

SOME NEW OR LITTLE KNOWN NEARCTIC
NEONYMPHA¹

(Lepidoptera: Satyridæ)

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The capture in Arizona in June 1941 of what struck me as an undescribed species of *Neonympha* suggested certain investigations, the results of which are given in this paper. A study of about a hundred specimens labelled "*henshawi* Edw.," which I accumulated from different sources, revealed that two pairs of gemmate species, one pair unnamed, the other neglected, occurred in Arizona. Confusion has been due not so much to some chance obscurity in a great entomologist's description 66 years ago, as to the indifference and consequent lack of precision in regard to this section of *Neonympha* on the part of those who wrote after him. Somehow lepidopterists have never seemed overeager to obtain these delicately ornamented, quickly fading Satyrids that so quaintly combine a boreal-alpine aspect with a tropical-silvan one, the upperside quiet velvet of "browns" being accompanied by an almost Lycænid glitter on the under surface. There exists very little information concerning such things as the number of broods, possible seasonal variation, limits of distribution, allied Mexican and Central American forms, haunts, habits and early stages.

What follows is an attempt to set down the peculiarities of these four insects as a tentative basis for further research that would amplify the comparatively meager facts at my disposal. A definition of the species most usually confused with *henshawi* Edw. and a full description of its typical race, with comparative descriptions of two other races are followed by comparative descriptions of the three other species, listing their distinctive characters in the same order. The species to be discussed are:

Neonympha dorothea n. sp. (referred to by Edwards as

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“some specimens” etc., in conjoint description of *henshawi* Edw., 1887, Butt. N. Am., III, *Neonympha* I; reproduced from a female in Edwards’ collection as “*henshawi* Edw., male,” by Holland, 1898, and later editions, Butt. Book, Pl. 25, fig. 8, upperside.)

Neonympha maniola n. sp. (presumably figured, as “*henshawi*,” by Wright, 1905, Butt. W. Coast, Pl. 25, fig. 226 a, b, c, male, upperside, female, both sides).

Neonympha pyracmon Butler (1866, Proc. Zool. Soc., London, p. 499, female; 1867, Proc. Zool. Soc., London, Pl. 11, fig. 11, female, underside; Godman, 1901, Biol. Centr. Am. Rhop., II, p. 658; III, Pl. 107, figs. 11, 12, male, both sides, mislabelled “*hilaria*”; Weymer, 1911, in Seitz, Rhop. Am., p. 223).

Neonympha henshawi Edwards (1876, Trans. Am. Ent. Soc., p. 205, female; Godman, 1880, Biol. Centr. Am., Rhop., III, Pl. 8, fig. 27, female, underside, mislabelled “*pyracmon*”; Edwards, 1887, Butt. N. Am., III, Pl. 1, figs. 5–8, both sexes, both sides; Maynard, 1891, Mnl. N. Am. Butt., p. 108, female; fig. 35d, female, hind-wing underside).

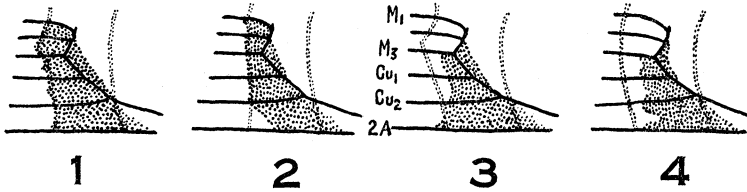
Neonympha dorothea n. sp.

Sharing with the other three species such upperside characters as: brownish ground color in male, with more or less diffuse fulvous red; fine fulvous margin, mainly subanal in secondaries; androconial mark in male primaries; præterminal dark spots in secondaries of both sexes; and such underside characters as: more or less fulvous ground color of primaries; small discal button-spot on both wings; four transverse lines, to wit: first discal, crossing cell R + M; second discal, curving round cell (its course in primaries dependent upon specific outline of termen); subterminal, mostly striate in primaries (less adjusted there to differentiation of termen) and mostly incomplete and deformed in secondaries; præterminal, mostly punctate in primaries, and embossed with serrate silver in secondaries where it forms a silver W in Cu₁, passes through two double ocelli in M₃ and M₂ placed within a cinereous irroration, and produces two pairs of V-shaped dashes in M₁ and R_s.

Distinguished from its three congeners as follows: Primaries apically short and rather bluntly rounded, with straight termen;

secondaries evenly rounded in both sexes, with very slight sinuation in female; præterminal spots rather blurred.

Androconial mark: medium sized, with fairly smooth outer edge coinciding, except in Cu_2 where it retreats basally, with second discal line as seen through wing; consisting of 5 patches (shading in 2A not included), adjoining cell and separated by



FIGS. 1-4. Scheme of androconial patches in *Neonympha*. 1, *N. maniola*; 2, *N. dorothea*; 3, *N. henshawi*; 4, *N. pyracmon*.

veins, as follows: rhomboid, with sides slanting basally subparallel to cubitus, in Cu_2 ; two decreasing trapezoids, in Cu_1 and M_3 ; two wedges in M_2 and M_1 ; and of short triangle, in cell $R + M$, against inner side of cross vein, pointing basally and reaching down to about level of Cu_1 . (See fig. 2.)

Female upperside: diffusely colored, with slight shadings.

