

*New records and a new species
of Afrobaetodes Demoulin
(Baetidae, Ephemeroptera) from Tanzania*

M. T. GILLIES (1)

SUMMARY

Supplementary notes are given on the female and nymph of the mayfly, *Afrobaetodes bernerii*, from material collected in Tanzania. The species is shown to have a wide distribution in lowland streams in eastern Africa. All stages of a new species, *A. pugio*, are described from mountain torrents in the north-east of Tanzania.

KEY WORDS : Insects — New species — East Africa — Tanzania — Fresh water — Ephemeroptera.

RÉSUMÉ

AFROBAETODES DEMOULIN (BAETIDAE, EPHEMEROPTERA) DE TANZANIE :
NOUVELLES DONNÉES ET DESCRIPTION D'UNE NOUVELLE ESPÈCE

À partir de matériel récolté en Tanzanie, on fournit des notes supplémentaires sur la femelle et la larve d'*Afrobaetodes bernerii*. On montre que l'espèce connaît une large distribution dans les courants d'eaux en plaine d'Afrique orientale. On décrit tous les stades d'une nouvelle espèce, *Afrobaetodes pugio*, à partir de torrents de montagnes dans le nord-est de la Tanzanie.

MOTS CLÉS : Insectes — Nouvelle espèce — Afrique orientale — Tanzanie — Eaux douces — Ephéméroptères.

The genus *Afrobaetodes* was created by DEMOULIN (1970) for a peculiar nymph from Malawi treated by KIMMINS (1955) as "? near *Centroptilum*". DEMOULIN showed that it resembled the Neotropical genus *Baetodes* NEEDHAM and MURPHY in having the gill lamellae inserted on the ventral surface of the abdomen as well as in its general sprawling aspect and almost complete loss of median filament. However, the wing venation of KIMMINS' specimen as well as the mouthparts of the nymph showed it to be phylogenetically distinct. A full description of the adult of the West African species *A. pusillus* (Navas), for-

merly placed in *Cloeon*, was given by GILLIES (1979). At that time two other species were recognised, *A. bernerii* Demoulin, the type species, and *A. delicatissimus* (Barnard) from South Africa, also previously placed in *Cloeon*. The adult of *Afrobaetodes* is noteworthy as including the smallest of African mayflies other than the Caenidae.

The ♂ of *A. bernerii* has not yet been described, but on the basis of new material from Tanzania I give further notes here on the ♀ and nymph. I also give a description of another species that occurs in the mountains of north-east Tanzania.

(1) Whitfeld, Hamsey, Lewes, Sussex, BN8 5TD, England.

Afrobaetodes berneri Demoulin

Baelidae nymph A, ? near *Centroptilum* Kimmins, 1955, Ann. Mag. Nat. Hist. (12) 8 : 871.

Afrobaetodes berneri Demoulin, 1970, S. Afr. Insect Life 14 : 52.

The nymph of *A. berneri* was well described by KIMMINS and included a note on the hind wing and the venation of the fore wing dissected out of the mature nymph. I have similar nymphs from the Morogoro district of Tanzania and from the river Mkulumuzi at Magila, Tanga Province. I also have a number of female imagines collected from cobwebs at the same site in Morogoro, which are provisionally assigned to the same species as the nymphs. Another female was collected at rest on vegetation near Arusha. Additional notes are given on this material here.

Female imago (in spirit)

Body uniform dark brown, abdominal terga without median pale patches. Fore femora fawn, rest of legs cream. Fore wing with marginal intercalaries from IR_{4+5} to 2nd CuA interspace; hind wing a minute, spurless strap (Fig. 1-4).

Body : ♀ 2.9 mm. Wing : 3.8 mm.

Nymph

Abdominal terga without median dorsal spines (Fig. 2-6). Mandibles (Fig. 3-12,13). Gill lamel-

lae III-VI not concave on anterior margin (Fig. 2-10).

MATERIAL EXAMINED

Tanzania : Morogoro, R. Kilihara, 15.vii.61, 7 ♀♀, 2 nymphs; Arusha, river at 4 miles on road to Moshi, 1.i.56, 1 ♀; Magila near Muheza, Tanga, r. Mkulumuzi, 16.ix.55., 2 nymphs.

