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NEW CAVERNICOLOUS ANT-LIKE BEETLE OF THE GENUS *EUCONNUS* (SUBG. *TETRAMELUS*) FROM CROATIA (COLEOPTERA: SCYDMAENIDAE)

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A new cave dwelling species of *Euconnus* (*Tetramelus*) Motschulsky is described from the Croatian cave »Bazgovačka Jama«. The relationship of the new species to the species-groups *longulus* and *oblongus* is briefly discussed and the occurrences of *Tetramelus* in the former Yugoslavia are concisely listed.

Key words: Coleoptera, Scydmaenidae, *Euconnus* subg. *Tetramelus*, new species, Croatia, taxonomy

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U radu se opisuje nova špiljska vrsta iz roda *Euconnus* (*Tetramelus*) Motschulsky iz Bazgovačke Jame. Ukratko se raspravlja o odnosu nove vrste prema grupama vrsta *longulus* i *oblongus*, te se daje pregled dosadašnjeg pojavljivanja roda *Tetramelus* u bivšoj Jugoslaviji.

Ključne riječi: Coleoptera, Scydmaenidae, *Euconnus* subg. *Tetramelus*, nova vrsta, Hrvatska, taksonomija

INTRODUCTION

Tetramelus Motschulsky, the mainly Palearctic subgenus of *Euconnus* (Scydmaenidae), includes at present 177 described species (NEWTON & FRANZ, 1998 and subsequent descriptions). Species of *Tetramelus* are common in decaying plant debris, humus or forest litter. As predators of mites their distribution is related to the presence of their prey, or in an indirect way to the presence of the specific host-substrate of their prey. Apterism, micro- or anophthalmy are rather common in Scydmaenidae but even if of markedly endogeous habits, the representatives of Scydmaenidae,

with one known exception, are not encountered in caves and the only hitherto attested cavernicolous species, *Scydmaenus aelleni* Besuchet, 1981, was reported from New Caledonia. Like the Caledonian *S. aelleni* Besuchet, *E. (T.) bazgoviensis* n. sp. exhibits only moderate adaptations to cavernicolous life. The species described below proves to be the first cavernicolous Scydmaenidae of the Palearctic fauna and the first cavernicolous representative of the tribe Cyrtoscydmini.

MATERIAL AND METHODS

Abbreviations used in the text: CNHM – Croatian Natural History Museum, Zagreb; CPH – P. Hlaváč collection, Košice, Slovakia; CSV – S. Vít collection, Genève, Switzerland; CDC – D. Čeplík collection, Košice, Slovakia; CJL – J. Lakota collection, Ružomberok, Slovakia; BH – Bosna & Hercegovina; HR – Croatia; MC – Macedonia; MG – Montenegro; SB – Serbia; SL – Slovenia.

Abbreviations used in the description (also in combinations): co – combined (Length or Width etc.); A – Antennae; E – Elytra; H – Head; L – Length; P – Pronotum; W – Width; design. = designated. Examples of combined use: H.W. = Head width; co.L.H.P. = combined length of Head and Pronotum; JH – junior homonym; Abbreviations used for states: BH – Bosnia & Herzegovina, CR – Croatia, MC – Macedonia, MG – Montenegro, SB – Serbia, SL – Slovenia.

Euconnus (Tetramelus) bazgoviensis sp. nov. (Figs 1–8, 10a, 10b, 11)