Male and female underside: primaries: second discal line running subparallel to first discal line, curving from costa behind cell to slope down towards subterminal line and thus limiting with the latter a truncate epsilon-shaped area in middle of wing; subterminal line from dorsum up to about Cu_1 running closer to second discal than to termen but then, by retaining a primal course, diverging terminally to reach apex (which would have been costa, had the apex been longer, in which case the subterminal line would have been parallel to a primal, slanting, termen), thus enhancing the impression of the outward slope on the part of the second discal which in reality is subparallel to the straight termen (to which, contrary to the subterminal line, it has become adjusted); secondaries: heavily and completely bordered with dark cinereous which encloses ocelli and silver serration, and expands in M_2 and M_3 where the second discal line is thickly arched inversely to termen.

Neonympha dorothea dorothea n. subsp.

Male: expanse of left fore-wing 20.9 (from base to end of M_1). Upperside: deep brown with lighter veins; some dark fulvous red scales just discernible in between them; cilia fuscous; dark fuscous androconial mark. Primaries very finely edged with fulvous; secondaries more broadly so, but only to about Cu_1 from tornus, with four spots along termen: first one rather indistinct, in Cu_1 ; second and third subreniform, blotchy, blackish, in M_3 and M_2 ; and fourth, very weak, in M_1 ; a fine dark ray (interneural fold) through middle of each reaching the cilia from disc. Underside: primaries: flushed with deep warm red of Erebian ("*callias*") tone over lower part; thickly dusted with yellowish brown and traversed by reddish brown striæ over upper part; lines: chestnut brown; præterminal consisting of very indistinct sequence of dots; small brown discal spot above M_2 near cell $R+M$ on both wings, buttoning top of androconial mark in primaries (if viewed through wing). Secondaries: discally of darker shade of brown than subcostal and subapical areas of primaries; with some redder striæ and a sprinkling of fluffy hoary scales basally; discal lines: deep chestnut brown; the first irregularly crossing cell $R+M$; the second from tornus following serrated (on Cu_2) but fairly direct course up to Cu_1 beyond which it strongly thickens and arches inversely to termen in M_3-M_2 , then narrows again, abruptly turns outward as if to end at M_1 , just above a roughly V-shaped basally pointed combination of two silver præterminal dashes, but really swerves back again and up towards R_s in which interspace it is almost concealed by a second V-pair of silver dashes which seems superimposed. Subterminal line from tornus arches inversely to termen in Cu_2 , dips terminally, then shoots up basally along middle of cell Cu_1 where it stops, forming a thickish chestnut brown bar which coincides with the terminal course of the interneural fold. A broad cinereous border heavily stippled with purplish black transverse striæ, merged with the cinereous underside of the fringe and limited inwardly by the arches of the second discal and subterminal lines, occupies the whole outer third (excepting a vineleaf-shaped, as viewed from base, fulvous brown space between second discal and subterminal lines in C_1-C_2), thus completely enclosing the ocelli and other markings to be mentioned. Ex-

amed in its action upon the discal and subterminal lines, it may be described as invading the termen from the tornus, with its inward edge causing the subterminal line to arch inversely to termen in Cu_2 , then bursting through in Cu_1 , diverting basally the broken end of the subterminal line and swelling strongly towards the second discal; beyond Cu_1 it pushes up even farther, touching (except for a few dusky scales in between) the second discal, which its pressure forces to arch in M_3-M_2 , and then reaching the termination of R_s . This border, which produces a strong avian or "scaly" effect, encloses præterminally, in M_3 and M_2 , two subreniform (twinned) ocelli, jet-black, each delicately rimmed and threaded through with light fulvous so as to form a capital "B" facing the termen, with the interneural folds faintly traced in a paler tint through the dark cinereous irroration; in each black cell of each "B" a bright silver "T" glitters, its stem projecting basally, its crossbar subparallel to the termen and neither stem nor bar touching the rim. The embossed silver of these four "T" marks is supplied by the breaking up of a silver line which starts from about Cu_2 (in continuation and sublimation of a vaguely discernible dark præterminal line from tornus); forms in Cu_1 , upon the interneural ray and beneath the end of the subterminal line, a "W" (as viewed from base), where an ocellus, visible as a spot on the upperside, seems to be in the process of being built with the help of the dark pigment which is channelled terminally by the interneural fold from the end of the subterminal line; then traverses the kernels of the spots in M_3 and M_2 and produces farther up the V-shaped pairs of silver dashes already mentioned; the first pair of these suggests the formation of a rudimental fourth spot whose interneural ray looks like a terminal projection of the second discal line. There is a thin bright fulvous margin from tornus to middle of cell Cu_1 , running between the cilia and the silver line (incidentally, in regard to these very *Coenonympha*-like markings, it should be noted that the ocelli in the latter genus are formed subterminally, not præterminally as in this section of *Neonympha*).

Female. Exp. 21.5. Upperside pale reddish brown with pinkish tone. Primaries: with faint adumbration post-cellularly and terminally, but on the whole producing a unicolorous impression. Secondaries: evenly rounded, as in male; with dim greyish shade surrounding the rather blurred and formless dark

spots (in M_2 , M_3 and Cu_1) and slightly deepening towards apex. Underside as in male.

