

FIVE NEW SPECIES OF FULGOROIDEA (HOMOPTERA)
FROM THE WESTERN UNITED STATES AND MEXICO

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ABSTRACT

Two Issidae, Dictydea texana (Texas), and Dictyssa schuhi (Oregon), two Derbidae, Persis arizonensis and P. ferox (both from Arizona and Sonora, Mexico), and one Fulgoridae, Scolopsella mexicana (Baja California, Mexico) are described. All are new state records for their genera.

RESUMEN

Se describen las siguientes especies de insectos cuyos géneros respectivos se reportan por primera vez en registros estatales: Dictydea texana de Texas, USA, y Dictyssa schuhi, de Oregon, USA (Issidae); Persis arizonensis y P. ferox, de Arizona, USA, y Sonora, México (Derbidae); Scolopsella mexicana de Baja California, México (Fulgoridae).

INTRODUCTION

This paper describes 5 distinctive new species of Fulgoroidea from the western United States and Mexico. Four of these increase our knowledge of distribution and the fifth is a second species in a previously monotypic genus. The discovery of Persis species in Arizona extends the range of the genus at least 1000 miles north of its previous distribution from South America to Mexico and the West Indies. The new issid species emphasize the disjunct distribution of Issidae in the southwest. All 23 genera of U.S. Issidae are found in the southwest, with 16 in California (two introduced from the old world), 13 in Arizona, 14 in Texas (including those described here), and only 6 are found in the states east of the 100 meridian other than those in Texas. Two genera are found in both California and Arizona (Euthiscia and Neaethus), three in both Texas and Arizona (Thionia, Tylanira, and Papagona), but five are found in California and Texas without records from intervening states (Dictyobia, Dictyonissus, Tylanira, Dictydea, and Dictyssa) although three are known from Mexico. New Mexico has had eight genera recorded from it. Although northern Mexico and New Mexico have not been well collected, surveys have not found the missing genera; perhaps some sort of refugia in Texas may explain the distribution pattern.

The issids and derbids may be keyed to genera in existing keys which are cited. A key is provided for the U.S. genera of Fulgoridae with elongate head projections. The issid species are referred to a key in Doering's (1936, 1938, 1939) excellent monograph with a statement of the characters that differ from the couplet at which the existing key would have to be modified to include the new species. Keys to species are provided in the other genera.

It should be noted that Fennah (1984) placed many of the U.S. genera of Hysteropterini in the Nogodinidae, including the two with new species described here, and it is true that there are many similarities between the two groups. However, now

the two families cannot be separated with any simple set of characters; that is, different tribes in the two families are separated by different combinations of subsets of characters. It is hoped that cladistic studies now being initiated in several museums will resolve this problem. Until that time, I shall follow the traditional classification used by Doering (1938).

ISSIDAE, HYSTEROPTERINI

Dictydea Uhler

This genus may be keyed through Doering's (1938) key to genera of the Issidae. Specimens of this genus have been collected previously only from California.

Dictydea texana keys to couplet 1 in Doering's (1939) key to the species of Dictydea, where the length of the tegmen, 5 to 5.6 times its width, fits neither half couplet. If one chooses the option with the longer wing, one would key to couplet 6, where the long tegmen and small size would separate it again from the other species in the genus.

Dictydea texana, new species Fig. 4, 5, 6, 16, and 17

Salient Features. -- Length of males 3.3 mm, females 4.2 mm, greatest width of body 1.3 to 1.7 mm. Color mottled brown as the rest of the genus, often covered with fragments of wax. Vertex broad, anterior margin about 2 times as wide as one lateral margin, about 4 times as wide as length at midline. Frons slightly wider at level of antenna, a little narrower than length in midline. Pronotum short, shorter medially than length of eye as seen from above. Mesonotum with three carinae, median carina flat. Abdominal segments carinate at midline. Tegmina widened in basal third; costal margin straight; 5-5.6 times as long as wide in basal third; usually dark brown with paler veins, with white spots along the margins, at the apex of clavus, a clump medially at apical third of tegmen, and usually one in penultimate median cell (Fig. 6).

