

OCCASIONAL PAPERS OF THE MUSEUM OF  
ZOOLOGY  
UNIVERSITY OF MICHIGAN  
ANN ARBOR, MICHIGAN

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A NEW SPECIES OF *MELANOPLUS* FROM SOUTHEASTERN  
UNITED STATES

(Orthoptera, Acrididae, Cyrtacanthacridinae)

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THIS species was first recognized as distinct from *Melanoplus morsei* by I. J. Cantrall in 1955, but was not described because of insufficient material. The holotype was taken at night in 1957 while I was collecting *Ceuthophilus* in Audubon State Park, Kentucky. The paratopotypic series was collected in the course of the next two years.

*Melanoplus vulnus*,<sup>1</sup> new species

(Figs. 1 and 3)

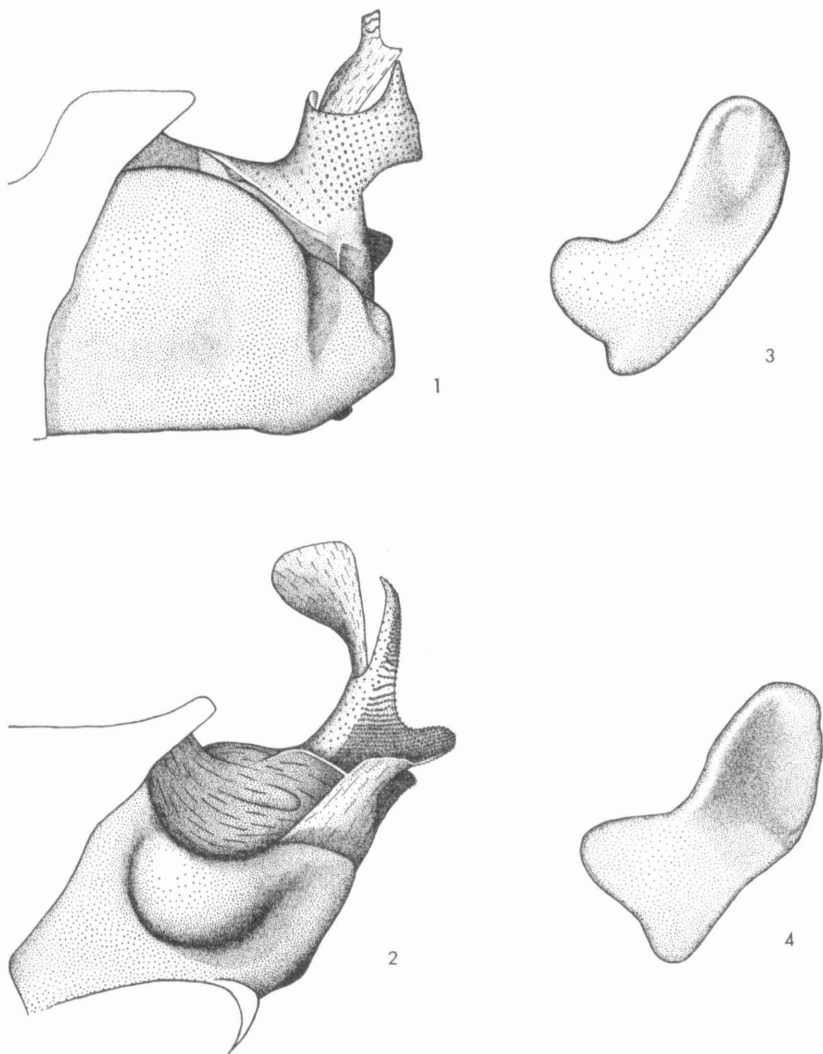
1907. Morse, p. 50; 1 male and 1 female from Hattiesburg, Mississippi, recorded as *M. morsei*. Error repeated by Blatchley, 1920, and Hebard, 1934.

DIAGNOSIS.—This species belongs to the *Melanoplus tribulus* group as treated by Blatchley (1920: 372; as the synonymous *obovatifennis* group) and Hebard (1935: 359), and is most closely related to *M. morsei* Blatchley. It differs from *morsei* in the presence of a very broad, shallow notch in the front margin of the pronotum and in details of the male genitalia. The internal genitalia (Fig. 1) are quite characteristic. The cerci (Fig. 3) are slightly more slender than in *morsei*, with the apical half less expanded and less concave. The furcula is extremely variable, but averages longer and has its prongs more divergent than in *morsei*.