Diagnosis

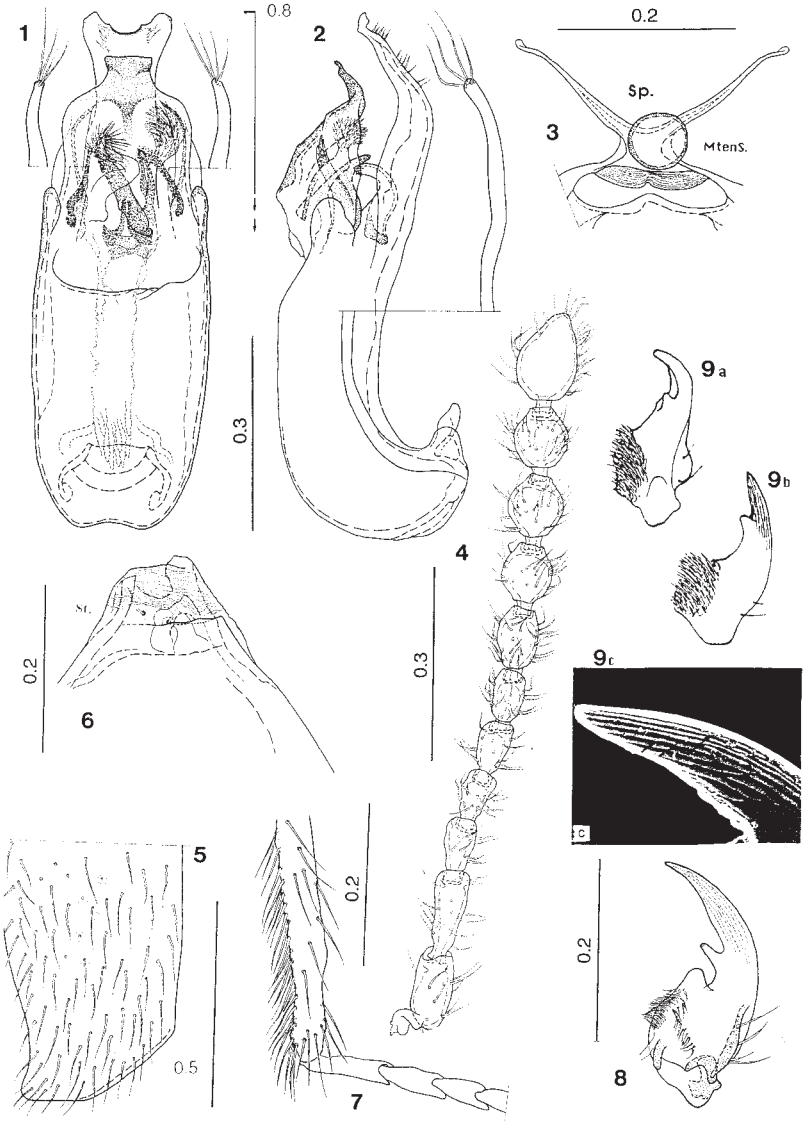
Anophthalmous and apterous. Slender, fairly convex species, markedly acuminated behind, especially in females; body length 2.22–2.35 mm, body width 0.76–0.84 mm; colour from yellowish to medium rust-red; integument shiny, with subobliterate punctures present only on the elytra; pubescence fine, suberect; antennae slender, having no subquadrate or transverse segments, all segments free of the basal rim; antennal club distinctly 5-segmented but loosely gathered, segments 8, 9, 10 subspherical, pedunculate; pronotum reduced in size, nearly cylindrical, lacking the basal fovea, base provided on each side by a clump of stiff setae; sexual dimorphic characters exhibited by the elytral apex and the metasternum.

