Resolution of Parsons' "*Philiris* species a" from Papua New Guinea (Lepidoptera, Lycaenidae)

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Abstract: A previously unnamed species of *Philiris* Röber, 1891, illustrated by Parsons in his 1998 book "The butterflies of Papua New Guinea", is examined and its identity resolved. *Philiris* ***mulleri*** **sp. n.** (holotype male, in BMNH, London) is described and compared with nominotypical *fulgens* Grose Smith & Kirby, 1897; *P. f. kurandae* Waterhouse, 1902; and *P. f. bicolorata* Wind & Clench, 1947. *P. septentrionalis* **stat. rev.,** historically considered a subspecies of *fulgens,* is treated as a distinct species due to significant morphological differences. Adult males and male genitalia of *fulgens, septentrionalis* and *mulleri* are illustrated. Difficulties in assigning females to species of the *fulgens* species-group are briefly outlined.

Keywords: Lepidoptera, Lycaenidae, Lycaeninae, new species, Papua New Guinea, *Philiris fulgens* species-group, *P. mulleri, P. septentrionalis*

Zur Aufklärung der Identität von Parsons „*Philiris* Species a" von Papua New Guinea (Lepidoptera, Lycaenidae)

Zusammenfassung: Eine von Parsons (1998, „The butterflies of Papua New Guinea") als unbeschrieben erkannte und abgebildete „*Philiris* Species a" aus der Gattung *Philiris* Röber, 1891 wird untersucht und ihre Identität aufgeklärt. Sie wird als *Philiris* ***mulleri*** **sp. n.** (Holotypus Männchen in BMNH, London) beschrieben und mit den Taxa *Philiris f. fulgens* Grose-Smith & Kirby, 1897, *P. f. kurandae* Waterhouse, 1902 und *P. f. bicolorata* Wind & Clench, 1947 verglichen. *P. septentrionalis* **stat. rev.,** historisch als eine weitere Unterart von *P. fulgens* betrachtet, wird wegen deutlicher morphologischer Unterschiede als separate Art betrachtet. Männliche Falter und Genitalien von *fulgens, septentrionalis* and *mulleri* werden abgebildet. Die weiterhin bestehenden Probleme der Zuordnung der Weibchen zu den im männlichen Geschlecht der Artengruppe definierten Arten werden kurz dargelegt.

Introduction

In his monumental work on Papua New Guinea butterflies, Parsons (1998) dealt with all described butterfly taxa occurring in the country at that time, laying a solid foundation for subsequent research. Parsons noted – sometimes in detail, in other cases only briefly – a number of apparently undescribed taxa which were, for one reason or another, problematic, or for which there existed insufficient specimens or inadequate data. These were usually referred to as "species a", "species b" etc. In almost two decades since the publication of Parsons' book many of these "loose ends" have been dealt with. In continued preparation for a comprehensive treatment of butterflies on the Milne Bay Province islands, this paper deals with Parsons' "*Philiris* species a" (Parsons 1998: 366).

Parsons (1998: 361–379) recognised 46 species of *Philiris* Röber, 1891 (= *Parachrysops* Bethune-Baker, 1904) in Papua New Guinea, three of which (*Philiris* "species a", "species b", "species c") were undescribed. Since that time, a further six species of *Philiris* have been described from Papua New Guinea (Müller 2014); these included Parsons' "*Philiris* species c", described as *P. parsonsi* Müller, 2014.

Of Parsons' three undescribed *Philiris* taxa, his "*Philiris* species a" is the most problematic; ♂♂ are morphologically almost inseparable from *P. fulgens* (Grose Smith & Kirby, 1897), and correctly placing ♀♀ of most the taxa associated with *fulgens* ("species a", *septentrionalis* Joicey & Talbot, 1916 [TL: Indonesia, Schouten islands, Biak], *bicolorata* Wind & Clench, 1947 [TL: Indonesia, Aru], *kurandae* Waterhouse, 1902 [TL: Australia, Queensland, Cairns]) remains fundamentally troublesome where two or more taxa occur sympatrically. Fortunately, ♂ genitalia are distinctive and diagnostic, but in resolving (naming) "*Philiris* species a" (see discussion), it is acknowledged that there is at present no unambiguous means of correctly associating ♀♀ with this new taxon.