Male Genitalia. -- Anal flap short, suboval. Style in lateral view with ventral and apical margin greatly rounded, apical dorsal extension moderately long, triangularly pointed, and bearing outside at its base a medium sized spine which is twice as long as broad and parallel to the extension. Aedeagus in left lateral view C-shaped, rounded apically; with two basal slender slightly curved hooks, the ventral longer, extending almost as far as the theca; the 2nd curved and longer, a third lies near the apex; theca 2/5 length of aedeagus, pointed apically. Aedeagus in right lateral view with small ventral spine near end of theca.

Type. -- Holotype male and allotype: TEXAS, Presidio Co., 4 mi. SW. Shafter, 2600', IV-19-1970, on Ephedra aspersa, C. W. and L. B. O'Brien (LOB)

Paratypes. -- Ten male and 8 female paratypes, same data as above. (LOB)

Notes. -- This species is easily distinguished from other Dictydea by its narrowed wings, small size, geographic distribution, and genitalia. The wings resemble those of Danepteryx, but that genus has a longer vertex and frons and different genitalia. These are the first specimens of the genus collected outside of California.

Dictyssa Melichar

Dictyssa may be identified through Doering's (1938) key to genera of the Issidae. Fennah (1984) placed Dictyssa in the Nogodinidae also. This new species would key to couplet six in Doering's (1936) key to the species of Dictyssa, where it has the small cells of beameri Doering but the unbranched M_{1+2} of quadravitrea Doering. The collections from Oregon represent the first record outside of California, Nevada, and Mexico.

Dictyssa schuhi, new species

Fig. 1, 2, 3, and 19

Salient Features. -- Length of males 2.5 to 3 mm, females 2.8 to 3.3 mm. Color brown with carinae pale straw to brown, wings brown with band of small translucent white cells. Vertex broad and short, length through middle about 1/3 the length of pronotum at midline. Greatest width of eyes approximately 1/3 width of vertex. Frons with lateral margins parallel, median carina distinct. Mesonotum not quite twice as long as pronotum on median line; a faint median carina present and two lateral carinae faintly indicated by color. Tegmen opaque, not inflated, 3/4 as wide as long, its greatest width behind apex of clavus; the veins coarse, outlining small cells, the costal cell