Male, holotype, female, allotype, and two males, paratypes, placed in the American Museum of Natural History. Taken during a brief visit to Grand Cañon, Ariz., South Rim, on June 9th, 1941 (bright cold morning after snow and rain). They were weakly fluttering beside the trail together with a few *Coen. tullia furcae* — almost no other butterflies about. Named in honor of Miss Dorothy Leuthold who kindly kicked up the first specimen. Female, paratype, labelled "Grand Cy., June 11th '30", ex Coll. of C.F. dos Passos, Am. Mus. Nat. Hist.

Neonympha dorothea edwardsi n. subsp.

Male. Exp. 20.2. Upperside: brown tint somewhat lighter, with much greater amount of duller fulvous red diffused in both wings. Secondaries: spots reduced to two, in M_3 and M_2 (visible also in Cu_1 in some specimens). Underside: striæ somewhat more abundant and conspicuous on both wings. Primaries: pale fulvous brown with light reddish wash in lower part; præterminal line quite clear as a row of dots. Secondaries: fulvous brown; beyond second discal line correspondingly paler than in *dorothea dorothea*. Cinereous border somewhat less developed, i.e. not approaching as close to arched but slightly thinner second discal in M_3 and M_2 , thus leaving a narrow but distinct stretch of ground color in between.

Female. Exp. 20.7. Upperside pale reddish brown but lacking the pinkish tone of *dorothea dorothea* — a slight but distinct character connecting it with transitions to the fulvous southern race or races.

Male, holotype, labelled: "Gila Co. Ariz. June 1902, O. C. Poling", ex A. G. Weeks Coll., Museum of Comparative Zoology, Cambridge, Mass.; female, allotype, "Ariz. 1892, C. J. Paine", Mus. Comp. Zool. Paratypes: 3 males "Gila Co. Ariz. June 1902, O. C. Poling", ex A. G. Weeks Coll., Mus. Comp. Zool.; 2 males and 1 female "Ariz. 1892, C. J. Paine", Mus. Comp. Zool.; male and female, from "Ariz^a", wrongly labelled "*Henshawi* M" in Edwards' hand, ex Edwards' Coll., Carnegie Museum (it is the female of this pair that Holland figures as "*henshawi* Edw., male" with the remark "much like *N. gemma*, but considerably larger and decidedly reddish upon the upper-side"; 1 male "Water Cañon, N. Mex., 5,000 ft. August '81,

F. H. Snow" ex Edwards' Coll., Carn. Mus.; 1 male "Fort Wingate (N. Mex.), June '23, Marloff Coll.", Carn. Mus.; 2 males "Colorado" (one "Coll. Hy Edw."), 1 female "Colorado, Coll. Hy Edw.", Am. Mus. Nat. Hist.

(I should have preferred taking as holotype the male from Edwards' collection were it not for the awkwardness of having such a vague locality as "Ariz" for the type of a race.)

Neonympha dorothea avicula n. subsp.

Male. Exp. 17.6. Upperside: primaries, fuscous, less brown than *dorothea dorothea*, with the dark fuscous androconial shading standing out very clearly; two large bright fulvous red patches in Cu_1 and M_3 and a similar bright tint along the veins involved in this area. The fulvous is so conspicuous and the fuscous so vague (and so much lighter than the sexmark), that the eye is inclined to accept the former as ground color. Secondaries: somewhat darker than primaries with only a slight suggestion of fulvous red in disc and two indistinct præterminal spots in M_3 and M_2 . Underside: ground color of both wings a dull dunnish brown, very different from the rich and contrasting shades in *dorothea dorothea*, and of a remarkably even appearance owing to the almost total lack of (brown) striæ, which are only faintly discernible about the costa and base of both wings. Primaries: lines very faint, with the first discal hardly differentiated from the striæ; but the discernible directions of the lines are naturally those of the species. Secondaries: first discal indistinct; second discal thickening and arching strongly, of a duller brown than in *dorothea dorothea* or *edwardsi*. Cinereous border as dark and rich as in typical race, but pressing against second discal in M_3 - M_2 completely, without even the presence of a few dusky scales in between. Ocelli a trifle smaller than the smaller size of the insect might justify; silver serration and brown bar well developed; terminal fulvous line broader anally than in *dorothea dorothea*.

Female. Exp. 18.5. Upperside of a very *Cænonympha*-like appearance stressed by small size and fulvous tone which slightly deepens in primaries in area corresponding to that limited by the discal lines beneath, but not showing any definite bands or lines, only a pale fuscous border merging with a similar shading along the costa. Secondaries: with a slight sinuation in termen unimpairing their "dorothean" roundness

and correspondence to primaries; well shaded with greyish; light fulvous in disc and beyond that slightly irrorated with the trans-wing shadows of the heavily striated cinereous border beneath. Underside: rather more contrasty than in male. Primaries: yellowish with faint fulvous red flush over lower part; marked as in male. Secondaries: as in male except for a slight olivaceous brown deepening of the dull ground color.

Male, holotype, female, allotype, and female, paratype, all three labelled "Fort Davis, Texas, 3.VI.40", female, paratype, exp. 20.5, same label, with the addition "6,500 f.". All these ex Coll. C. F. dos Passos, Am. Mus. Nat. Hist.

The fixation of these three definite racial points, *dorothea dorothea*, *dorothea edwardsi* and *dorothea avicula* is, I think, unavoidable, but one does not care to indulge in pursuing this course and giving names to the various transitions which occur between them, especially as some of these variations seem to be seasonal. It will be noted that the holotypes of all three races were taken in June. Fifteen smallish specimens, twelve males, three females (Carn. Mus.), from Paradise, Ariz. taken by Poling late in the season (August-October) represent a certain transition from *edwardsi* to *avicula*; another kind of transition between the same is represented by two males from Silver City, South New Mexico, ex coll. dos Passos, Am. Mus. Nat. Hist.

