoln dist. 16 Oct. 1948 N. B. Tindale', in the collection of the South Australian Museum, with male and female paratypes in the S.A. Museum, the F. M. Angel and in my own collection.

Several males and one female were taken by F. M. Angel and N. B. Tindale flying on the morning of October 16th, 1948, and pupae were found in shelters on *Gahnia trifida* Lab., from which a number of males, but only two more females emerged on 19th and 22nd October. The shelters were of the usual *chrysotricha* type, similar to those from Mount Compass, Hobart, and from South Bruny.

Wanilla Fount, or Fountain, about twelve miles west of Port Lincoln, is a permanent freshwater spring discharging from the Uley Basin, flowing down to

the sea, distant some three miles at Kellidie Bay. The fountain is no more than 25 feet above sea level, and is surrounded by a luxuriant growth of *Gahnia trifida*, which becomes less vigorous away from the spring itself.

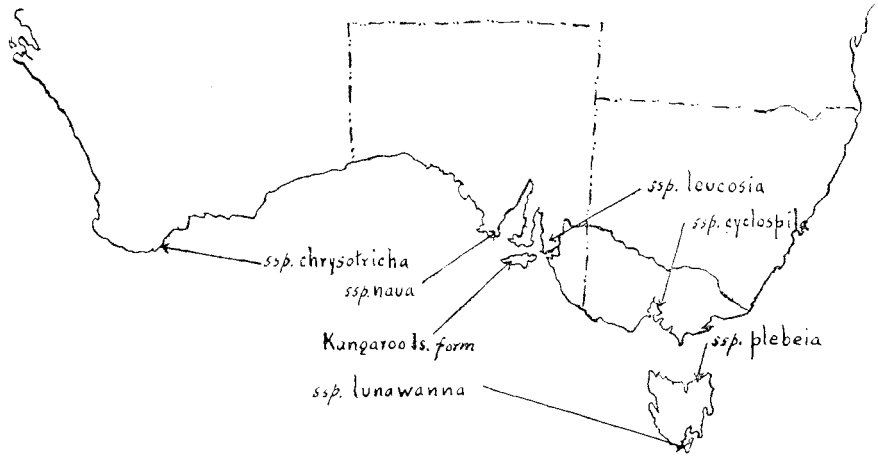
The area south and west of Port Lincoln where the butterfly is found was known as Nauo or Naua, the name of the aboriginal tribe formerly living there. The name of the subspecies from Port Lincoln perpetuates the name of this native tribe.

Thanks to F. M. Angel I have been able to examine a male and female of a possible additional race from Rocky River, Kangaroo Island. This locality is in the western part of the island, an area with a much higher rainfall. The pair, unfortunately not in the best condition, are noticeably darker than specimens from Mt. Compass, in this respect they are close to ssp. *naua* from Port Lincoln, especially on the underside of the hindwing. The discal silver centred spots on the hindwing beneath are small, as in typical *c. chrysotricha*, and particularly in the male they are very faintly tinged with silver.

The close resemblance between these western Kangaroo Island specimens and *c. chrysotricha* from Albany points to an association which is reminiscent of the strong relationship between the plants from Kangaroo Island and those from south-western West Australia (noted by J. G. Wood, 1930, Trans. Proc. Roy. Soc. South Australia 54: 105-139), a relationship which does not extend to the mainland areas of South Australia.

Specimens from Robe, South Australia, are as noted by Waterhouse (1938) intermediate between those from Mt. Compass and Melbourne, in fact the male and female kindly lent me by F. M. Angel, labelled 'Robe 6-11-37', are almost indistinguishable from a Frankston pair in my possession.

The accompanying map indicates the areas from which *Hesperilla chrysotricha* and its races have been described.



The following table sets out the distinguishing characters of the races of *chrysotricha*.