HOLOTYPE.—Male, Audubon State Park, Henderson County, Kentucky, June 26, 1957, D. C. Eades. Allotype, female, same data except taken on June 15, 1959. Both in the Museum of Zoology, University of Michigan.

DESCRIPTION OF HOLOTYPE.—Closely resembling *morsei* in size, form,

<sup>1</sup> *Vulnus*, Latin, meaning dent; in reference to the very broadly and shallowly notched front margin of the pronotum.



FIGS. 1-4. 1, *Melanoplus vulnus*, new species, internal genitalia of holotype, viewed from left side. 2, *M. morsei* Blatchley, internal genitalia of male, Wyandotte Cave, Indiana, viewed from left side. 3, *M. vulnus*, new species, left cercus of holotype. 4, *M. morsei* Blatchley, left cercus of male, Wyandotte Cave, Indiana.

coloration, and general appearance. Length of body, 19.2 (measurements in mm.); breadth of head across genae, 2.8; breadth of head across eyes, 3.6; minimum breadth of frontal costa, 0.45; interocular distance, 0.43; maximum diameter of eye, 2.1; minimum diameter of

eye, 1.67. Front margin of dorsum of pronotum with a very broad, shallow notch extending across approximately one-half of pronotal breadth, sides of notch merging imperceptibly into rest of margin. Hind margin of dorsum of pronotum with a similar notch about as deep, but extending across only about one-fifth of margin. Length of pronotum, 4.0; length of prozona of pronotum, 2.5; length of lateral carina of prozona of pronotum, 2.5; length of lateral carina of metazona of pronotum, 1.17; breadth of pronotum at principal sulcus, 2.47. Tegmina not touching each other; almost round, apical ventral margins somewhat flattened. (Both tegmina in holotype reduced more than is typical for the species; see note under Table I.) Length of hind femur, 10.8.

Terminal abdominal structures: Cercus (Fig. 3), 1.27 mm. in length, curving slightly dorsomesad, basal breadth, 0.62, tapering rapidly in second fourth of length, minimum breadth, 0.43 about middle, thence expanding slightly, apical half subequal, maximum breadth, 0.45; apex oblique, distodorsal angle rounded, distoventral angle very broadly rounded; outer surface of basal half convex, of apical half slightly concave with an oblong swelling about a third as wide as width of apical half of cercus, beginning in middle of apical margin and extending proximad and slightly ventrad, there merging with the depressed surface without reaching ventral margin. Furcula with lateral margins almost straight and diverging at about a 40 degree angle; apices narrowly rounded; mesal margins attingent in basal fourth, irregular and sharply diverging in apical three-fourths with a prominence (left prong) or short lobe (right prong) set off by a notch; breadth across base, 0.75; across apices, 1.10; total length of prong, 0.97; length of left prong from notch to apex, 0.22, of right prong, 0.43; (form of furcula variable in series, see below). Supra-anal plate triangular with somewhat rounded sides, proximal breadth, 1.57; length (measured from point where prongs of furcula diverge), 1.53; dorsal surface with two strongly raised, rounded carinae, subparallel in basal fourth of visible portion, maximum interval between them there, 0.22, narrowing sharply at almost half the distance to apex of plate to a breadth of 0.08, then rapidly expanding to 0.17; surface of plate strongly concave between and on both sides of carinae, rising and fusing with carinae just beyond the middle. Subgenital plate as in *morsei*. Internal genitalia (Fig. 1) with dorsal valves of aedeagus wrapped three-fifths of the way around ventral valves, fused dorsad and forming a "V"-shaped distal notch, angles bordering notch about 60 degrees; distal parts of ventral valves tall attingent laminae with

lateral margins almost straight, each concave caudad with apex curved somewhat dorsad, mesal corner rectangulate, distal margin slightly sinuate, lateral corner emarginate; other features as shown in figure.

DESCRIPTION OF ALLOTYPE.—Front margin of dorsum of pronotum with a broad notch as described for holotype. Closely resembling females of *morsei* in all other features.

VARIATION.—(Tables I and II). The Mississippi specimens are clearly larger than the more northern ones in all measurements shown in Table I, and by more than twenty per cent in the case of body length.