Neonympha maniola n. sp.

Male. Primaries: more elongated apically than in *dorothea* with slightly slanting termen; in color like *dorothea edwardsi* with similar diffuse fulvous red. Secondaries: termen slightly sinuate; distinct præterminal spots, in Cu_1 (small), M_3 and M_2 (only the last two in most specimens), rather broadly aureolated with diffuse pale fulvous unlike any *dorothea* race.

Androconial mark: large, broader throughout than in *dorothea*, with larger, differently shaped patches and slightly jagged outer edge projecting on veins and interneural folds; post-cellularly pushing against second discal as seen through the wing; consisting of 5 patches: broad trapezoid, in C_2 ; two slightly decreasing trapezoids, in Cu_1 and M_3 ; two wedges in M_2 and M_1 ; and of a triangle, in cell $R + M$, twice as long as in *dorothea*, pointing basally and reaching down to about level of Cu_2 . (See fig. 1.)

Male underside: primaries: rather bright fulvous of a uniform tint (in some specimens the lines are almost erased), only slightly yellower along costa and subapically, and very weakly striated; second discal, in correspondence to termen, after sloping terminally from costa turning basally in middle of cell M_2 , then sloping downwards towards first discal line, subparallel here to subterminal line which starts from dorsum slightly closer to termen than to second discal and further up slopes apically though rather less so than in *dorothea*. Secondaries: producing in contrast with brightly and evenly fulvous primaries a curious "Manioid" or "Hipparchian" effect, being thickly dusted all over (even between second discal and subterminal in some specimens) with greyish scales and abundant dusky striæ over a dull brownish ground. Cinereous border reduced to a suboval patch in middle of outer third, weakly pigmented (in some specimens scarcely noticeable amid the general suffusion, although essentially of a different, probably cilian, origin, tint and texture than the dull grey, probably basally originated, scales over the rest of the wing); this patch not as finely or evenly striated as in *dorothea*, the striæ not much darker or less brown than in the rest of the wing, and surrounded completely and cloudily by the ground color with a yellower glimpse of same also visible within, around the ocelli, as a diffusion or germination of their rims. Second discal line of the *dorothea* type but more vaguely deviated basally in M_3 - M_2 , owing to weaker development of cinereous irroration; less abruptly projecting outwards in M_1 and clearer in R_s , but producing the same impression of passing underneath the second pair of silver dashes as in *dorothea* and thus not connecting with the second discal of primaries; bar of subterminal very weak.

Male, exp. 20.5, holotype, "Cochise Co., ex Coll. A. G. Weeks, slide 454", Mus. Comp. Zool.; paratypes: 2 males, labelled "Chiricahua Mts., (one: 7.VI.08, V. L. Clemense), ex Coll. H. C. Fall", Mus. Comp. Zool.; 2 males "Chiricahua Mts. (22.VI.33, D. K. Dunkan; 25.VI)", ex coll. C. F. dos Passos, Am. Mus. Nat. Hist.

This, I think, is the "*henshawii*" figured by Wright who gives color photograph of male and female upperside and female underside (folded) from specimens taken in Sta Rita Mts., Pima Co. with the remark: "It can scarcely be considered as

belonging to the West Coast fauna and has but little, if any interest for us." The female figure is only slightly differentiated from the male, with primaries upperside fulvous red, diffusely bordered with fuscous, and secondaries evenly fuscous with the fulvous aureoles of the male merely enlarged and deepened in tint to form an interrupted lunulate belt; underside (with allowance for a greenish blurring of the color process in the figure) very similar to the Chiricahua males.

I have felt somewhat reluctant to fix this as a species, as there are no females in any of the collections I have examined. *Maniola* is closely allied to *dorothea*; but granted that androconial mark, wing shape, behavior of second discal and subterminal lines, and certain peculiarities of scaling, such as disclosed by the cinereous irroration, constitute specific characters in this group (if they do not, then one arrives at the absurd conclusion that there is only one "good" species, *gemma* Hübner, with ab. *pyracmon*, ab. *henshawi*, ab. *maniola*, ab. *dorothea* etc. not even as races, for they occur together in different combinations) I cannot very well see how *maniola* can be placed alongside the *dorothea* races described, which all have a system of common characters quite inapplicable to *maniola*.

The third species, *pyracmon* Butl., is newly added here to the fauna of North America, although for many years specimens, labelled "henshawi" in collections, have been coming from Arizona. The Biol. Centr. Am. figure of "*Pyracmon*" female underside, totally different from Butler's figure, refers obviously to a form of *henshawi*, while the beautifully executed portrait of *pyracmon* male, with underside, is designated as "*hilaria*" (an error corrected in the text). Butler's figure of the underside is coarsely colored, being, with the other butterflies on the plate, too dusky and though illustrating, as it purports to do, a female, produces a wrong impression, simulating a male. Thus, *pyracmon* is pretty well concealed from the collector. However, a careful examination of Butler's text and figure convinces me that the Biol. Centr. Am. does illustrate the male of Butler's species, and with this figure the Arizonian insect tallies nicely. Unfortunately, I have not been able to obtain Mexican specimens or to get a photograph of the type from England.