Male. Above.	ssp. *chrysotricha*	ssp. *naua*	ssp. *leucosia*	ssp. *cyclospila*	ssp. *plebeia*	ssp. *lunawanna*
Hindwing central patch.	2·5 mm. long 2 mm. wide	2·5 mm. long 1·5 mm. wide In appearance a distinct rectangle.	3 mm. long 1·5 mm. wide Frequently extended as a suffusion towards inner margin.	3·5 mm. long 1·5 mm. wide Frequently extended as a suffusion towards inner margin.	4 mm. long 1·5 mm. wide Usually extended towards inner and outer margin.	4 mm. long 1·5 mm. wide Usually extended towards inner and outer margin.
Male. Beneath. Apex of forewing and the hindwing.	'Reddish' (v. Meyrick and Lower)	Saccardo's umber (Ridgway 29)	Tawny-olive (Ridgway 29)	Buffy-brown (Ridgway 40)	Sayal-brown (Ridgway 29)	Snuff-brown (Ridgway 29)
Hindwing markings. Discal and cell spots.	Spot in 1*a* is half the size of 2, 3, 6 and cell spots, all silver centred.	Spot in 1*a* is half the size of 2, 3, 6 and cell spots, which are 1 mm. square, all clearly silver centred. Spots in 4 and 5 the size of that in 1*a*, but only faintly silver centred.	Spot in 1*a* is one-third the size of 2, 3 and 6 which are slightly elongated 1·5 mm. diameter, silver centred. Cell spot 1 mm. square, silver centred. In 4 a minute brown dot, in 5 an elongate brown ring.	Spot in 1*a* one-third the size of 2, 3 and 6, which are elongate, 2 mm. x 1 mm. all silver centred. In 4 and 5 brown rings. Cell spot 1 mm. diameter, silver centred.	Spots in 1*a* and 4 brown dots, in 2 and 3 faintly silver centred, in 6, 1 mm. diameter, clearly silver centred. In 5 a brown ring, in cell a brown ring.	Spots in 1*a* and 4 absent or just discernible as faint brown dots. Brown rings in 2 and 3, in 5 a brown dot. Spot in 6 is 1 mm. diameter, silver centred. Cell spot half the size of 6, silver centred.
Female. Above. Forewing.			Usually a minute discal dot in upper half of 1*a*.	Usually a small discal dot in upper half of 1*a*.	Usually a minute discal dot in upper half of 1*a*.	
Beneath. Hindwing markings. Discal and cell spots.		Spot in 1*a* is one-third the size of 2, 3, 6 and cell spots. which are 1 mm. diameter, silver centred. In 4 a brown dot, in 5 a brown elongate ring.	Spot in 1*a* is half the size of 2 and 3, which are narrowly elongate (2 mm. long), clearly silver centred. In area 6 a rectangular spot (2 mm. x 1 mm.), in cell the spot 1 mm. diameter, both clearly silver centred. In area 7 a spot of the size of 2 and 3, but only faintly silver centred.	Spot in 1*a* is half the size of 2 and 3, which are elongate (2 mm. x 1 mm.), all silver-white centred. In 4 a brown ring, in 5 an elongate brown ring. Spot in 6 elongate (2·5 mm. x 1·5 mm), silver-white centred. Cell spot 1·5 mm. diameter silver-white centred. In area 7 a spot of the size of 2 and 3, clearly silver-white centred.	Spot in 1*a* half the size of 2, 3 and cell spots, which are 1 mm. diameter, those in 2 and 3 slightly elongate, all silver centred. In 4 a minute brown dot, in 5 an elongate brown spot. Spot in 6 is rectangular (1·5 mm. x 1 mm.), silver centred, in 7 as those in 2 and 3, but only faintly silver centred.	A minute brown dot in 1*a*, in 2 a small brown ring, faintly silver centred. Spot in 3 is 1 mm. diameter, silver centred. In 5 a brown dot, in 6 the spot is 1·5 mm. diameter, slightly elongate, silver centred. Cell spot similar to that in area 3, silver centred.

The resemblance between the races found at Albany, Port Lincoln, western Kangaroo Island and South Bruny Island is remarkable, and is difficult to interpret when the isolation and the great distances between these races is considered. All of these races are noticeably darker in colour, especially the ground colour of the hindwing beneath, and the discal silver spots particularly in the males are very restricted and faintly marked.

It is to be noted that with the exception of *c. naua* from Port Lincoln, the other races, *c. chrysotricha* from Albany, the western Kangaroo Island form and the isolated *c. lunawanna* from South Bruny all inhabit areas of comparable rainfall, e.g., Albany 30-40 inches, western Kangaroo Island 'more than 25 inches' (v. Wood, 1930), and Lunawanna 34-38 inches per annum. Port Lincoln comes directly under the 20 inches isohyet.

Gahnia trifida Lab. is known to be the foodplant at Lunawanna and Port Lincoln, since although Wood (1930) omits it from his local list, recording *Cladium filum* only, it is certainly found at Wanilla Fountain, some twelve miles from Port Lincoln. Both plants are given by Wood as from western Kangaroo Island, and *G. trifida* is recorded from West Australia, so that it may be the choice of the butterfly in that locality also.

The races from Mount Compass, *c. leucosia*; the Port Philip area, *c. cyclospila*; and northern, eastern and south-eastern Tasmania, *c. plebeia* are very close to each other, they form a compact group not easy to separate. In general they are larger and lighter in colour, particularly on the underside of the hindwing, and especially in the female the silver spots of the hindwing beneath are notably increased in size and number.

The rainfall throughout this range, 25 inches at Mt. Compass, 23 inches at Hobart, 20 inches at Swansea is smaller than in the areas inhabited by the darker, outlying races, and at least in Tasmania the larvae feed on either *G. trifida* or *G. filum*.