A. berneri appears to be widespread in the lowlands and plateaux of Tanzania as elsewhere in eastern Africa. Originally described from Malawi, it has also been reported from the Transvaal, South Africa, AGNEW (1963), DEMOULIN (1970) (Fig. 5). Whether *A. delicatissimus* (Barnard) represents a second South African species remains to be seen. GILLIES (1979) treated it as distinct from *A. berneri* since, as reported by BARNARD, it lacked a hind wing. In view of the vestigial nature of the wing, however, it is possible that in some specimens of *berneri* it is absent altogether or that its presence was overlooked by BARNARD. In either case the distinctness of *delicatissimus* remains in doubt.

Afrobaetodes pugio sp. n.*Etymology*

From the latin, *pugio*, a dagger, in reference to the shape of the hind wing.

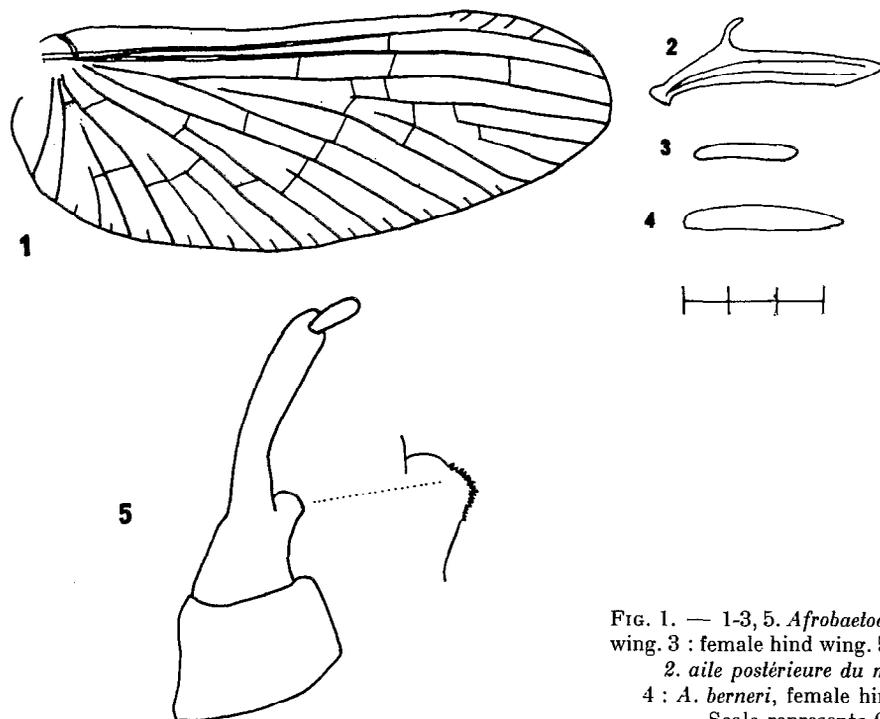


FIG. 1. — 1-3, 5. *Afrobaetodes pugio*. 1 : male fore wing. 2 : male hind wing. 3 : female hind wing. 5 : male forceps. 1. aile antérieure du mâle.

2. aile postérieure du mâle. 3. aile postérieure de la femelle. 4 : *A. berneri*, female hind wing. Aile postérieure de la femelle.

Scale represents 0.3 mm. L'échelle est de 0,3 mm.