Butler's original description, in Victorian Latin, runs thus:

"*Euptychia Pyracmon*, sp. n. female. Alæ supra fusca, linea post alarum medium posita fusca, extus rubro marginata, anticarum subintegra, posticarum lunulata: anticæ margine postico paulo fuscescente, ciliis cinereis: posticæ margine apicale paulo fuscescente, margine anali rufescente, maculis tribus (or two. V. N.) submarginalibus nigris, interna minima: corpus cinereofuscum; antennis supra fuscis, subtus albidis, præ flavescentibus, cinereo fasciolatus. Alæ subtus ochrea cinereo variæ, fasciis duabus mediis irregularibus ferrugineis: anticæ linea submarginali undulata apicem non attingente (this character cannot be constant. V. N.): posticæ linea submarginali lunulata argentea, apud marginem analem intus ferrugineo marginata, ad apicem maculas duas binas argenteas formante, maculis duabus mediis marginalibus nigris, macula permagna subanali cinerascens: corpus ochreo cinereum. Exp. alar. unc. 1 14/16. Hab. Oajaca (Mexico). B. M.

Closely allied to *E. gemma* from which it differs in being much larger, having the apex of the fron wings subangulated and the outer margin of the hind wings sinuated; the wings above reddish in some parts, with much larger marginal black spots; below the central streaks are more distinct, reddish and different in outline."

The last distinction is a mistake, *gemma* showing the same peculiar serrate projections of the second discal, secondaries underside (a character carried to a still further extent in the closely allied *pephredo* Godman [1901, Biol. Centr. Am. Rhop., II, p. 657; III, pl. 8, fig. 12, mislabelled "gemma"] which thus stands towards *hilaria* Godman [1901, Biol. Centr. Am., II, p. 658] in the same way as *pyracmon* does towards *henshawi*); otherwise the description is reasonably clear and has been repeated in a condensed form 45 years later by Weymer who alludes to the male too — at least I think he does, because of two details, the "reddish" aureoles in secondaries upperside, and the "dentate" lines in secondaries underside; but his reference to the sexmark as being "large" is extremely unfortunate (though in keeping with the general mess Weymer makes of the *Neonympha*).

Pyracmon from a North American pair may be described thus:

Neonympha pyracmon Butl.

Primaries: with full evenly rounded termen; secondaries: termen sinuate, with slight projection on Cu_1 in both sexes, but the wing comparatively small and round (i.e. not as developed as in the next species).

Male upperside: velvety brown, i.e. of a smoother and lighter color than *maniola* or *dorothea*, with dull cinereous, instead of fuscous, cilia. Secondaries: second discal visible as a wavy dark fuscous line margined outwardly with fulvous red; præterminal spots rimmed with the same bright hue (very different from the pale aureoles of *maniola*); clot of similar fulvous red tint above Cu_2 , corresponding to triangular diffusion of subterminal bar beneath.

Androconial mark: short and narrow, much smaller than in *dorothea*, with deeply sinuate outer edge, its crests traversed by the veins; only just reaching second discal at these points; consisting of three patches (in Cu_2 , Cu_1 and M_3) decreasing upwards, roughly trapezoid in shape but with outer sides deeply scooped; and of a very slight crescent (instead of triangle) in cell $R + M$ with its convexity against cross vein and reaching down to about level of Cu_1 . (See fig. 4.)

Female upperside: less differentiated from male than in *dorothea*, with similar to male but broader red rims, red blot and red margin to wavy second discal on warm brownish ground in secondaries; primaries with distinct reddish second discal.

Male and female, underside: both wings smooth greyish ochreous with a suggestion of olivaceous and very sparse striæ. Primaries: lines running subparallel to each other and termen; all three comparatively thick, of a clear fulvous red on both wings; præterminal dots blended into a continuous fulvous red line. Secondaries: lines, especially second discal, extraordinarily developed, continuous, broad, clearly displaying their mellow fulvous red tint; second discal so strongly toothed outwardly in its bold course (essentially of a different, direct, type than in *dorothea* or *maniola* where its outward deviation in M_1 causes the eye to miss its connection with the second discal of primaries) up to costa, where it connects with the second discal of primaries, that it interferes with the marginal markings as it projects terminally along veins Cu_2 , Cu_1 , M_2 ,

M₁ and R_s as if attracted by the metal of the præterminal serration; on Cu₂ its projection practically unites with the swerve of the subterminal line, thus forming a kind of roof over the W of the silver line, the bar being transformed here into a fulvous red triangular blot. The palish cinereous patch with a fulvous red diffusion of the aureoles, is in contact with the second discal because of the latter's development terminally, not because of its own basally as it is in *dorothea*; it is weakly dusted rather than striated with dark scales and produces a smoother, slightly opalescent effect due perhaps to the proximity of the florid second discal line.

Male, exp. 19.8, plesiotype, "Palmerlæ, Cochise Co., July '05" Am. Mus. Nat. Hist.

Other specimens: male and female (exp. 19.6) "Globe, Gila Co., Sept. 11", ex Coll. C. F. dos Passos, Am. Mus. Nat. Hist.; male "Paradize, Ariz., Poling", Carn. Mus.; male "C. J. Paine Coll.", Mus. Comp. Zool.; male "Cochise Co." ex Coll. W. C. Wood, Am. Mus. Nat. Hist.