In *Melanoplus vulnus* the tegmina average shorter and the apex more rounded than in *morsei*, but there is considerable variation in their size. In the holotype one tegmen is smaller than the other, with both smaller than usual. The Davidson County, Tennessee, and the Mississippi males have slightly larger tegmina and the Mississippi female distinctly larger ones than the individuals from other localities.

The male cerci show a distinct north-south cline, southward becoming larger with the apical half not expanded and its outer surface more flattened.

The furcula is quite variable, but the variation shows no clear geographic pattern. It is not unusual for the two prongs to be strik-

TABLE I  
MEASUREMENTS (IN MM.) OF *Melanoplus vulnus* AND *M. morsei*  
The ranges of variation are given first with the means (in parentheses) below

Species and Number	Length of Body	Length of Pronotum	Length of Tegmen*	Breadth of Tegmen*	Length of Caudal Femur
<i>vulnus</i> : males	17.3-23.4	4.0-5.0	2.6-3.7	2.0-2.7	10.0-11.9
(9)	(18.87)	(4.30)	(3.24)	(2.36)	(10.80)
females	20.6-28.7	4.7-5.7	3.5-5.0	2.7-3.7	11.7-14.4
(13)	(24.33)	(5.35)	(4.03)	(3.13)	(12.96)
<i>morsei</i> : males	16.0-20.9	3.7-4.6	2.7-4.0	1.9-2.7	9.4-11.5
(44)	(18.50)	(4.21)	(3.50)	(2.26)	(10.37)
females	20.3-25.7	4.7-5.6	3.4-4.8	2.7-3.4	11.6-13.9
(31)	(23.51)	(5.18)	(4.17)	(2.95)	(12.75)

\* The length of tegmen was measured from half way between the anterior and posterior margins where it emerges from under the pronotum when the specimen is in its natural position. For specimens in which the tegmen was not in the natural position, the location of this point was estimated. In three instances in which the right and left tegmina were of different size, the measurements of the larger tegmen are given in the table. These were the holotype of *vulnus* (right tegmen length, 2.1; breadth, 1.9; left tegmen length, 2.6; breadth, 2.0); a male of *morsei* from Wyandotte Cave, Indiana (right tegmen length, 2.7; breadth, 2.0; left tegmen length, 3.7; breadth, 2.7); and a male of *morsei* from 3 mi. E of Shelbyville, Tennessee (right tegmen length, 3.2; breadth, 2.1; left tegmen length, 3.6; breadth 2.4).

ingly different in shape, breadth, or both. The mesal margins usually have some indication of a notch at about the middle and another at about three-fourths the distance to the apex, either (or occasionally both) of which may be well developed. In the Mississippi male there are four (right prong) or five (left prong) short lobes set off by notches along the mesal margins. The paratopotypic male caught in 1959 has the prongs twisted outward till the outer margins are almost attingent to the posterior margin of the last tergite; this appears abnormal and the measurements (length of prong, 0.90; breadth across apices, 1.36) are therefore not included in Table II. In the Giles County, Tennessee, male the prongs of the furcula are shorter than usual, while in those from Davidson County, Tennessee, they are less divergent than is typical. In spite of these variations, the furcula can be a good character if used with caution.

The supra-anal plate varies from slightly longer than broad to

TABLE II  
MEASUREMENTS (IN MM.) OF MALE CERCUS AND FURCULA  
The ranges of variation are given first with the means (in parentheses) below