Etymology

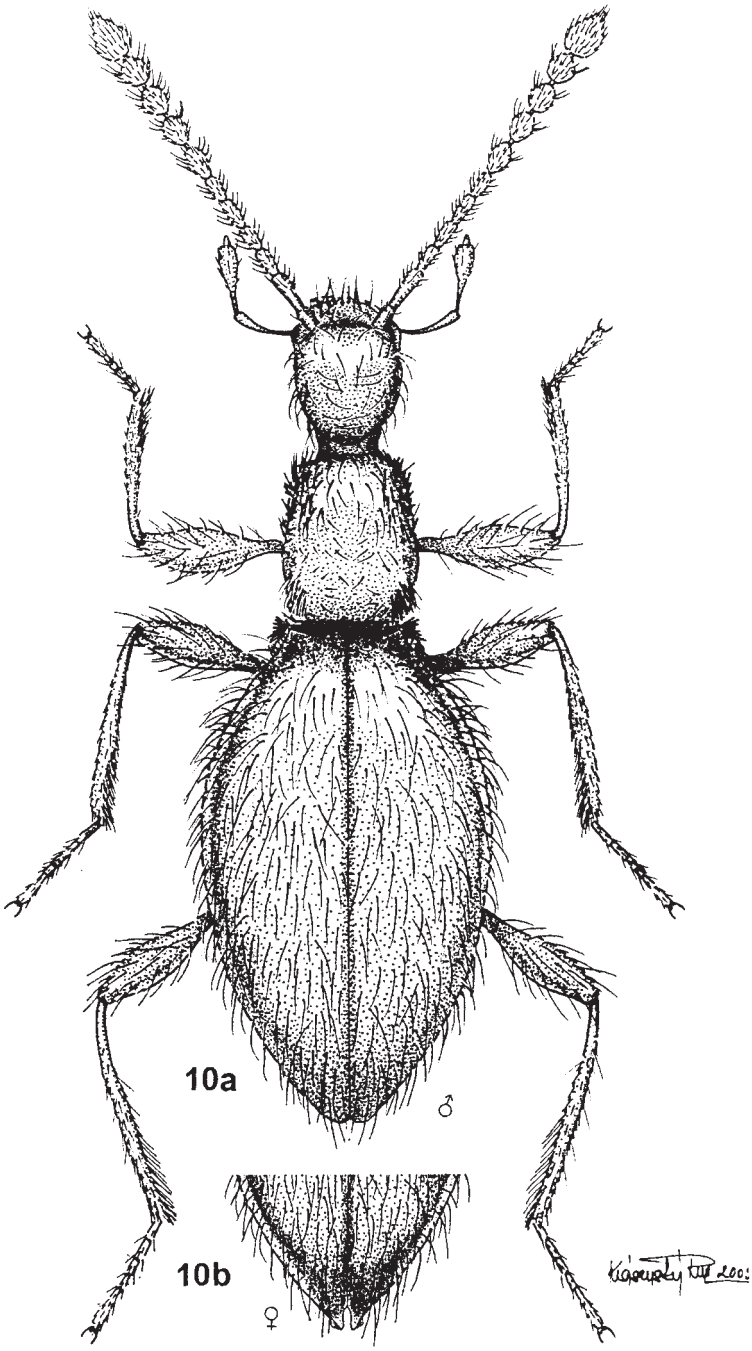
locotypic, using the vernacular name of the cave.

Material examined (4♂, 15♀)

Holotype, ♂: Croatia: Brač island, Nerežišće env., Bazgovačka jama, 17.7. 2001. Čeplík lgt./ (CNHM). Paratypes, 3♀: (idem HT); 1♂, 5♀ (idem HT), but 17.2.2001 –17.7.2002 in pitfall trap; 3♀ (idem HT), but 7.3–7.8 2000 in pitfall trap. Lakota lgt; 1♂, 1♀: Bazgovača špilja, Bežmek stan, Gažul, o. Brač, 03.08.2004, leg. B. Jalžić; 1♂, 1♀: Bazgovača špilja, Bežmek stan, Gažul, o. Brač, 04.08.2004, leg. P. Rade & R. Ozimec. (CNHM, CPH, CSV, CJL, CDC).



Figs 1–9. *E. (T.) bazgoviensis* n. sp.: 1) Aedeagus (Paratype) – dorsal aspect (distal section of paramere removed); 2) aedeagus (Holotype) – lateral aspect (distal section of paramere removed); 3) spermatheca – Sp. and metendosternite – MtenS., ventrally; 4) antenna (female); 5) apical tip of the female left elytron – lateral aspect; 6) base of the right elytron, tegumental setae omitted (female), St. – sutural edge; 7) apical third of metatibia (female); 8) right mandible, dorsal aspect (female); Scale given 0,3 mm, or as indicated; 9a)–9c) Mouth-parts of *Euconnus* (by SCHMID, 1988): 9a) mandible of *Cladoconnus denticornis*; 9b) mandible of *Tetramelus pubicollis*; 9c) mandible apex in *Tetramelus pubicollis* – dorsal aspect.



Figs 10a–10b. *E. (T.) bazgoviensis* n. sp.: 10a) Habitus, male; 10b) Apex of elytra, female.

Description

Head subtriangular, strongly convergent behind to the midline, but non-projecting backward, slightly longer than wide (ratio L./W.: 1.08–1.16), slightly narrower than the pronotal base; supra-antennal prominences gently protruding; frons flattened or weakly concave, progressively connected to the clypeus; frontoclypeal transverse groove present; eyes completely atrophied; vertex slightly convex; occipital edge simply connected to the neck; sides of the head arched, provided with setae directed backward;.

