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NEW RECORDS OF MARSUPIALIA, LIPOTYPHLA, AND PRIMATES FROM THE DUCHESNEAN (MIDDLE EOCENE) SIMI VALLEY LANDFILL LOCAL FAUNA, SESPE FORMATION, CALIFORNIA

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ABSTRACT

A paleontologic mitigation program at the Simi Valley Landfill and Recycling Center, Ventura County, California, has yielded significant new samples of isolated small mammal teeth from the Duchesnean (middle Eocene) Simi Valley Landfill Local Fauna of the Sespe Formation. New records of a marsupial, lipotyphlans, and a microsyopid primate for this local fauna include: *Herpetotherium* sp., *Batodonoides walshi* n. sp., cf. *Oligoryctes* (genus and species undetermined), and cf. *Uintasorex* sp. In addition, significantly larger samples of the erinaceomorph lipotyphlan *Sespedectes singularis* and the marsupial *Peradectes californicus* are now recorded from the Simi Valley Landfill Local Fauna.

INTRODUCTION

The Sespe Formation of Simi Valley, Ventura County, California, has long been recognized for its abundant fossil mammals of middle Eocene to upper Oligocene (Uintan-Arikarrean) age (e.g., Stock, 1932, 1935, 1936; Golz, 1976; Golz and Lillegraven, 1977; Mason, 1988; Kelly, 1990, 1992, 2009; Kelly et al., 1991; Kelly and Whistler, 1994, 1998). Five superposed local faunas of middle Eocene (Uintan-Duchesnean) age have been recognized from the middle member of the Sespe Formation (Kelly, 1990, 1992; Kelly et al., 1991). The youngest of these faunas is the Duchesnean Simi Valley Landfill Local Fauna from bed 30A (Natural History Museum of Los Angeles County locality 5876) of the middle member of the Sespe Formation (Kelly et al., 1991). Prothero et al. (1996) documented the paleomagnetism of the middle member and placed bed 30A within Chron 17r of the geomagnetic polarity time scale, or about 38.0 – 37.8 million years before present (Luterbacher et al., 2004). Recently, 345 isolated teeth of fossil small mammals were recovered by wet screen sieving of bulk matrix from bed 30A during a paleontologic mitigation program at the Simi Valley Landfill and Recycling Center (Lander, 2008). These teeth represent a significant increase in the samples of fossil mammals of the Simi Valley Landfill Local Fauna.

Within these new samples are new occurrences of marsupials, lipotyphlans, and a microsyopid primate from the Simi Valley Landfill Local Fauna (Walsh, in Lander, 2008, Appendix C), including a new species of geolabidid. The purpose of this report is to document these new occurrences.

METHODS

Measurements of teeth were made with an optical micrometer to the nearest 0.01 mm. Eutherian cheek teeth cusp and dental terminology follow standard usage, while those of marsupials follows Marshall et al. (1990) and Korth (1994). Upper and lower teeth are designated by uppercase and lowercase letters, respectively. All specimens were recovered by wet screen sieving of bulk matrix from bed 30A (LACM locality 5876) of the middle member of the Sespe Formation at the Simi Valley Landfill and Recycling Center during a mitigation program directed by Paleo Environmental Associates, Inc., for Waste Management of California, Inc. All specimens are deposited in the Vertebrate Paleontology Section of the Natural History Museum of Los Angles County. Detailed locality data are available at this institution and also see Lander (2008).

Abbreviations and acronyms are as follows: ap, greatest anteroposterior length; L, left; ht-tal, height of talonid; ht-tri, height of trigonid; LACM, Natural

History Museum of Los Angeles County; N, number of specimens; Ma, million years before present; OR, observed range; R, right; tr, greatest transverse width; tra, anterior transverse width; trp, posterior transverse width; tr-talb, greatest transverse width of talonid basin.

SYSTEMATIC PALEONTOLOGY

Cohort Marsupialia Illiger, 1811
Order Didelphimorpha Gill, 1872
Family Herpetotheriidae Trouessart, 1879
Genus *Herpetotherium* Cope, 1873
Herpetotherium sp.

Referred Specimen—Partial LM1 or 2, LACM 153689.