Locality and Number	Cercus			Furcula	
	Basal Breadth	Minimum Breadth	Maximum Breadth Apical Half	Total Length of Prong	Breadth Across Apices*
<i>Melanoplus vulnus</i>					
Henderson County, Kentucky (5)	.53-.62 (.58)	.40-.43 (.42)	.42-.45 (.44)	.97-1.08 (1.01)	1.10-1.27 (1.19)
Tennessee (3)	.63-.65 (.64)	.45-.49 (.47)	.45-.49 (.47)	.90-1.17 (1.01)	1.01-1.25 (1.11)
Mississippi (1)	.71	.50	.50	1.04	1.16
All localities (9)	.53-.71 (.62)	.40-.50 (.44)	.42-.50 (.45)	.90-1.17 (1.01)	1.01-1.27 (1.16)
<i>Melanoplus morsei</i>					
Southern Illinois (4)	.66-.73 (.70)	.44-.50 (.46)	.48-.55 (.52)	.80-.88 (.83)	.77-1.11 (.92)
Crawford County, Indiana (25)	.63-.75 (.68)	.40-.53 (.48)	.50-.62 (.56)	.67-.92 (.79)	.65-1.03 (.83)
Harrison County, Indiana (9)	.62-.75 (.69)	.40-.50 (.47)	.53-.58 (.55)	.77-.88 (.82)	.73-1.03 (.84)
Bedford County, Tennessee (6)	.58-.70 (.65)	.43-.54 (.50)	.47-.59 (.56)	.81-.97 (.89)	.74-.95 (.88)
All localities (44)	.58-.75 (.68)	.40-.54 (.47)	.47-.62 (.55)	.67-.97 (.82)	.65-1.11 (.85)

\* Maximum breadth across apical .1-mm. of the two prongs of furcula.

slightly broader than long, its sides averaging more rounded and the central part somewhat broader as compared with that of *morsei*.

The distal ends of the aedeagal valves of the Mississippi male are strikingly different from those of Kentucky specimens. The prolonged tip of the distal end of the dorsal valve arises more anteriorly than in the holotype, is longer and stouter, and ends in a short, posteriorly directed hook. On the posterior margin just below the hook is a lobe slightly larger than the hook. The distal end of the ventral valve differs from that of the holotype in having the apex not curved dorsad and in having the distal margin more sinuate and more produced laterad, the emargination thus being in the lateral margin and not in the distolateral corner as in the holotype. The male from Giles County, Tennessee, is intermediate in the shape of the aedeagal valves, but resembles the holotype more than it does the Mississippi male.

Considering all these differences one might treat the Mississippi specimens as representing a distinct species if it were not for the Tennessee specimens. With the evidence provided by the latter, however, it is clear that there are north-south clines in tegminal size, in several features of the male cercus and aedeagal valves, and perhaps in overall size. Possibly *M. vulnus* should be split into two or more subspecies, but the material at hand is insufficient to justify such action. It is not certain that there are steps in the clines, and there is some indication that if steps do exist they may occur at different places for different characters.

**SPECIMENS EXAMINED.**—Nine males, 13 females, 4 nymphs. Holotype and allotype listed above.

**Paratopotypes:** *Kentucky:* Henderson County, Audubon State Park, caught as nymphs June 7, 1958, and reared to maturity, D. C. Eades, 3 males, 8 females; same locality and collector, June 15, 1959, 1 male nymph and 1 female nymph, reared to maturity; all in University of Michigan Museum of Zoology except one male and one female in author's collection.

**Additional Material:** *Tennessee:* Davidson County, Nashville, Percy Warner Park, June 17, 1949, J. J. Friauf, 2 males, 1 female, 4 nymphs, in Friauf collection; Giles County, 9 mi. W of Pulaski, August 24, 1924, T. H. Hubbell, 1 male, 1 female, in University of Michigan Museum of Zoology. *Mississippi:* Perry County, Hattiesburg, July 17, 1905, A. P. Morse, 1 male, 1 female, in Museum of Comparative Zoology of Harvard University (recorded in literature as *morsei*; examined and male genital structures drawn for this study by T. H. Hubbell).

HABITAT.—Like *Melanoplus morsei*, *M. vulnus* is a thamnophilous species inhabiting open woodlands and moderately shaded woodland margins.

At the type locality in Audubon State Park, Kentucky, the species was found along a narrow road through forest, at a point where the roadbed has been filled, the sides slope down to the woods margin. The bordering forest includes large trees of *Prunus*, *Robinia pseudo-acacia*, *Juglans*, *Platanus occidentalis*, *Liriodendron tulipifera*, *Morus rubra*, *Ulmus americana*, *Acer negundo*, and *Fraxinus*. At the time the collections were made each side of the road was bordered by a three-foot strip of mowed grass and weeds. On the north side the transition from the mowed strip to the woods was narrow; it included tree seedlings, *Vitis*, *Rubus* (*Eubatus*), *Impatiens*, *Plantago*, *Lonicera*, grasses, etc. The transition zone on the south side of the road was broader and strongly dominated by *Impatiens* and *Rhus radicans*. To the east and west of the collecting site the forest canopy closes over the road and the weedy transition zone disappears. *M. vulnus* was common in the mowed area and transition zone on the north side and scarce on the south side. Near the road farther east a bulldozer about a year before had moved earth in preparation for a housing project; the bare area thus created had become covered by a great variety of plants. A single specimen was found on the margin between this disturbed area and a woods of *Platanus occidentalis*, *Liriodendron tulipifera*, *Acer saccharum*, *Ulmus americana*, *Tilia americana*, and *Robinia pseudo-acacia*.