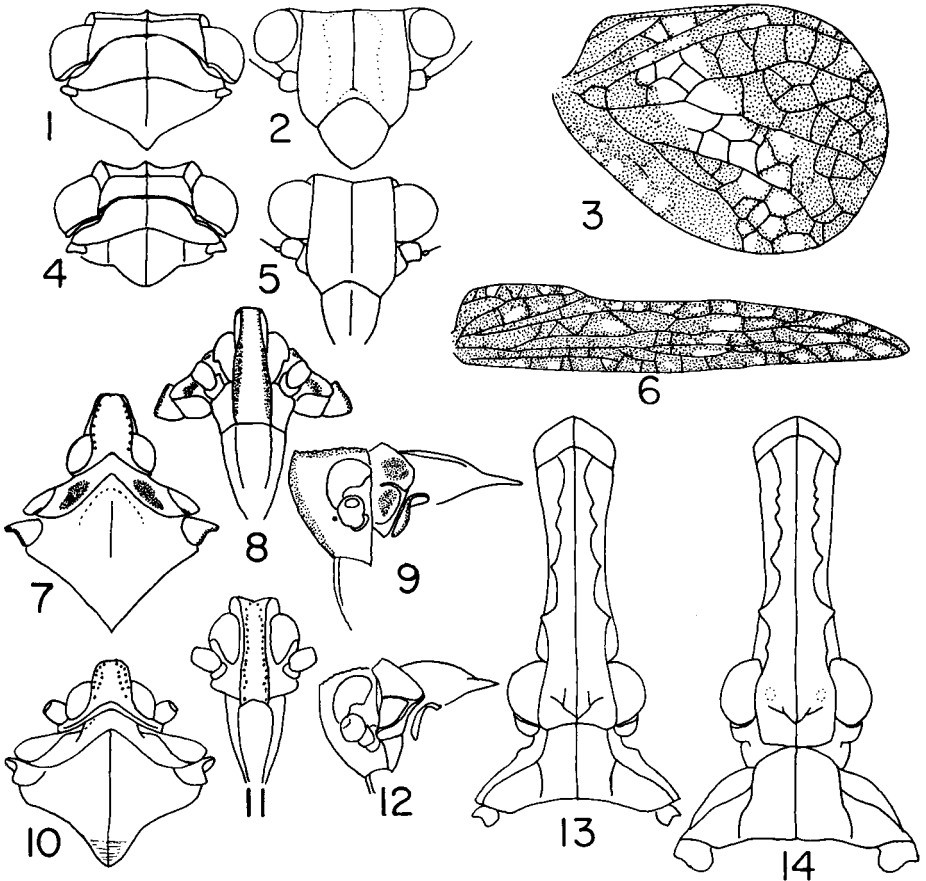


FIG. 1-3. *Dictyssa schuhi*, n. sp., 1. dorsal view of head and thorax; 2. frontal view of head; 3. tegmen. 4-6. *Dictydea texana*, n. sp., 4. dorsal view of head and thorax; 5. frontal view of head; 6. tegmen. 7-9. *Persis ferox*, n. sp., dorsal, frontal, and lateral views of head and thorax. 10-12. *Persis arizonensis*, n. sp., dorsal, frontal, and lateral views of head and thorax. 13. *Scolopsella mexicana*, n. sp., dorsal view of head and pronotum; 14. *Scolopsella reticulata* Ball, dorsal view of head and thorax.

narrowly expanded on basal half; venation characteristic of the genus with vein R straight, nearer Sc₂ than M₁₊₂, M₁₊₂ and M₃₊₄ simple, forked near level of claval junction.

Male Genitalia. -- Anal flap twice as long as broad, slightly emarginate at tip. Each style subquadrangular. Aedeagus C-shaped, as viewed from left with two aedeagal hooks subequal in length, basal one broader, bifurcate in varying degrees in different specimens; theca reaching to apical 1/6 of aedeagus, apex of theca rounded.

Type. -- Holotype male and allotype: OREGON, Klamath Co, Bly Mt., Aug. 28, 1962, on Purshia tridentata, Joe Schuh (AMNH).

Paratypes. -- Seven male and 15 female. OREGON, same data as holotype, 4♂, 12♀, (AMNH, LOB). One ♂, 1♀ paratypes same data but Sept. 15, 1960 and 1 ♀ Aug. 12, 1962, no host (AMNH). CALIFORNIA: Plumas Co., Chester, 1♂, VII-15-1954, D. J. and J. N. Knull, (OSU); Siskiyou Co, 10 mi. N. McCloud, 4200', 1♂, 1♀, VII-31-1963, on Ceanothus velutina, L. B. O'Brien, (LOB).

Notes. -- This species is named in honor of Joseph Schuh, a superb collector, who combined a love of entomology with a lifetime of work in the field. This species may be separated from all but D. clathrata Melichar by the small size of the cells and the narrowness of the pale band of the tegmen. D. clathrata has the tegmina 1/9 longer than wide rather than 3/4 as wide as long, three sectors of M rather than 2, and vein R curved rather than straight. The male genitalia also separate it from all other species in the genus.

DERBIDAE, CENCHREINI

Persis (Anapersis)

Persis is a Neotropical genus which has not been reported previously from the United States. Fennah (1952) has erected three subgenera. These insects may be keyed to genus through Fennah's (1952) key to the Cenchreini. A key to the species in Mexico and the U.S. is given below. Characters used to key Persis spreta Fowler are from the literature only (Fowler, 1904; Fennah, 1952).

Key to the species of Persis in the United States and Mexico

1. Four black spots on pronotum ferox, n. sp.
Pronotum yellowish.....2
2. Vertex exceeding eye by width of an eye; tegmen with veins broadly white throughout, cells usually narrowly brown foveata Caldwell
Vertex not exceeding eye by width of an eye; some cells of tegmen concolorous with veins3
3. Tegmina unicolorous, yellowish.....spreta Fowler
Tegmina dusky brown with broad white veins anteriorly, fading to pale yellowish brown apically arizonensis, n. sp.

Persis (Anapersis) ferox, new species

Fig. 7, 8, 9 and 15

Salient Features. -- Length of males 6.8 mm, females 6.9-7.2 mm. Ground color yellowish orange with 4 oval black spots on pronotum, one pair in lateral foveae, other slightly mesad of lateral carinae; lateral carinae of vertex and frons strongly black, posterior margins of tegulae narrowly black; median carina of mesonotum with white stripe on each side; tegmina pale with broad white veins, all cells brown; wings milky white. Frons and vertex deeply depressed; in lateral view meeting at slightly obtuse angle (Fig. 9), vertex exceeding eye by width of eye. Vertex in dorsal view 2/3 as broad as long in midline, half as wide at apex as at base. Pronotum medially carinate, lateral carinae and ventral margin strongly raised to form lateral foveae.