It remains to tackle the fourth species. In 1876 W. H. Edwards, working, it may be assumed, in a bad light (note the "plumbaginous"), thus described a new "Euptychia":

"*Euptychia henshawi*, n. sp. male. Exp. 1.5 inch. Upperside light fuscous, immaculate. Underside of primaries russet, deepest along inner margin, brownish towards costa; crossed by four wavy ferruginous lines, one of which is parallel to the hind margin, midway between cell and margin, one just beyond cell and curving around it to costa, the third crosses middle of cell and the fourth is a demi-line ending at median nervure; there are also four transverse streaks near base of wing. Secondaries grey-brown, slightly russet tinted, crossed by two ferruginous lines, the outer one irregular, wavy towards margin, shaded on its inner side; the outer, near base, rather zigzag than wavy; some fine streaks on basal area; the hind margin ashy brown streaked with dark ferruginous; showing four black eyelets, small, equal, placed near the edge of the wing, in pairs on the upper median and next upper interspaces, each with a plumbaginous streak across the marginal side and through the middle, but not reaching quite across; irregular streaks or slight patches of dull silver in the interspaces both towards outer and inner angle; the margin next inner angle edged with ferruginous. Body above fuscous, beneath gray,

the abdomen buff, legs gray; palpi gray with black hair in front; antennæ fuscous, imperfectly annulated with whitish; club fuscous above, russet below.

“Female. Exp. 1.7 inch. Both wings russet in disc, primaries most brightly. The margins fuscous as is also costal edge of primaries; on secondaries the eyelets of underside are indicated by small dark fuscous spots. Underside as in male.

“From Arizona and New Mexico, collected in 1874 by H. W. Henshaw of the Wheeler expedition in honor of whom I name the species, and in 1875 by Lieut. W. C. Carpenter.”

The description of the male is worthless for all purposes of determination and I have ignored it in my bibliographical summary. A light fuscous *Neonympha* expanding 1.5 inch with no markings, red flush or androconial brand might be, for all one knows, an oversized *gemma*—although on the other hand it is possible to argue that the describer was merely in a hurry to get to the interesting underside. The “demi-line” obviously refers to some chance sequence of striæ (and what is further left without comment fits at least seven species of *Neonympha*). Size, ground color of underside and description of lines in secondaries underside apply perhaps better to *dorothea edwardsi* than to the species which I hold to be the true *henshawi* Edw. The words “New Mexico”, where *henshawi* is not yet known to occur, suggest that there were some specimens of *edwardsi* (not however the one taken, much later, by Snow) among the series Edwards was examining as he wrote. On the other hand, the description of the lines in primaries upperside and of the cinereous scaling in secondaries underside does not fit *edwardsi* (or any race of *dorothea*) at all: it exactly fits *henshawi*. In fact, if this male were a hybrid between the two, with moreover a strain of *gemma*, it could not have been better described. Such a freak being unlikely, I am forced to dismiss this confused and composite picture altogether as not applying to any known insect.

The description of the female however is that of a fairly recognisable *henshawi* (a form of which was figured as *pyracmon* by Godman four years later) differing from the female of *dorothea* in the two main details cited: “russet in the disc, primaries most brightly” and “small dark fuscous spots” which in *dorothea* are comparatively large and dim. As the tint which Edwards calls “russet” seems to be on the yellow, rather than

on the red side (for example, the costal yellowish brown of the primaries underside in *dorothea* or the ground color upperside in female *avicula*), "russet" cannot apply to the pale reddish female of *dorothea edwardsi*, a specimen of which Edwards had. "Underside as in male" merely suggests that when Edwards picked up the fresher female of the two he possessed, a *henshawi*, the general impression he had formed from the inspection of his mixed males was based less on his specimens of *dorothea*, than on those of *henshawi*. But again, the back of an entomologist's mind is not a very sound basis for the deciphering of his descriptions, and so a further accumulation of clues is necessary.

In 1887, 11 years later, Edwards, in one of the finest works on butterflies ever published, gave a lovely plate illustrating his species, the models being a male and female from his collection. These are before me as I write and are not *dorothea edwardsi*. Except that the termen in the female is perhaps not sinuated enough, these figures are admirable. The accompanying description, which is far superior to the original one, will be examined presently. Edwards adds that the resemblance of his species to *gemma* is close in regard to the markings, and describes the egg which Doll sent him from Arizona in 1881, but which did not hatch (thus leaving us in doubt as to which of four possible species laid the dome-shaped turquoise blue ovum Edwards figures). In 1891, Charles J. Maynard described *N. henshawi* Edw. ("Henshaw's Quaker") as follows: "About the size of the type *N. euritris*, but is more reddish or rusty above, a dark band crosses middle of both wings, and there are two black dots in middle of outer border. Beneath finely marked with minute lines between the common bands. On outer portion of fore wings there is a wavy band but no spots. In the middle of hind wing is a whitish space containing four dots in pairs, each with a silver center. Above and below these are silver markings." There is not a shadow of doubt that this blunt description refers to the species (though not to the same specimen) that Edwards figured, and the humble woodcut Maynard gives of the underside of a female right hind wing represents that species quite unmistakably — which is a highly important moment in the nomenclatorial history of this unfortunate butterfly, and which would have prevented me, if nothing else did, from switching the name *henshawi* to the species

dorothea had I wished to retain the more familiar name for a butterfly which appears to be more widely distributed this side of the border. Godman's mention of "*henshawii*" (II, p. 658) may as well refer to *dorothea*; Weymer's description of "*henshawii*" in what Holland politely calls a "monograph" of the *Neonympha* is much too slapdash and muddled to be taken into any account at all.