The Davidson County, Tennessee, specimens were collected along the sides of a bridle path and on a sunny slope in a stand of *Fagus grandifolia* on the higher portion of Percy Warner Park. The woods were typical for the area except slightly more open. The specimens from Giles County, Tennessee, were found on herbs and dead leaves in a brushy opening near a creek, at the foot of a steep slope forested with *Fagus grandifolia*, *Castanea*, *Quercus prinus*, and *Carya*. Morse (1907) stated that the pair from Hattiesburg, Mississippi, were "taken in woodland on sandy, river bottom-land, in company with *M[elanoplus] viola*."

SEASONAL OCCURRENCE.—*Melanoplus vulnus* matures in mid- to late June. In late summer and fall it is replaced by *M. rusticus obovatipennis* and *M. scudderi*. Eleven nymphs caught on June 7 matured indoors at Ann Arbor, Michigan, between June 14 and 18. The allotype, taken on June 15, provides the earliest field record of an adult; of two nymphs taken at the same time, the male matured

the next day, while the female matured on June 25 (at Mountain Lake Biological Station, Giles County, Virginia, at 3850 feet altitude). Three adults and four nymphs were collected in Davidson County, Tennessee, on June 17. The latest record is August 24.

*Melanoplus morsei* Blatchley

(FIGS. 2 and 4)

1891. McNeill, p. 77; 1 male and 1 female from Running Lake, Illinois, recorded as *Pezotettix manca*.  
 1899. McNeill, p. 369; same specimens recorded as *M. obovatipennis*.  
 1903. Blatchley, pp. 309-11; original description of *M. morsei*.  
 1920. Blatchley, pp. 376-7; expanded description and general review.  
 1930. Blatchley, p. 72; designation of holotype.  
 1934. Hebard, pp. 193-4; correction of McNeill's record and records of *morsei* from four additional localities in Illinois.

This species was adequately described by Blatchley in 1920, except for the internal genitalia and cercus, here shown in Figures 2 and 4.

VARIATION.—The variation is similar to that discussed under *vulnus*, but the following additional points should be mentioned. In some specimens there is a very slight notch in the front margin of the pronotum; the difference from *vulnus* is more reliable in females than in males. The expansion, curvature, and concavity of the apical half of the cercus are somewhat variable, but not sufficiently to obscure the differences from *vulnus* previously mentioned. The furcula varies more than in *vulnus*; the lateral margins are straight to broadly curved, the apical thirds of the lateral margins somewhat divergent to clearly convergent, the mesal margins virtually straight to deeply notched. In the male recorded below from New Amsterdam, Indiana, the right prong of the furcula is bifid with the mesal process half the length of the lateral process, whereas on the left prong the mesal process is present only as a slight prominence of the margin.

The Tennessee specimens average slightly larger in all the characters shown in Table I. Other minor geographic differences are shown in Table II.

SPECIMENS EXAMINED.—Forty-eight males, 39 females, 6 nymphs. *Illinois*: Carbondale, June 26, 1907, 1 male, 1 female; Running Lake, July 15, 1883, 1 male, 1 female; Thebes, July 31, 1905, 1 male; all in the Illinois State Natural History Survey Collection. Giant City State Park, June 15, 1955, R. D. Alexander, 1 male, Ohio State Museum. [Additional specimens recorded by Hebard (1934, p. 194), but not seen are as follows: Hicks Branch, June 24, 1932, Ross, Dozier, and