Parsons (1998: 366) declared that "*Philiris* species a" is closely related to *P. fulgens* and that the two species are sympatric in Morobe Province. He gave the distribution of the former as "Northern mainland PNG, Normanby Island and New Britain" and added that the female had not been recognised, but "probably closely resembles that of *fulgens*". He went on to say that the unnamed species was "confusingly like *P. fulgens bicolorata* from southern mainland PNG, and also the nominate race of *fulgens* from [Ambon]", and provided some rather confusing morphological features that in his view illustrated variation: "The [hindwing upperside] costa and subapex of the Normanby Island ♂ is much broader dark brown than that of the mainland ♂, and the [hindwing upperside] margin in the ♂ from New Britain is much narrower than that of the mainland ♂." Most of the localities noted by Parsons for "*Philiris* species a" were on the New Guinea mainland, and it seems – each was mentioned only in the singular – that only 1 ♂ each from Normanby and New Britain were available to him. Whilst these two specimens almost certainly do represent "*Philiris* species a", there remains some doubt, and neither is included in the type series (see below). It is noted that individual photographs for Parsons' plates were clearly taken at different times and with different photographic equipment or lighting, with the result that comparisons are sometimes hampered with regard to colour and exposure (e.g. *Hypolycaena phorbas* illustrated by Parsons [1998: plate 61]; see Tennent, in press).

Parsons (1998: plate 51, figs. 1322–1323) illustrated adult ♂♂ from Wau and Gabensis (both Morobe Province) and

the ♂♂ from Normanby (Parsons 1998: plate 51, fig. 1324) and Kerevat, New Britain (Parsons 1998: plate 51, fig. 1325). He also included diagrammatic figures of ♂ genitalia of *P. fulgens* and "*Philiris* species a" which, as he suggested, clearly indicate distinct species (Parsons 1998: plate XI). The only specimen the author is able to directly compare with Parsons' illustration is the Normanby ♂ in the Australian National Insect Collection (ANIC) in Canberra; that of Parsons (1998: plate 51, fig. 1324) has a dark blue, indistinct and rather dull hindwing upperside; the reality is a hindwing that is dark but prominent shining blue (Fig. 19).

Since genitalia of ♂♂ in the *fulgens* species-group are diagnostic, and in view of Parsons' observation that "the unnamed species is confusingly like *P. fulgens bicolorata* ...", the holotype of *bicolorata* was obtained on loan from the Museum of Comparative Zoology, Harvard University. Morphologically, the *bicolorata* holotype specimen is very similar indeed to "*Philiris* species a" – and to other species of the *fulgens* group –, but the genitalia (Fig. 22) confirms its conspecificity with *P. fulgens*. The holotypes of both nominotypical *fulgens* (Figs. 1–3) and "*fulgens*" *septentrionalis* (Figs. 11–13) are in the Natural History Museum, London (BMNH) and have already been dissected (Figs. 21, 23). ♂ genitalia (not figured) of *P. fulgens kurandae* (Figs. 9–10) are also typical of *fulgens*. Dissections confirm that Parsons "*Philiris* species a" is a distinctive undescribed species, as Parsons believed.

Philiris mulleri sp. n.

(Figs. 16–20, 24.)

Holotype ♂: Papua New Guinea, Baiyer River, Western Highlands Province, 1200 m, 5°30′ S, 144°10′ E, 12.–18. xi. 2013, C. J. Müller (BMNH).

Paratypes (in total 11 ♂♂): 1 ♂, *Philiris* sp. nov. (nr. *fulgens*) ♂, Bulolo, Morobe Province, P[apua] N[ew] G[uinea], M. J. Parsons, Dec[ember] 1981, I[nsect] F[arming and] T[rading] A[gency] coll[ection], Alt[itude] 1000 [m], Brit[ish] Mus[eum] 1987-194, B[ritish] M[useum] (N[atural] H[istory]) No. (V) 1094. 10 ♂♂, Papua New Guinea, West Sepik Province, Mianmin Range, ca. 950 m, 4°39′ S, 141°45′ E, vi. 2010, C. J. Müller (all BMNH).