Male Genitalia. -- Median lobe of pygofer semicircular. Genitalia in left lateral view with caudal margin of pygofer slightly produced; anal flap elongate, bifurcate beyond tip of eleventh segment; aedeagus slightly curved, flagellum bilaterally symmetrical, with 2 broad projections and 5 hooks on each side as illustrated (Fig. 15); ventral

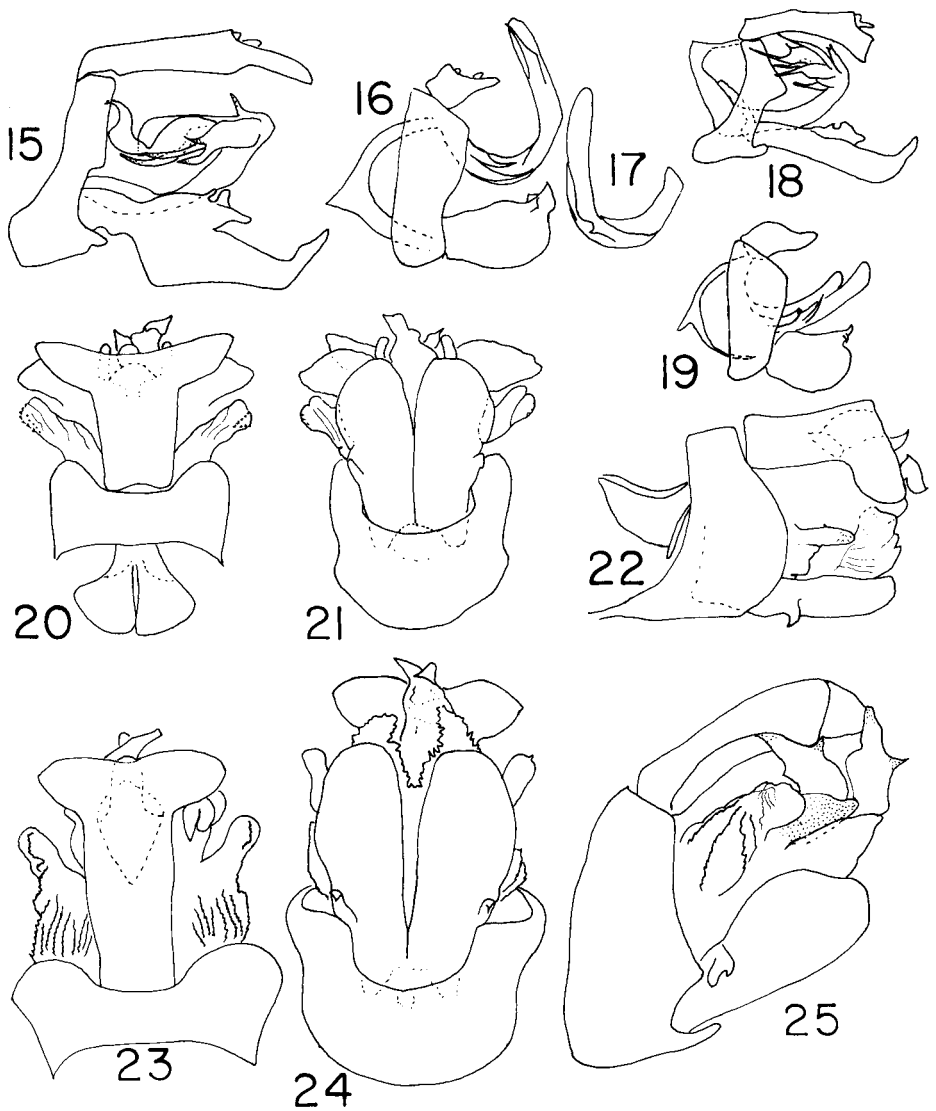


FIG. 15. *Persis ferox*, n. sp., left lateral view of male genitalia. 16, 17. *Dictydea texana*, n. sp., 16. left lateral view of male genitalia; 17. right lateral view of aedeagus. 18. *Persis arizonensis*, n. sp., left lateral view of male genitalia. 19. *Dictyssa schuhi*, n. sp., left lateral view of male genitalia. 20-22. *Scolopsella mexicana*, n. sp., dorsal, ventral, and left lateral view of male genitalia. 23-25. *Scolopsella reticulata*, Ball, dorsal, ventral, and left lateral view of male genitalia. (Showing both dorsal inflatable lobes of aedeagus in lateral view).