Antennae (Fig. 4) longer than the combined length of the head and pronotum (ratio A.L./co.L.H.P.: ♂/ 1.35–1.42; ♀/ 1.23–1.35) and longer than the elytra combined width (ratio A.L./.co.E.W.: ♂/ 1.53–1.56.; ♀/1.37–1.39); all segments unrimmed basally; antennal club distinctly 5-segmented, moniliform, about as long as the segments 1–6 combined; apical segment rather short, about one and half times longer than wide, acuminate apically; segments 8, 9 and 10 spherical and pedunculate, segment 7 elongate, but bulging, one and half times as long as wide; segments 3–6 elongate, subequal; pedicle more than twice as long as wide; scape shorter than pedicle.

Pronotum relatively small and narrow, elongate, only slightly longer than the head (ratio P.L./ P.W.: ♀/1.2–1.27; ♀/1.29–1.36), convex, nearly cylindrical and non-cordiform; base glabrous, lacking basal foveae or a transverse groove, delimited laterally by short lateral carinae with, externally, a clump of stiff, spine-like, tightly packed parapleural setae directed backwards.

Elytra more than one and a half times as long as broad (ratio E.L./E.W.: /1.57 –1.77) or than the combined length of the head and pronotum (ratio E.L./ co.L.H.P.: /1.56–1.61); base converging to the pronotal base, provided with obtuse humeral rim associated with two minute fovea (Fig. 6); scutellum hidden; dorsum convex, provided with subobliterate punctures. Apical third of the elytra sexually differentiated; apex of the male elytra (Fig. 10a) subtruncate and rounded laterally, each elytron being rounded separately at the suture; the female elytra (Fig. 10b) with apex progressively compressed and crest-like shapped, stretched backward, deeply notched medially and obtusely tooth-like produced on each side (Fig. 5).

Venter. Meso- and metasternum entirely fused, metasternum about twice as long as the sternal lamina and as long as the five following abdominal segments combined, discreetly flattened medially in the female, male with a deep, glabrous, median groove, delimited laterally by a rudimental ridge; sternal lamina sharply raised on the mesosternum, pigmented, its ventral edge obtusely serrate, progressively fused with the metasternum. Metasternum loosely asperate, faint-punctate, with short pubescence.

Legs elongate; tibiae stick-like (Fig. 7), tapered apicaly; apical third of the inner face of all tibiae provided with a setose brush; apical spurs, if present, strongly reduced.

Sexual dimorphism at first glance appears to be ill-pronounced (pronotum less and antennae more elongate in male; see ratios, but it is in fact well pronounced on the apex of the female elytra (Figs 5, 10a, 10b) and on the metasternum of the male.

Spermatheca minute, spherical (Fig. 3).

Aedeagus (Figs 1, 2,) elongate, of about 0.8 mm, well characterised by a broadly bilobed apex of the ventro-apical lamina and a highly structured armature of the internal sac which includes one pair of ciliate plus three odd, digit-like pieces (not always easily visible); parameres furnished with four apical sensillae.

Biology

Species collected under stones and in pitfall-traps of the terminal section of the cave (+/–150m from its entrance) in the company of *Duvalius* (*Euduvalius*) *lucidus* Müller and *Phaneropella lesinae* Reitter, always singly. The cave is, for the conditions of the island of Brač, very cold and wet, with a lot of organic compounds, the humidity 100 %, the temperature about 8.7 °C.

Distribution

Known only from the Bazgovačka or Bazgovača Jama, cave located on the Croatian island of Brač.

DISCUSSION

The occurrence of *E.*(*T.*) *bazgoviensis* in the cave is clearly not just accidental. Its facies (more or less common to other cavernicolous Coleoptera of different families as Carabidae, Staphylinidae and Leiodidae) and several other morphological particularities indicate an evolutionary adaptation to the cavernicolous habitat: pronotum

Fig. 11. *Euconnus (Tetramelus) bazgoviensis* from Bazgovačka jama (Photo: R. Ozimec).

(normally cordiform and distally swollen in *Tetramelus*) is reduced in size in *E.* (*T.*) *bazgoviensis*, narrowed, noninflated, nearly cylindrical; legs elongate, with markedly slender (at least ten times longer than wide), stick-like shaped, apically tapered tibiae, provided with a more extended setose area; antennae with 5-segmented antennal club, formed by unrimmed and loosely gathered segments; mandible showing a supplementary tooth-like process and a reduced or partly atrophied molar section; and finally a unique adaptation of the apical edges of the female elytra.