Etymology: This new species is named for Chris Müller, whose detailed research in recent years has added significantly to knowledge of Papua New Guinea butterflies, and who generously donated a number of *Philiris* specimens, including the specimen designated here as the holotype of *P. mulleri,* to the BMNH some years ago.

Diagnosis

Male very similar to *P. fulgens,* individual specimens may be virtually indistinguishable; forewing length (holotype) 16 mm; forewing outer margin slightly convex, apex rounded (margin distinctly concave in *P. f. kurandae;* straight or slightly convex in other *fulgens* subspecies); forewing basal two thirds dull purple blue, leaving broad brown-black margin at tornus, costa and apex (dark margin generally less broad at tornus and more extensive at apex in nominotypical *fulgens* and *P. f. bicolorata;* basal colour brighter purple in *P. f. kurandae*); hindwing broadly shining blue in spaces 1b–5, extending broadly into space 6; marginal border and costa broadly dark brown (marginal border broad, especially so at the tornus, blue barely extends into space 6 in nominotypical *fulgens* and *P. f. kurandae;* marginal border narrow, blue extensive in space 6 in the *P. f. bicolorata* holotype [the only *bicolorata* specimen seen by the author]); underside glossy white, with pinkish cast; forewing with indistinct dark marginal border; hindwing with distinct black marginal cilia, particularly at veins; solitary black spot in space 1a. It is noted that a black spot is invariably present (often very small or vestigial, occasionally absent) in almost all *fulgens* species-group taxa, including *P. septentrionalis* (see discussion), but excluding *P. f. kurandae*. The under surface of many *Philiris* taxa lose their white scales quite quickly and become worn, often with a "stained" appearance.

Male genitalia distinctive by comparison with other *fulgens* species-group species. Whole genitalia like other species of the group; dorsal edge of tegumen with shallow concave indentation, edges rounded (deeper, with dorsal edges weakly lobed in *fulgens*, *septentrionalis*, *bicolorata*); valva broad basally, extending in long, curved, slim mid-section tapering to a curved blunt point (valva basally bulky, mid-section broad, with angled apex terminating in blunt posterior process in *fulgens* and *septentrionalis*; *bicolorata* similar [to *fulgens* and *septentrionalis*], but apex less broad, hooked). Female not identified (see discussion).