margin of style bent at basal third, dorso-lateral margin with strong tripartite hook.
Type. -- Holotype male and allotype: ARIZONA, Sta. Cruz Co., Peña Blanca Lake, White Rock Cp., IX-14-1964, C. W. O'Brien or L. B. O'Brien (LOB).

Paratypes. -- Five male, 7 female: ARIZONA, Sta. Cruz Co.: Piña [sic] Blanca L., 3♂, 3♀, VIII-22-1967, M. W. Nielson, grass and weeds (LOB); Nogales, 2♀, IX-1-1906, W. M. Giffard collection (CAS) [these 2 specimens are labelled *Persis ferox* in VanDuzee's handwriting; one also has a red "TYPE ferox" label and a label "Probably an E. P. VanDuzee Manuscript Name. Not listed in Pan-Pacific Entomologist 16 (4)"]. MEXICO: San Bernardino, Rio Mayo, 1♂, VIII-6-1935, H. S. Gentry (CAS). SONORA: Alamos, 1♂, and 7 mi. SE. Alamos, 1♀, both VIII-12-1960, P. H. Arnaud, Jr., E. S. Ross, and D. C. Rentz (CAS); 1♀. Alamos, X-11-1966, at blacklight, M. W. Nielson (LOB).

Notes. -- The bright black markings on the pronotum and on the carina of the frons and vertex apparently led Van Duzee to choose the manuscript name *ferox*, meaning bold or brave, which I am adopting for the name of this species although I am not designating any of his Arizona specimens (females only) as holotype. The pronotal color pattern easily separates this species from any other member of the genus.

Persis (Anapersis) arizonensis, new species

Fig. 10, 11, 12, and 18

Salient Features. -- Length of males 5.2 to 5.8 mm, females 6.0-6.5 mm. Coloring very like most *Persis* species, yellow to yellowish orange with lateral carinae of frons black, median white stripe down center of mesonotum only in one specimen, in others mesonotum yellow orange; anterior veins of tegmina broadly white, white areas narrowing and becoming concolorous in apical fifth, cells brown anteriorly, becoming pale near apex; hind wings milky white. Vertex and frons both deeply depressed, in lateral view meeting in obtuse angle, vertex not exceeding the eye by the width of an eye. Vertex twice as wide at base as at apex, by actual measurement as broad as long when breadth measured at base, length at midline. Pronotum medially carinate, ventral margins and lateral carinae slightly raised to form lateral foveae.

Male Genitalia. -- Median lobe of pygofer semicircular. Genitalia in left lateral view with caudal margin of pygofer strongly produced; anal flap elongate, lateral apical margin emarginate, truncate; aedeagus slightly curved, flagellum bilaterally symmetrical with single median ventral spine and paired vertical plates with 2 apical spines and 4 basal spines each (Fig. 18). Style with tripartite laterodorsal hook and recurved apical projection.

Type. -- Holotype male: ARIZONA: Sta. Cruz Co., Patagonia, VIII-2-[19]24, E. P. Van Duzee (CAS); Allotype: ARIZONA: Sta. Cruz. Co.: Peña Blanca Lake, White Rock Cp., IX-14-1964, C. W. O'Brien (LOB).

Paratypes. -- Five females, 1 male, and 1 specimen with abdomen missing. MEXICO: SONORA: Alamos, 1♂, 1♀, 1 abdomen missing, VIII-12-1960, P. H. Arnaud, E. S. Ross, and D. C. Rentz, (CAS); 2♀, X-7-1966, 1♀, 10-8-1966, M. W. Nielson (LOB). Saric, 1♀, VIII-18-1929, no other data (CAS).