Three of these characters: mouth-parts; sexually differentiated apex of elytra and the aedeagus, call for further comments.

Mouth-parts

Larvae and adults of Scydmaenids are active predators of mites (SCHMID, 1988) occurring in different endogeous habitats such as leaf or forest litter, decaying wood, vegetable debris or various moist situations. According to SCHMID, all genera and subgenera of the family are more or less highly specialized predators in different groups of mites, and their mouth-parts are closely adapted to prey morphology. Those of *Euconnus* (including *Tetramelus*), more closely adapted to the *Protesoma* and *Ptyctina* anatomy, are characterised by an expanded molar part covered with dense setose vestiture (Fig. 9a, 9b). In *E.* (*T.*) *pubicollis* Müller & Kunze, the mandibles are more widely outspread and provided with a small *retinacula*, and their distal third provided with a wrinke-like texture (Fig. 9c). In *E.* (*T.*) *bazgoviensis* (Fig. 8) the mandible shows the molar edge produced distally in a strong tooth-like process, molar vestiture visibly reduced, *retinaculum* more strongly developed and wrinke-like texture of the apices evanescent.

Elytral apex

The latero-apical prolongation of elytra exhibited by the females of *E.* (*T.*) *bazgoviensis* (Fig. 5) appears unique within *Tetramelus*. Nevertheless, an analogous, but more discreet tendency appears also in the subfamily Mastiginae, at least in several European species of *Palaeostigus* Newton, known for their epigean behavior. In *E.* (*T.*) *bazgoviensis* sp. nov this adaptation could be related to the reproductory activities, possibly to the ovipository function.

Aedeagus

At first glance the apically bilobed aedeagus of *E.* (*T.*) *bazgoviensis* appears rather isolated and cannot be attributed without restrictions to any group of *Tetramelus* of the Balkan Peninsula. The known species of *Tetramelus*, provided with a broadly bilobed ventro-apical lamina, belong to the group-*longulus* (SCHWEIGER, 1958; 1961), widespread in Eastern Alps (Switzerland, Italy, Austria), which includes the species *E.* (*T.*) *longulus* Halbherr, *E.* (*T.*) *helenae* Flach, *E.* (*T.*) *hoelzeli* Schweiger, *E.* (*T.*) *pavionis* Schweiger and *E.* (*T.*) *pseudolongulus* Schweiger. The group is also characterised by advanced microphthalmy, by a subtriangular head converging backwards, and by an aedeagus having a broad, apically truncate and bilobed ventral lamina. However, according to SCHWEIGER (1961), the internal structure of the aedeagus and a specifically foveolate base of the pronotum do not fit with *E.* (*T.*) *bazgoviensis* n. sp.