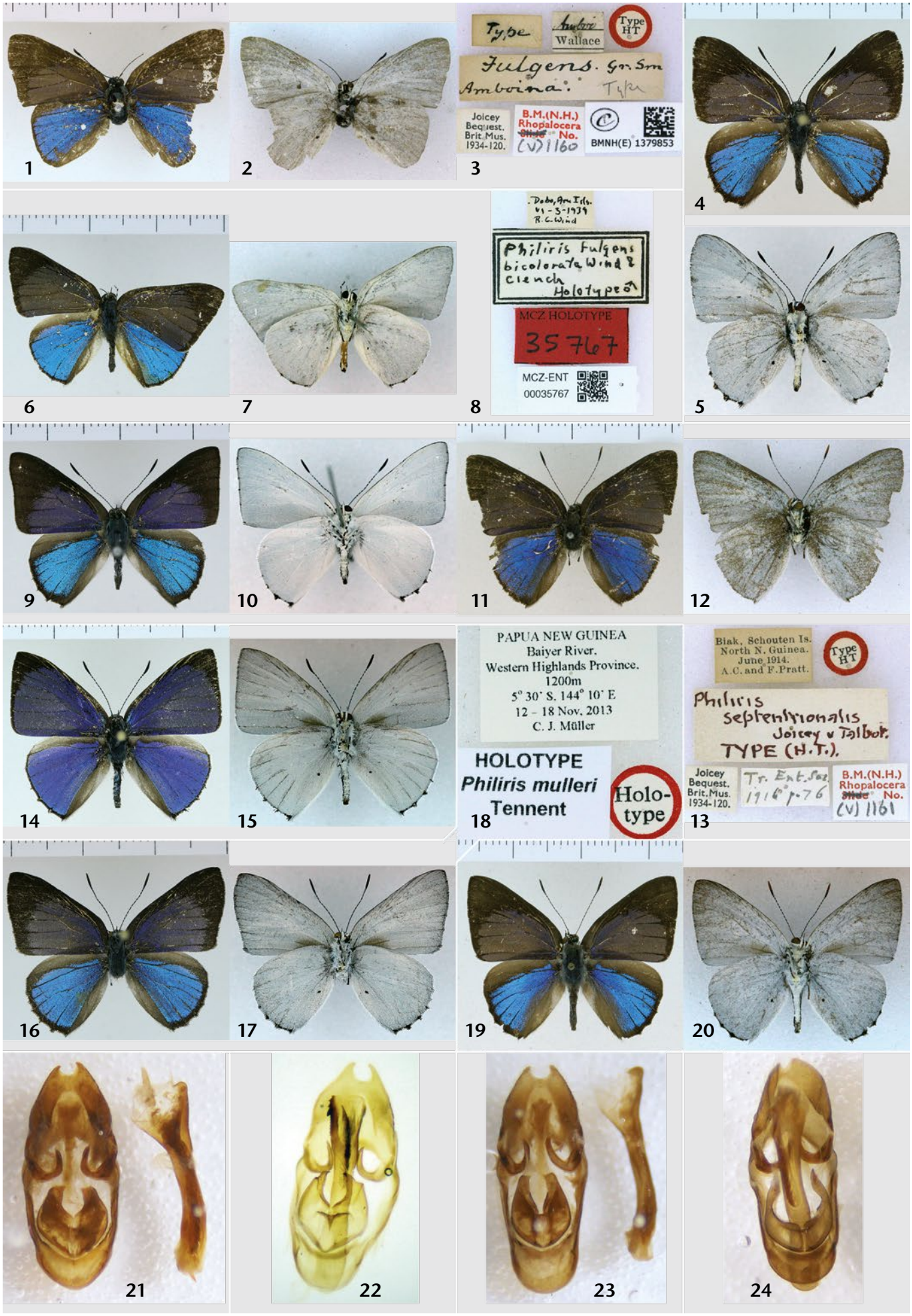
Distribution: Papua New Guinea. Probably widespread on the main island of New Guinea; reported also from the Bismarcks (New Britain) and the D'Entrecasteaux (Normanby).

Discussion

Although ♂ genitalia of *P. mulleri* are distinctive, morphological differences between *mulleri* and *fulgens* subspecies noted in the description, above, are variable and many individual males may be difficult to place without dissection. In series, differences are more apparent.

The status of *P. septentrionalis* **stat. rev.** as species, has been the subject of some discussion. Joicey & Talbot (1916: 76) described "*Philiris fulgens septentrionalis*" from

Figs. 1–10: ***Philiris fulgens*. Figs. 1–5:** *P. fulgens fulgens:* **Figs. 1–3:** ♂ holotype (Ambon) with labels; **1:** ups.; **2:** uns.; **3:** labels. **Figs. 4–5:** *P. f. fulgens* ♂ (Seram); **4:** ups.; **5:** uns. **Figs. 6–8:** *P. fulgens bicolorata:* ♂ holotype (Aru) with labels; **6:** ups.; **7:** uns.; **8:** labels. **Figs. 9–10:** *P. fulgens kurandae:* ♂ (Queensland); **9:** ups.; **10:** uns. – **Figs. 11–15:** *Philiris septentrionalis:* **Figs. 11–13:** ♂ holotype (Biak, Schouten Islands) with labels; **11:** ups.; **12:** uns.; **13:** labels. **Figs. 14–15:** ♂, upperside (Mianmin Range, West Sepik Province); **14:** ups.; **15:** uns. – **Figs. 16–20:** *Philiris* ***mulleri*** **sp. n. Figs. 16–18:** ♂ holotype (Baiyer River, Western Highlands Province) with labels; **16:** ups.; **17:** uns.; **18:** labels. **Figs. 19–20:** ♂ (Normanby Island); **19:** ups.; **20:** uns. – **Figs. 21–24:** ♂ genitalia. **Fig. 21:** *P. fulgens fulgens* HT (Ambon), BM(NH) vial 1160. **Fig. 22:** *P. fulgens bicolorata* HT (Aru), vial JT923. **Fig. 23:** *P. septentrionalis* HT (Biak, Schouten Islands), BM(NH) vial 1161. **Fig. 24:** *P. mulleri* PT (Bulolo, Morobe Province), BM(NH) vial 1094.