Park, 1 female; Alto Pass, August 13, 1891, Hart and Shiga, 1 male, 1 female.] *Indiana*: Lawrence County: 1 female; 3 mi. SE of Mitchell, July 15, 1903, W. S. Blatchley, 1 female; both in the Purdue University Collection. Crawford County: west edge of Wyandotte about 1 mi. from Wyandotte Cave, June 25, 1902, 3 males (including holotype), 1 female; same locality, July 10, 1899, 1 female (allotype); August 4, 1921, 1 female; August 31, 1923, 2 females; all collected by W. S. Blatchley and in the Purdue University Collection. Wyandotte Cave, 8 males, 3 females, 2 nymphs; 2.7 mi. N of Pilot Knob, 14 males, 4 females, 4 nymphs; both series collected by I. J. Cantrall on June 30, 1955, and in the University of Michigan Museum of Zoology. Harrison County: Valley City, 7 males, 9 females; New Amsterdam, 1 male; R.3, T.4, S.33, 1 male, 1 female; all collected by E. S. Thomas on July 3, 1938, and in the Ohio State Museum. *Tennessee*: Bedford County: 4.2 mi. NW of Shelbyville on U. S. Highway 41A, 2 males; 3 mi. E of Shelbyville, 8 males, 13 females; all collected by J. J. Friauf on June 22, 1949, and in his personal collection.

The published record of *M. morsei* from Hattiesburg, Mississippi, by Morse (1907:50) applies to *M. vulnus*, as noted under that species. This record was repeated by Blatchley (1920:377) and by Hebard (1934:194), the latter author commenting that Morse's specimens, though very large, were typical of *morsei*. The record of *morsei* from Big Pine Creek, near South Bloomingville in Hocking County, Ohio, published by Kostir (1914:374) on the basis of a determination by A. N. Caudell, is also an error repeated by Blatchley and Hebard. Examination of one of Kostir's specimens in the collection of the Ohio State Museum by E. S. Thomas shows it to be *M. decoratus* Morse.

HABITAT.—*Melanoplus morsei* agrees with *M. vulnus* in being a thamnophilous species inhabiting open woodlands and moderately shaded woodland margins.

The specimen from Giant City State Park, Illinois, was caught on leaf litter in an open oak-hickory woods bordering a remnant hill prairie of *Andropogon scoparius*, *Hypericum*, and *Rhus glabra*.

Blatchley (1920, p. 377) stated that near Wyandotte, Crawford County, Indiana, *morsei* "occurred only along roadsides and in bare limestone glades on the crests and upper slopes of the high wooded hills. In Lawrence County it was found to be rather common in mid-July among the underbrush of high wooded slopes on the State University farm, three miles southeast of Mitchell. Here the soil was very sparsely vegetated, sedges and wild asters being the prevailing herbs. The ground was covered with the dead leaves of the last season,

with whose colors the hues of the locusts so blended that they were invisible while motionless."

I. J. Cantrall collected the Wyandotte Cave, Indiana, specimens in an open oak-hickory woods on a hillside littered with many limestone slabs. The ground cover included *Rhus radicans*, *Smilax*, *Helianthus*, *Carex*, and reproduction of *Acer rubrum*, *Sassafras albidum*, and *Quercus*.

The specimens from north of Pilot Knob, Indiana, were collected on a roadside margin beside a woods of second growth of *Carya* and mixed *Quercus* with some *Acer rubrum* and *Liriodendron tulipifera*. The dominants along the margin were *Smilax*, *Rhus radicans*, *Parthenocissus*, and *Rubus (Eubatus)*, with *Plantago major*, *Solidago*, *Erigeron*, *Sassafras albidum* reproduction, *Vitis*, and *Lonicera* also present. *M. morsei* was most abundant where the ground was covered with dead leaves and the vegetation was shrubby and about knee high.

The specimens from northwest of Shelbyville, Tennessee, were collected along an old, grown-up road through an extensive woods of *Juniperus virginiana*, *Quercus*, and *Carya*. The specimens from east of Shelbyville were collected in an open woods dominated by *Carya* with some *Quercus*. The ground was covered with leaves, grass, and scattered shrubby undergrowth.

SEASONAL OCCURRENCE.—Adult *morsei* has been taken as early as June 15, but nymphs were found as late as June 30 the same year. The latest record is August 31. Like *vulnus*, *morsei* is replaced in the late summer and fall by *M. rusticus obovatipennis* and *M. scudderi*.

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*Accepted for publication August 19, 1959*