Tab.1. List and distribution of *Euconnus (Tetramelus)* in the former Yugoslavia

#	Species/Country	BH	HR	MC	MG	SB	SL
1	***apfelbecki*** Csiki, 1919: 64 = *longipennis* Apfelbeck, 1911. (JH, preoc., nec CASEY, 1897)	X					
2	***balcanicus*** Karaman, 1973					X	
3	***bazgoviensis*** Vít & Hlaváč, sp. nov.		X				
4	***biokovensis*** Müller, 1908		X				
5	***cetinjensis*** Davies, 2004 = *apfelbecki* Franz, 1968. (JH, preoc., nec CSIKI, 1919)				X		
6	***conciliator*** Apfelbeck, 1906	X				X	
7	***dorotkanus*** Reitter, 1881		X		X		
8	***Gobanzi*** Reitter, 1899		X				
9	***istrianus*** Daffner, 1987		X				
10	***karamanae*** Franz, 1979			X			
11	***karamani*** Reitter, 1896		X				
12	***ljubetensis*** Apfelbeck, 1918					X	
13	***Mariovi*** Karaman, 1973			X			
14	***merditanus*** Apfelbeck, 1907	X			X		
15	***microcephalus*** Reitter, 1881 = *petraeus* Apfelbeck, 1911 (synonymized in KARAMAN, 1973: 47)	X	X		X		
16	***mohamedis*** Reitter, 1896	X					
17	***montenigrinus*** Karaman, 1973				X		
18	***narentinus*** Apfelbeck, 1911	X	X				
19	***nikitanus*** Reitter, 1881		X		X		
20	***njegosi*** Karaman, 1973				X		
21	***oblongus*** Sturm, 1838 = *gredleri* Reitter, 1881 = *oblongus bosnicus* Machulka, 1928 (synonymized in DAFFNER, 1987: 45) = *oblongus plitvicensis* Machulka, 1928 (synonymized in DAFFNER, 1987: 45)	X	X	X	X	X	X
22	***ophthalmicus*** Apfelbeck, 1911		X				
23	***peristeri*** Karaman, 1973			X			
24	***pubicollis*** Müller et Kunze, 1822	X	X	X	X	X	X
25	***sturanyi*** Ganglbauer, 1899		X				
26	***styriacus*** Grimmer, 1841	X	X				
27	***subterraneus*** Reitter, 1881		X				
28	***Thomayi thomayi*** Reitter, 1879		X				
29	***thomayi herzegovinensis*** Karaman, 1973	X					
30	***velebiticus*** Müller, 1924		X				
31	***vicinus*** Karaman, 1973			X			
	Total	**10**	**17**	**6**	**9**	**6**	**2**

The only other species of *Tetramelus* of the West Palearctic fauna, showing a bilobed apex of the ventral lamina, is *E.* (*T.*) *bedeli* Reitter. The species, which occurs in France (Alpes Maritimes) and Italy (Liguria occ.), was curiously included in the Balkan group *oblongus* by Z. KARAMAN (1973) and also by DAFFNER (1987), in his key to group-*oblongus*. However, Z. KARAMAN did not focus her attention on the internal sac of the *Tetramelus* of the Balkan Peninsula and DAFFNER restricted his approach mainly to the apical shape of the ventral lamina of the aedeagus. The fragmentary data of both authors nevertheless permit the conclusion that the species included in the group-*oblongus* exhibit a highly developed ciliate armature of the internal sac, which could, especially in *E.* (*T.*) *istrianus* Daffner, to be related to that found in *E.* (*T.*) *bazgoviensis* n. sp. (Fig. 2), but also to that found in the subgenus *Cladoconnus* Reitter.

COMMENT ON THE DISTRIBUTION OF *TETRAMELUS* IN THE FORMER YUGOSLAVIA

The genus *Euconnus* Thomson at present includes over 2460 described species (NEWTON & FRANZ, 1998 and subsequent descriptions), which represents more than 50% of species described in the family Scydmaenidae. In spite of its 37 valid subgenera, about 60% of the species (mainly from tropical regions) were not, and presently cannot be attributed to any known subgenus. Consequently, the systematics of the genus remains largely unclear and whole subgeneric concept must be revised.

Nevertheless, the main Palaearctic subgenus *Tetramelus* Motschulsky appears to be well defined. The first *Tetramelus* from the territory of the former Yugoslavia was described by REITTER (1879: 49) under the name *Euconnus thomayi*. Although the territory of the former Yugoslavia is rather small, there are 30 species and 1 subspieces known from the region (Tab. 1.) today. Only three species *E.* (*T.*) *pubicollis* Müller et Kunze, *E.* (*T.*) *oblongus* Sturm and *E.* (*T.*) *styriacus* Grimmer are relatively common also in other part of Europe, *E.* (*T.*) *cociliator* Apfelbeck and *E.* (*T.*) *merditanus* Apfelbeck is also known from Albania. The other 26 taxa are today endemic to the territory of former Yugoslavia. Croatia has the richest fauna with 17 species, only 2 species occurring in Slovenia.

The most important contributions to the knowledge of *Tetramelus* fauna of Balkan region were by REITTER, APFELBECK and later by ZORA KARAMAN who revised the subgenus (Z. KARAMAN, 1973). Taxonomic use of the aedeagus was introduced by MACHULKA (1928), Z. KARAMAN (1973) and FRANZ (1964, 1968). DAFFNER (1987) described the last *Tetramelus* from the region. Thus *E. (T) bazgoviensis* sp. nov. is the first new species of *Tetramelus* described from the Balkans in 15 years.

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