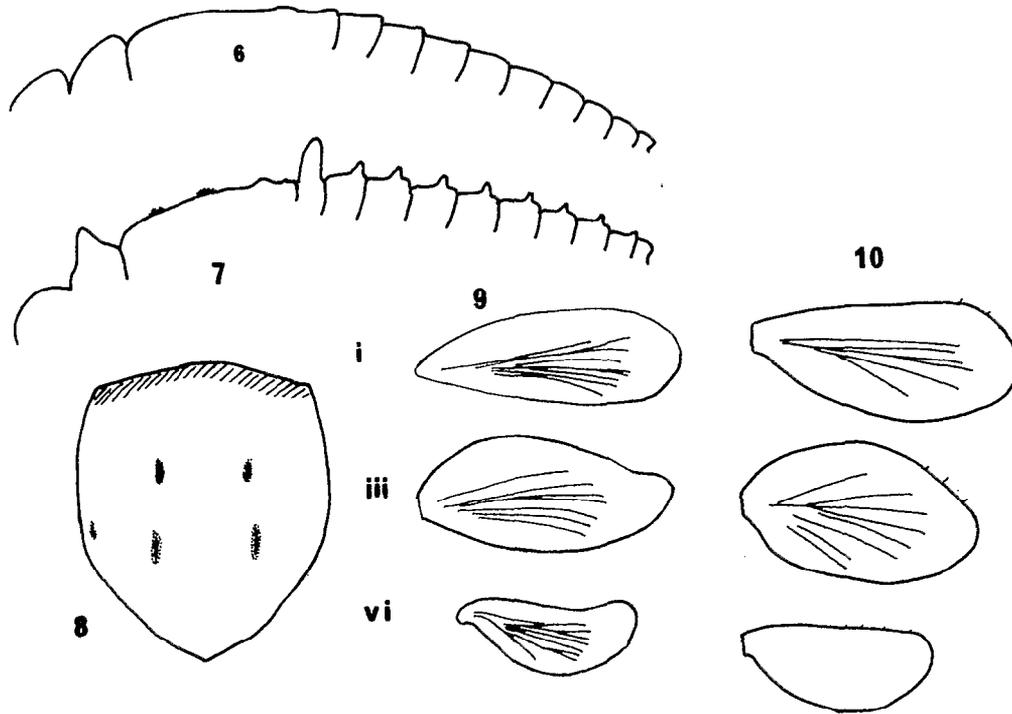


FIG. 2. — 6, 10. *Afrobaetodes berneri*. 6 : Nymph, dorsum in lateral view. 10 : Gill lamella I, III, VI. 6. *Larve, dos en vue latérale*. 10. *Lamelles trachéobranchiales I, III, VI*.
7-9. *A. pugio*. 7 : Nymph, dorsum in lateral view. 8 : Scutum, showing distribution of setal tufts. 9 : Gill lamellae I, III, VI. 7. *Larve, dos en vue latérale*. 8. *Scutum, montrant la distribution des touffes sétales*. 9. *Lamelles trachéobranchiales I, III, VI*.

♂ imago

In live : Eyes, thorax and abdomen chocolate-brown ; fore femur chocolate, mid and hind femora lemon-yellow, tibiae and tarsi clear ; terga III-V with small, median pale areas, forceps base chocolate, forceps clear, tails white.

In spirit : Turbinate eyes fawn, slightly ovoid, well separated. Thorax dark brown ; fore femur dark brown, rest of legs cream ; fore wing (Fig. 1-1) clear, stigma with 4-5 incomplete, oblique crossveins, marginal intercalaries present from 6th radial interspace to 3rd cubital interspace ; hind wing (Fig. 1-2) narrow, pointed, with 2 veins and tall, posterior-directed spur. Abdomen dark brown with cream areas of variable extent on terga II or III to V, that on IV occupying most of tergum ; in addition, there may be diffuse pale areas along dorsum and sides of other terga ; venter cream, forceps base and swollen base of forceps limb dark brown (Fig. 1-5) ; tails white.

♀ imago

In spirit : Head and thorax dark brown. Fore femur fawn, rest of legs cream. Hind wing (Fig. 1-3) minute, strap-like, pointed and without spur.

Abdomen dark brown, terga II or III to V or VI with median pale areas ; in some specimens there may be small, lateral pale areas on other terga. Tails white.

Body : ♂ 3-3.2 mm, ♀ 2.8-3 mm. Wing : ♂ 3.7-3.8 mm, ♀ 3.6-4 mm. Tails : ♂ 7 mm.

Nymph

Body (Fig. 2-7) generally pale brown except for 4 small blackish spots on scutum ; abdomen with conspicuous dorsal spines down mid-line. Vertex with a pair of submedian tufts of very short setae. Mouthparts (Fig. 3, 11-15) : left mandible canines fused, no setal tuft at base of prosthema, right mandible with divided canines, prosthema bristle-like, a well-developed setal tuft at its base ; galea-lacinia of maxilla with 3 stout teeth, the inner one recurved at the tip, palp weakly chitinised, with two segments and a short filamentous gill attached to the apex of the basal segment ; labial palp with 3 segments, the 2 distal segments partly fused, the apical segment globular.