Description—The partial upper molar is missing the posterior labial corner, including a large portion of the stylar shelf (Figure 1A). It is moderately worn and the enamel surface is somewhat abraded, which probably occurred during deposition in a fluvial environment. The tooth is dilambdodont with a V-shaped centrocrista. Stylar cusp A is small and positioned near the anterolabial corner of the tooth, close to the posterolingual terminus of the preparacrista and just anterior and lingual to stylar cusp B. It is connected anterolabially to the anterior cingulum. Stylar cusp B is worn down (or abraded), but its occlusal outline clearly indicates it is well developed and positioned along the labial border of the tooth, slightly more anteriorly than the paracone. The occurrence and morphology of other stylar cusps cannot be determined because of the missing portion of the stylar shelf. The paracone and metacone are well developed with triangular occlusal outlines. The metacone is larger and slightly taller than the paracone. The protocone is large with a triangular occlusal outline and slightly rounded along its lingual border. The preprotocrista extends anterolabially from the protocone to a weak, but distinct protoconule and then continues to join the anterior cingulum. The postprotocrista extends posterolabially from the protocone to a small, distinct metaconule, which is larger than the protoconule. The anterior cingulum is moderately developed and extends lingually from stylar cusp A to join the preprotocrista. The enamel along the labial border of the stylar shelf is slightly crenulated. Measurements of partial upper molar are ap = 1.90 mm and tra = 2.33 mm (ap and tr dimensions of the whole tooth would be larger).

Discussion—Many species that were formerly assigned to *Peratherium* Aymard, 1846, from the early to middle Eocene of North America are now regarded as belonging to *Herpetotherium* with *Peratherium* restricted to European species (Rothecker and Storer, 1996; Korth, 2008). *Herpetotherium* was historically assigned to a subfamily (Herpetotheriinae Trouessart, 1879) of Didelphidae Gray, 1921 (e.g, Korth, 1994; McKenna and Bell, 1997), but recent investigations indicate that *Herpetotherium* is the sister group to Didelphidae and the subfamily has been elevated to familial rank, Herpetotheriidae (Kirsch et al., 1997; Case et al., 2005; Sánchez-Villagra et al., 2007; Becker et al., 2008). Species of *Herpetotherium* are primarily distinguished by size and the relative size and positions of the stylar cusps (e.g., McGrew, 1959; Fox, 1983; Krishtalka and Stucky, 1983a,b, 1984; Korth, 1994, 2008; Eberle and Storer, 1995; Rothecker and Storer, 1996).

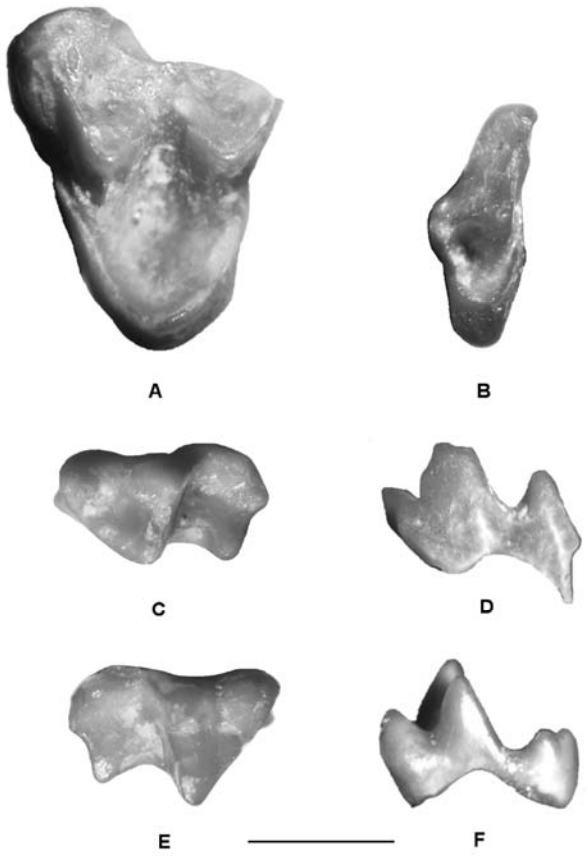

FIGURE 1. *Herpetotherium* sp. and *Peradectes californicus* from Simi Valley Landfill Local Fauna. A, *Herpetotherium* sp., partial LM1 or 2, LACM 153689. B-F, *Peradectes californicus*: B, RM4, LACM 153695; C-D, Lm1, LACM 153691; E-F, Rm3, LACM 153694. All occlusal views except D (labial view) and F (lingual view). Scale = 1 mm.