The Mt. Compass locality is noteworthy. Distant some 10 miles from the shores of St. Vincent Gulf, it is a plateau c. 1000 feet in altitude, with low hills running several hundred feet higher. The highest locality at which *c. leucosia* has been collected is the small hanging swamps on Mt. Moon at c. 1200 feet. The habitat of this race differs completely from that of the other races of *chrysotricha*, elsewhere this species is usually found in small areas on or quite close to the sea and river shoreline.

SUMMARY

The acquisition by the Tasmanian Museum of specimens of *Hesperilla chrysotricha* Meyrick and Lower, 1902, from near Hobart led me to undertake further investigations into the distribution and variation of this butterfly, with the result that an additional race, *c. lunawanna* is described from Tasmania, together with the true female of *c. plebeia* Waterhouse, 1927.

Lower considered the specimens from Port Lincoln, S.A., to be a distinct sub-species, we are now able to confirm this as we have caught and bred material in some quantity, and the name *naua* is now given to this sub-species.

The early stages, the foodplant and the distribution of the Tasmanian and South Australian races are described and discussed.

ACKNOWLEDGMENTS

I wish to thank the Director of the South Australian Museum for allowing me to examine South Australian Museum material, F. M. Angel and N. B. Tindale for specimens from Port Lincoln and other South Australian localities, the Director of the Tasmanian Museum and S. Angel for material from Tasmanian localities.

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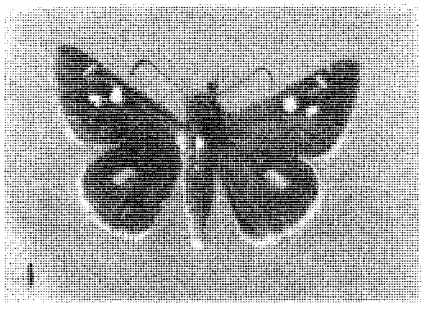
PLATE I

FIG. 1.—*Hesperilla chrysotricha naua* n.ssp. Holotype male, upperside. Wanilla Fount., Pt. Lincoln Dist., 16th October, 1948. x 1¼.
FIG. 2.—Male, underside of same specimen. x 1¼.
FIG. 3.—Allotype female, upperside. Wanilla Fount., Pt. Lincoln Dist., 16th October, 1948. x 1⅛.
FIG. 4.—Female, underside of same specimen. x 1⅛.
FIG. 5.—*Hesperilla chrysotricha plebeia* Waterhouse. Female, upperside. Hobart, Tas., 7th February, 1948. x 1¼.
FIG. 6.—Female, underside of same specimen. x 1¼.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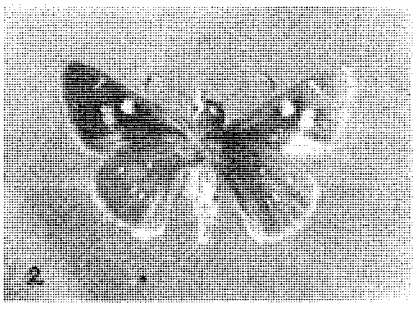
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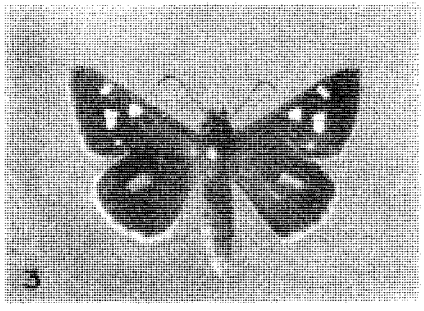
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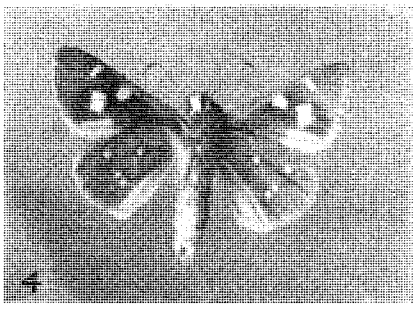
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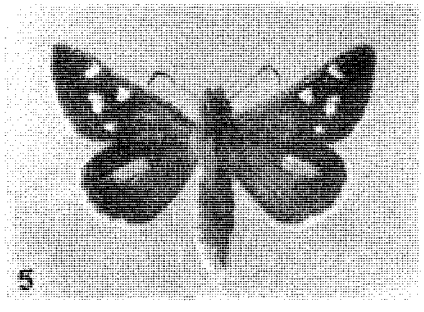
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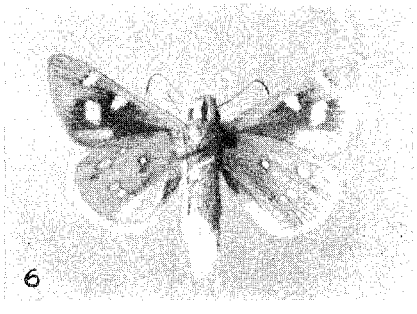
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