a ♂ from Biak (Figs. 11–13) and a second ♂ from Kapaur, comparing it with [nominotypical] *fulgens,* from which it was said to differ "in the more extended purple on [the] forewing which reaches costa and extends beyond cell half-way between it and apex, its edge evenly curved and nearer the margin than in the typical form. Hindwing with increased cellules 6 and 7". Others, including Parsons (1998: 366) also placed *septentrionalis* as a subspecies of *fulgens,* although Parsons also noted "it is possible that *septentrionalis* represents a species distinct from *fulgens* ...". The genus *Philiris* contains a number of species that are difficult to separate, not only in the *fulgens* species-group, but morphology of *septentrionalis* very clearly suggests a distinct species; it is larger than any *fulgens* species-group species; the forewing apex is distinctly pointed; the upperside blue is significantly more extensive and — notably — although there is, if one looks carefully, a slight difference in the colour of fore and hindwings, the species lacks the unmistakable and prominent "two-tone" upperside of *P. fulgens* and *P. mulleri*. ♂ genitalia of *septentrionalis* identifies it as closely associated with the *fulgens* species-group, but the dorsal depression of the tegumen is broader and the base of the valvae is less bulky than that of *fulgens*.

Distribution of *P. septentrionalis* is more extensive than previously realised; it is recorded here from West Sepik Province where it is sympatric with *P. mulleri,* as it is in Morobe Province.

It is noted that Parsons (1998: 365) refers to a lectotype of *septentrionalis,* "designated by Sands (1981c)". This was overlooked by the author until immediately prior to submission of this ms. However, the specimen in question (identifiable from data on the label) bears no lectotype label, but does bear a holotype label, and handwritten data leaving no doubt that this was intended by Joicey & Talbot to be the holotype (see Fig. 11). This is clearly the holotype and is treated as such here. The reference provided by Parsons for a lectotype designation refers to an unpublished thesis (Sands 1981), not widely available and not seen by the author. Parsons' reference to a lectotype is invalid and is disregarded. It is noted, for the record, that labels associated with the Kapaur specimen mentioned by Joicey & Talbot (1916: 76) included a circular yellow paratype label, without any indication of what it was a paratype of. A suitable label has been added by the author. It is further noted that the holotype of *septentrionalis* was regarded as such by Müller (2014: 40, figs. 24, 25).

With the exception of *P. f. kurandae* (no other species of this group occur in Australia), ♀♀ of the *P. fulgens* species-group are notoriously difficult to reliably place with ♂♂; they appear very similar indeed and are individually variable. There is little doubt that the ♀ of *P. mulleri* is "known", and it would almost certainly be possible to allocate ♀♀ to this species, but it would be on a rather *ad hoc* basis, with no real expectation of accuracy. It is considered sensible not to do so, until such time as allocation can be made with certainty (i.e. following rearing, or recognition of diagnostic features).

The purpose in illustrating dissections was to demonstrate dissimilarities in ♂ genitalia, which is adequately achieved by presenting "whole" ♂ genitalia (Figs. 21–24). The reason for not dissecting further (e.g. removing and presenting separate illustrations of the phallus) is that three of the four specimens are primary types and the author was unwilling to run the risk of causing unnecessary damage. For example, with regard to the holotype of *fulgens bicolorata,* which belongs to MCZ, Harvard, dissected by the author (Fig. 22), the phallus is very securely attached to the vinculum. Dissections of the holotypes of nominotypical *fulgens* (Fig. 21) and *septentrionalis* (Fig. 23) were made some years ago and all are, predictably, rather brittle; the dissection of *P. mulleri* (Fig. 24), labelled "*Philiris* sp. A", was made by Parsons more recently. Since in all cases, distinctive features are already revealed, further dissection of primary types was deemed unnecessary and unwarranted. Genitalia of *P. mulleri* bear some resemblance to those of *Philiris lavendula* Tite, 1963 (see Müller 2014: fig. 75).

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