Pronotum with a broad median tubercle ; scutum (Fig. 2-8) with 2 submedian pairs of blackish linear

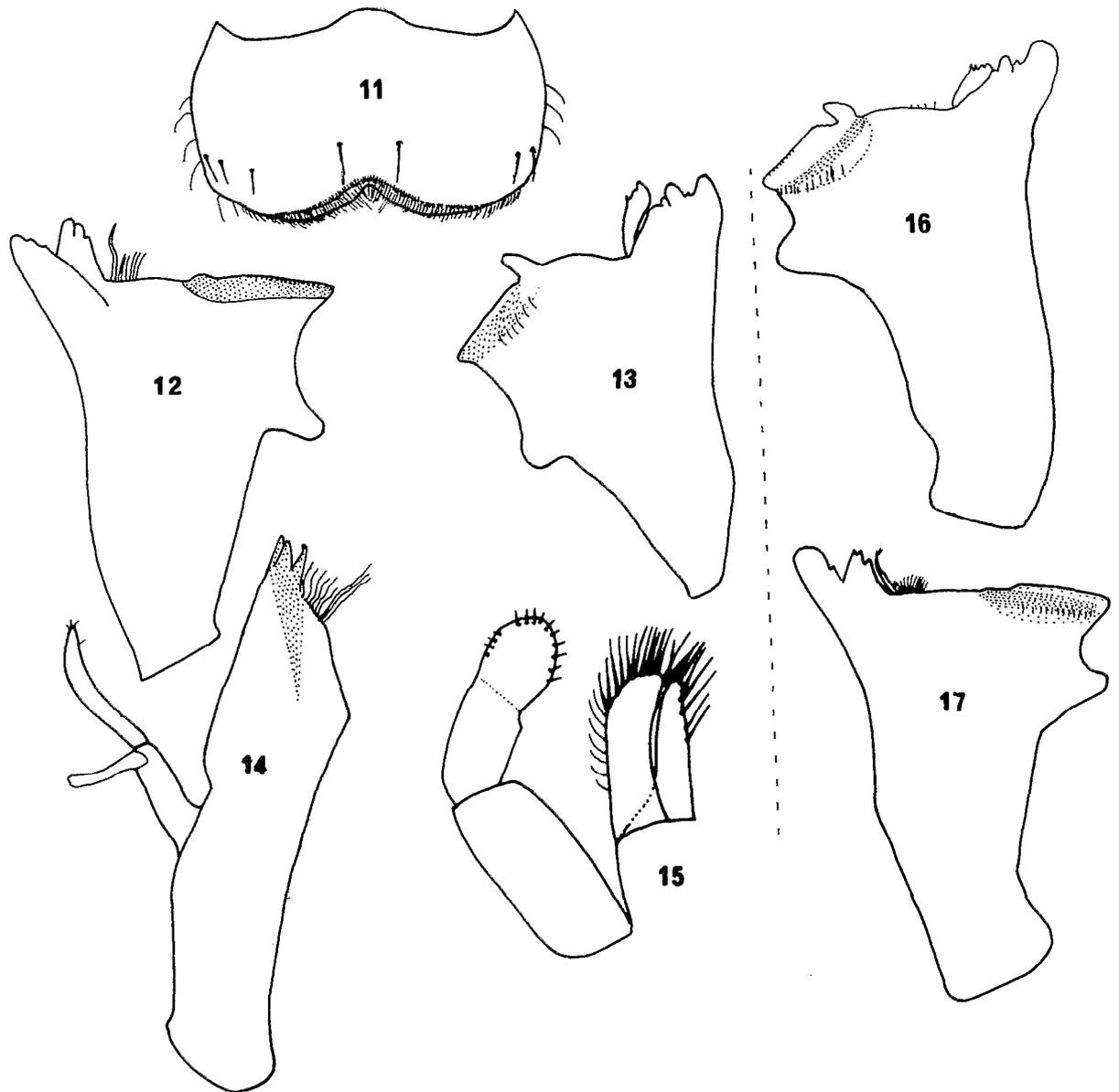


FIG. 3. — 11-15. *Afrobaetodes pugio*, mouthparts. 11 : Labrum, dorsal view. 12 : Right mandible. 13 : Left mandible. 14 : Maxilla. 15 : Labium. *A. pugio*, pièces buccales. 11. labrum, vue dorsale. 12. mandibule droite. 13. mandibule gauche. 14. maxille. 15. labium. 16-17. *A. berneri*. 16 : Left mandible. 17 : Right mandible. 16. mandibule gauche. 17. mandibule droite.

spots, each composed of a compact tuft of very short stout setae. Legs : coxae each with a conspicuous dorsal spur projecting upwards on either