But to return to Edwards' description in Butt. N. Am.:

"Male. Exp. 1.5 inch. Upperside dark brown, often with russet over the extra-discal areas of both wings; some examples have an ill defined patch of russet on the median interspaces of primaries, and there is usually a russet edging to hind margin secondaries next anal angle; on the middle of same margin two small black spots not always present; fringes dark grey. Underside either brown or russet, thickly dusted with yellow-white scales, more yellow beyond the discal band of secondaries; the whole surface finely streaked and dotted with red brown; primaries crossed by three wavy red brown lines, two of which enclose the discal band, the other lying nearly midway between the band and margin, often macular; some examples have a demi-line crossing cell to median; the discal lines are continued across secondaries, the outer one often projecting roundly on second subcostal nervule; a short sinuous line an anal angle; on middle of hind margin a large suboval patch, the ground of which is dark brown, sprinkled with whitish scales; within this, in upper median and discoidal interspaces, a pair of velvet black spots, each with an inverted "T" shaped patch of silver; in the interspaces towards outer angle a pair of silver dashes each, and in lower median a silver serration, and a bar in submedian. Body above dark brown, beneath grey brown; legs same; palpi grey with many black hairs; antennæ blackish, annulated with light; club black above, ferruginous at tip and beneath.

"Female. Exp. 1.7 inch.; russet, brown about the margin; spots on secondaries as in male. Underside of primaries russet, of secondaries yellow brown; marked like the male.

"New Mexico, Arizona, Colorado. First taken by H. W. Henshaw of the Wheeler Exploring Expedition, 1874. Morrison afterwards brought examples from Arizona and B. Neumoegen from Oak Creek Canon, Colorado."

It is evident that here again Edwards had a series of mixed

specimens before him. Only the Arizona ones, and not all of them, were *henshawi*. The "patch of russet" coming directly after the "russet" of the first line is not mere repetition, but seems to imply the difference that Edwards might have noticed between Henshaw's specimens with diffuse fulvous and a fulvous patched New Mexican race of *dorothea*. The "not always present" is less an excuse for the "immaculate" of the original description than an impression produced by the contrast between the distinct spots of *henshawi* and the rather dim blotches of *dorothea*. The abundantly streaked yellow underside is *henshawi* all over; so is the continuation of the lines from primaries across secondaries. The "often roundly projecting" refers to specimens of *dorothea*. The "suboval patch" is again *henshawi*. The original description of the female has been slightly revised as Edwards was evidently puzzled at having such different specimens of females. But taken all in all, I think we can distinguish here, through the fade-out of *dorothea*, an elegant and correct delineation of both sexes of the species which in 1887 corresponded to Edwards' final concept of his *henshawi*, the butterfly figured.

An examination of the eight specimens which are labelled, I understand, by Edwards himself, and come from his collection (now in the Carnegie Museum) reveals that five of these are *dorothea edwardsi* while the other three (two males and one female) represent the insect which I here definitely fix as *Neonympha henshawi*. There is no doubt in my mind that the female belongs to the same colony as the two males, and there is a reasonable amount of probability that it is the exact specimen of the original description which in the corresponding passage conveys rather neatly the general impression produced by this remarkably well conserved female. This noted, the following summary of distinctive characters will settle the identity of *N. henshawi*.

Neonympha henshawi Edw.

Typical race: primaries: roughly elongated apically, with slightly concave (fuller in female) slanting termen; secondaries: terminally sinuate, more so in female where they are very developed, with a projection (in some almost caudal) in termen on Cu_1 ; tornus angulate in both sexes. Upperside: cilia dull cinereous as in *pyracmon*. Male: of a smooth brown tint

rather as in *pyracmon*. Primaries: with a cloud of dull fulvous discally (presumably less evident in fresh specimens); M_3 and lower corner of cell $R + M$ outlined in same. Secondaries: with two præterminal spots, very distinct, small, oval, unrimmed; dimly discernible second discal line which is dark fuscous, tinged outwardly with diffuse dull fulvous.

Androconial mark: resembling that of *pyracmon*, but more expanded (conspicuously so in faded specimens) towards dorsum; consisting of three patches: large rhomboid with concave outer edge in Cu_2 ; a much narrower one in Cu_1 , slightly concave outwardly; smallish patch in M_3 ; and of a crescent rather tending to a triangle but still retaining *pyracmon*'s character, although larger and reaching down in cell $R + M$ to somewhat beyond the level of Cu_1 . (See fig. 3.)

Female upperside: primaries rather bright tawny fulvous in disc, otherwise fulvous brown inclining to fuscous towards base and terminally; second discal brownish, distinct; first discal suffused with the brownish shading (but distinct in all other specimens I have examined which thus look more definitely banded than the only female of the typical race). Secondaries: fulvous in disc, fuscous basally, with a fuscous border in which the fulvous aureoles of the two distinct black small oval præterminal spots are broadened basally, and fuse to form an inner band.