Notes. -- This species may easily be separated from the other U.S. species, *ferox*, which has black pronotal markings. It is more difficult to distinguish from other species in the genus, but its northern habitat, small size, short head, and tegmen with brown anterior cells and concolorous apical cell separate it from any other species known from Mexico at this time. *P. foveata* Caldwell is known from Veracruz, Chiapas, and Tabasco in Mexico, and Belize, Honduras, El Salvador, Costa Rica, and Panama. *P. spreta* Fowler has been reported only from Tabasco.

FULGORIDAE

Scolopsella Ball

Four genera of Fulgoroidea in the continental United States have elongate narrow head projections with the head about half as long as the rest of the body. The most common, *Scolops*, is a Dictyopharidae, and can be separated from the others because the veins in the hind wings are not reticulate. The other three genera are

Fulgoridae and may be separated by the following key:

1. Lateral carinae of vertex irregularly curved and crenulate (Fig. 13); base of hind wing brown or whitish..... Scolopsella
Lateral carinae not curved or crenulate, only slightly raised; base of hind wing orange or red 2
2. Head projection flattened, usually triangular when viewed from above; hind wings orange at base, brown and/or transparent apically Amycle
Head projection terete; hind wing red at base, brown apically Rhabdocephala

Key to species of Scolopsella

1. Length of anal flap of male greater than width at apical expansion (Fig. 23); apical margin of pygofer emarginate ventrally (Fig. 25)..... reticulata Ball
Length of anal flap of male less than width at apical expansion (Fig. 20); apical margin of pygofer smoothly convex (Fig. 22) mexicana, n. sp.

Scolopsella mexicana, new species

Fig. 13, 20, 21, and 22

Salient Features. -- Length of males 14.2 to 15.2 mm, females 17.6 to 21.2 mm. Color mottled in shades of brown. Head produced so that vertex is 4.3 times as long as broad. Pronotum long, truncate apically, tricarinate, lateral carinae forking. Mesonotum tricarinate. Tegmina various shades of brown with cross veins and reticulations pale, some apical cells white; inner margin of corium slightly concavely excavated. The structural characters and coloration do not differ from S. reticulata Ball (1905). A dorsal view of the head of both species is figured; they were drawn as though the crenulations are bilaterally symmetrical, which occurs in about 1 of 5 specimens. In the others the carinae are wavy and twisted and differ slightly on each side.

Male Genitalia. -- Anal flap in dorsal view broadly expanded at apex, broader across apical expansion than long medially (Fig. 20). Apical margin of pygofer smoothly rounded. Aedeagus with three pairs of inflatable lobes with internal stiff aedeagal appendages. Tips of lateral lobes with spicules, median lobes rectangular and striate and less strongly spicate, dorsal lateral lobes bifurcate, each tip ending in short broad spine (see Fig. 22, projections beyond anal flap).

Type. -- Holotype male and allotype: MEXICO, Baja California Norte, 9 mi. SE. Rancho Laguna Chapala, VII-1-1973, at blacklight, Fisher and Westcott (LOB).

Paratypes. -- Three male, 1 female: MEXICO: Baja California: 5 mi. S. Bahia de Los Angeles, VI-3-1974, R. L. Westcott (LOB). Baja California Norte: 24 mi. N. Bahia San Luis Gonzaga, 1♂, 1♀, IV-14-1962, E. L. Sleeper, (CAS). Baja California Sur: 26 mi. W. La Paz, VIII-11-1966, J. T. Doyen, (CIS).

Other Specimens Examined. Two female. Baja California Norte: 5.6 mi. N. San Borja, 1600', VI-4-1974, R. L. Westcott (LOB). Baja California Sur: 6-7 mi. NW San Jose del Cabo, 13-1400', IX-21/22-1976, R. L. Westcott (LOB).

Notes. -- This species may be separated from S. reticulata Ball (Figs. 14, 23-25) by the male genitalia, most easily by the shape of the anal flap, which can be used without dissection if both species are available for comparison. S. reticulata is golden brown and usually larger than the darker mexicana, but the range of lengths of both males and females overlap. So far all of the specimens examined from the U. S. are S. reticulata and all from Mexico are S. mexicana. I have seen specimens of S. reticulata from Arizona (Santa Cruz, Maricopa, Pima, and Pinal Counties) and California (Joshua Tree National Monument, Riverside or San Bernardino County).

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