side of the thorax, the hind coxal spur being the most slender (Fig. 4-19); femora with a line of stout setae along posterior margin; tarsal claw with a single row of 4-5 denticles (Fig. 4-18), the second row sometimes

represented by a single denticle; a filamentous coxal gill projects ventrally from each fore coxal insertion.

Abdominal terga I-VIII with median posterior spines, that on I the most prominent and at least twice as tall as on II; posterior margin of IX slightly raised. Posterior and lateral margins of segments smooth, without teeth. Gills (Fig. 2-9) present on

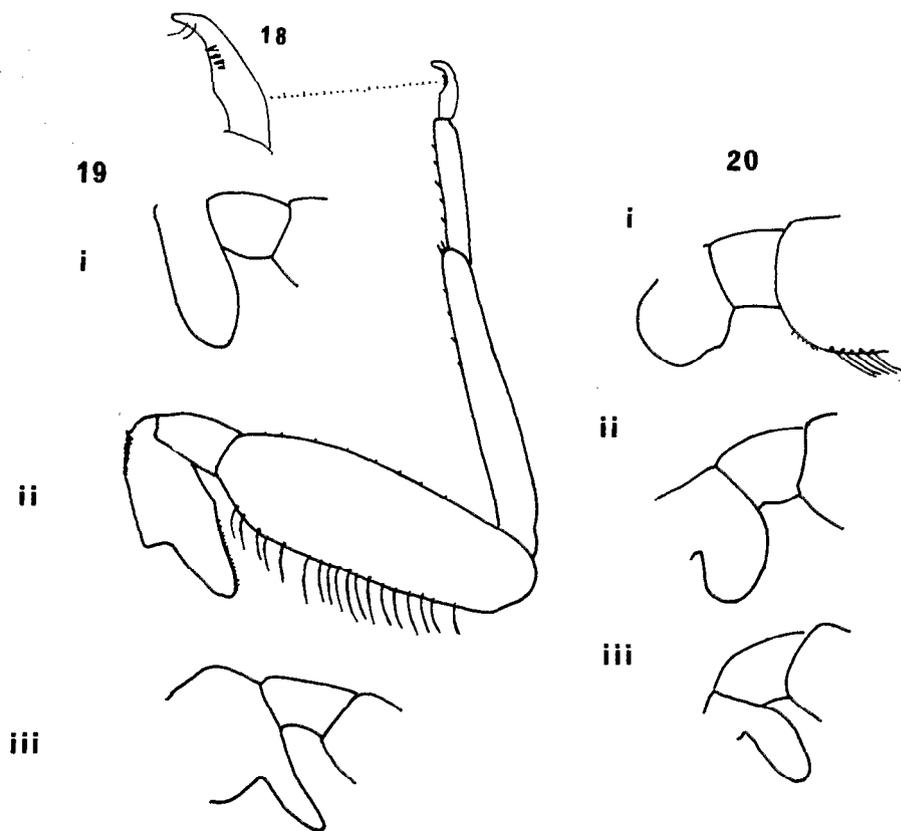
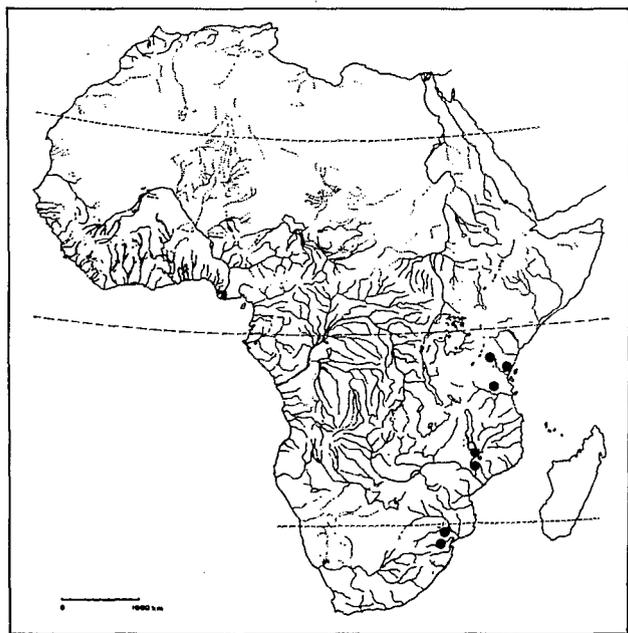