Male and female underside: ground color similar on both wings (except for a space between second discal and subterminal in secondaries where it is lighter), of *pyracmon* type, but rather drabber, more yellowish, and regularly striated with browner striæ (except in said space). Primaries: second discal, corresponding to termen, angularly curving around cell $R + M$ from costa (less angularly in some females where it thus resembles *pyracmon*), then sloping towards first discal with its concavity outward, subparallel here to subterminal which runs midway between second discal and termen, all through subparallel to termen, to reach costa. Secondaries: second discal tending, especially in female, to be straight (cp. the primal straightness of its course in *pyracmon* despite the dentations), and distinctly passing in front of the upper V-mark to connect with second discal line of primaries. Cinereous irroration reduced to small weak suboval patch in middle of outer third, speckled rather than striated with darker (dull brownish)

scales; completely surrounded by ground color, with broadish yellowish brown diffusion of aureoles within. Subterminal line thin and only slightly curved in Cu_2 with very slight or diffused bar (invisible in most females) not interrupting the line which is thus perceptibly continued up as a slight inner margin of patch (very clear and straight in some females).

Female, lectotype, exp. 21.3, and male, paratype, exp. 20.4, labelled in Edwards' hand, "Henshawi M., Ariz^a," Carn. Mus. Paratypes: male with same label, Carn. Mus.; two males, no locality, ex Holl. Coll., Carn. Mus.

None of the following specimens examined belong to the type race, and the females fit in especially well with Maynard's description and figured outline: one male, exp. 20.5, "Arizona", ex Coll. C. F. dos Passos; Am. Mus. Nat. Hist.; three females (one exp. 22.9) "So Ariz., O. C. Polling, ex Coll. A. G. Weeks," Mus. Comp. Zool.; one female "Chiricahua Mts., D. K. Dunkan, 24.VI.33", ex Coll. C. F. dos Passos, Am. Mus. Nat. Hist.; one female, "Cochise Co., ex Coll. W. C. Wood," Am. Mus. Nat. Hist.

Two males from Pima Co., "Mud Springs, Santa Catalina, 6,500 f. 17-20.VII.16", Am. Mus. Nat. Hist., and a female, "Cochise Co., C. J. Paine", Mus. Comp. Zool., offer some curious "pyracmonoid" characters. One of these males (exp. 18.7) has a slight rusty broadening of the second discal line in secondaries underside, which thus seems to run closer to the cinereous patch than in typical *henshawi*. The other male and the female show a definite rusty diffusion of this line near costa and another projection where it tends to unite with a rusty (though less red than in *pyracmon*) blot above the silver W.

Two males with Edwards' labels in pencil "*Henshawi* M. Ariz^a" ex Coll. Holland, Carn. Mus., obviously represent a definite race. There is more dull fulvous red spread over the primaries, so that these might be described as of that color, with dark fuscous sexmark traversed by fulvous veins, and rather pale fuscous shadings terminally and subcostally; second discal line in secondaries broadly margined discally with warm reddish fulvous; aureoles of the same tint. Underside curiously resembling *hilaria* (especially in one of the two specimens) owing to the transverse spaces between the lines being alternately darker and lighter, and rather brightly yel-

lowish between the second discal and subterminal lines of both wings. Six females (2 females "Arizona E. G. Graham Acc. 8157. St. Rita Mts., 5.VII.27", Carn. Mus., 1 female, same region, same collection, "Florida Camp 8.VII.27", Carn. Mus., and 3 females "Huachuca Mts., 6.800 f., 21, 23, 23, VI.36", ex Coll. C. F. dos Passos, Am. Mus. Nat. Hist.), belonging, I think, to the same form as the variegated males, may be described as: fuscous with contrasting warm reddish bands and margins to lines, and with underside very like Godman's figure.

A few words may be added concerning the male armature of the four species under consideration. In *dorothea* the uncus looks straighter and the clasp broader (more arched dorsally and fuller ventrally) than in *maniola*, *pyracmon* or *henshawii*. I do not perceive much difference between the organs *pyracmon* and *henshawii*, except perhaps a slightly thinner uncus in the latter. Of the four species, *maniola* seems to have the narrowest clasp (concave ventrally, with elongated spur). Partly because several superficial characters proved sufficient to easily separate the four species, and partly because the number of specimens representing each was not compatible with a long series of dissection, the examination of the male armature was limited to half a dozen preparations, two of which were made for me by Mr. W. P. Comstock at the American Museum of Natural History. For the genitalia of *maniola* I used a slide prepared in 1934 by Dr. Marson Bates. Judging by the fact that he prepared a slide of *dorothea* too, it seems fair to suppose that he had noticed the difference between these two insects long before I did. Further study might reveal whether the shape of the clasps is constant (it was identical in 3 specimens of *dorothea*), or, if not, what is the specific scope of its variation.

In conclusion, my thanks are due to Mr. W. P. Comstock of the American Museum of Natural History for his invariable assistance and advice, and for the loan of their material; to Mr. C. F. dos Passos for loaning me his specimens; to Prof. Nathan Banks for placing at my disposal the series of the Museum of Comparative Zoology; to Dr. C. T. Parsons of that institution for assisting me in several matters; to Dr. A. Avinoff and Dr. W. R. Sweadner of the Carnegie Museum who not only patiently answered my queries concerning the Edwards series, but did me the exceptional favor of sending me all the "*henshawii*" material of the Carnegie Museum.



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