FIG. 4. — 18-19. *Afrobaetodes pugio*. 18 : Tarsal claw. 19 : Coxal spurs of legs I, II, III. 20. *A. berneri*. Coxal spurs of legs I, II, III. 20. *éperons coxaux*, I, II, III.



I-VI, arising from the ventral side of the line of junction of terga and sterna; posterior lamellae shallowly concave on anterior margin, without marginal setae; tracheae faintly discernible as a symmetrical network of fine lines. Tails: median filament reduced to a single segment, cerci scantily clothed with fine hairs on inner margin, only visible under high magnification.

MATERIAL

Tanzania: holotype ♂ imago, Amani, Tanga, Dodwe stream, 900 m, 17.x.62, 15 ♂♂ same provenance, 16-18.x.62; 2 ♂ subimagines (one with associated nymph skin), same provenance, 20.xi.61, 14.x.62; 2 ♀♀ Amani by R. Sigi, 600 m, vii.52, 29.ix.58, 7 ♀♀ Dodwe stream, 16-18.x.62; 1 nymph, Amani, R. Sigi, 15.ix.51, 14 nymphs, Amani, Dodwe stream, 2.xii.61, 8.xii.61, 1 nymph, Amani, Ukungwi

FIG. 5. — Map showing recorded distribution of *Afrobaetodes berneri*. *Distribution d'Afrobaetodes berneri en Afrique.*

stream, 4.iii.85; 1 nymph, Upare, R. Ingiliza near Bombo, c. 1200 m; 2 nymphs, West Usambara, R. Mombo below Soni, 1.vii.61. R. Sumbuguru, near Kidatu, 2.iii.91., 1 nymph; R. Sonjo, 40 kms north of Ifakara on road to Kidatu, 7.iii.91., 5 nymphs.

ETYMOLOGY

From the latin, *pugio*, a dagger, in reference to the shape of the hind wing.

The female differs from that of *A. bernerii* Dem. (the only sex known) in the smaller hind wing and the presence of broad pale areas on the abdominal terga. The nymph differs most obviously in the presence of a line of prominent median spines down the dorsum of the abdomen. The presence and distribution of setal tufts on the mesonotum and the concave anterior margin of the last two gills are also characteristic. From *A. delicatissimus* (Barnard) and *A. pusillus* (Navas) it differs in the presence of a hind wing.

A. pugio appears to replace *A. bernerii* in the cool

waters of mountain torrents in north-east Tanzania, although, as recorded above, both species have recently been taken together in streams draining the northern slopes of the Southern Highlands. Nymphs are not uncommonly found in stony streams although seldom in abundance at any one spot. They have the distinctive habit of resting on the upper surfaces of rocks. At Amani they were found, for example, in the shallow overflow on top of a stone and concrete dam in not more than 1 or 2 cm of water. Female spinners have been seen ovipositing in the afternoon and were often found in some numbers in cobwebs spun across mountain streams just above the surface of the water. No adults were caught in light-traps, which might suggest diurnal activity by both sexes. However, no swarms of males of these tiny mayflies were ever encountered.

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