Herpetotherium is a relatively rare taxon in the Sespe Formation with *H.* cf. *H. knighti* being previously recorded from the Uintan Tapo Canyon and

Brea Canyon local faunas (Stock, 1936; Kelly, 1990). The Sespe Uintan sample of *Herpetotherium* is only known from lower dentitions. Except for its larger size, LACM 153689 is very similar in occlusal morphology to those in the Uintan sample of *H*. cf. *H. knighti* from San Diego (Lillegraven, 1976). It differs from Bridgerian *H. knighti* (McGrew, 1959) by having a slightly weaker protoconule and larger size. Troxell (1923) described *H. marsupium* from the Bridger Formation, Wyoming. This species is now known from Texas, Utah, Wyoming, and Canada, ranging from the Wasatchian to Duchesnean (Kishtalka and Stucky, 1983b, 1984; Korth, 2008). Rothecker and Storer (1996) described *H*. sp., cf. *H. marsupium* from the Duchesnean Lac Pelletier Lower Fauna of Saskatchewan. The Sespe upper molar is similar in size to those of *H. marsupium* and slightly larger than those of *H*. sp., cf. *H. marsupium*. It is larger than those of *H. fugax* Cope, 1873, *H. edwardi* (Gazin, 1952), *H. youngi* (McGrew, 1937), *H. valens* (Lambe, 1908), and *H. merriami* (Stock and Furlong, 1922), and much smaller than those of *H. comstocki* (Cope, 1884).

A specific assignment for the Sespe specimen cannot be made until better material is available from the Simi Valley Landfill Local Fauna that includes complete upper molars with stylar cusps C and D present. Therefore, LACM 153689 is referred to an indeterminate species of *Herpetotherium*. This is the first record of the genus from the Duchesnean of the Sespe Formation.

Family Peradectidae Crochet, 1979
Genus *Peradectes* Matthew and Granger, 1921
Peradectes californicus (Stock, 1936)

Referred Specimens—RM4, LACM 153695; Partial Rdp3, LACM 153690; Lm1, LACM 153691; Lm3, LACM 153692, 153693; Rm3, LACM 153694.

Discussion—The teeth of *Peradectes* from the Simi Valley Landfill Local Fauna (Figure 1B-F) are indistinguishable in size and occlusal morphology from those of the Uintan samples of *P. californicus* from San Diego and the Sespe Formation (Stock, 1936; Lillegraven, 1976), and are referred to this species. Measurements of the referred teeth are presented in Table 1. Previously, only one lower molar of *P. californicus* had been reported from the Simi Valley Landfill Local Fauna (Kelly and Whistler, 1994).

Grandorder Lipotyphla Haeckel, 1866
Order Erinaceomorpha Gregory, 1910
Family Sespedectidae Novacek, 1985
Genus *Sespedectes* Stock, 1935
Sespedectes singularis Stock, 1935

Referred Specimens—Partial RM1, LACM 153697; RM2, LACM 153698; LM3, LACM 153699, 153701; partial LM3, LACM 153700, 153702, 153703, 153704, 153705; RM3, LACM 153707; partial RM3, LACM 153706; Lm1, LACM 153696.

Discussion—Novacek (1985) provided a detailed description of *Sespedectes singularis*. Only two teeth of *S. singularis* were previously known from the Simi Valley Landfill Local Fauna (Kelly and Whistler, 1994). The new sample of teeth from the Simi Valley Landfill Local Fauna are indistinguishable in size and occlusal morphology from those of the Uintan-Duchesnean sample of *S. singularis* from the Sespe Formation (Novacek, 1976, 1985) and are referred to this species. Measurements of the new sample are provided in Table 2.

TABLE 1. Measurements (in mm) of *Peradectes californicus* from Simi Valley Landfill Local Fauna.

LACM #	Position/Dimension		Measurement
153695	RM4	ap	1.02
		tr	1.71
153690	partial Rdp3	ap	–
		tra	–
		trp	0.72
153691	Lm1	ap	1.39
		tra	0.92
		trp	0.72
153692	Lm3	ap	1.30
		tra	0.93
		trp	0.76
153693	Lm3	ap	1.44
		tra	0.80
		trp	0.84
153694	Rm3	ap	1.46
		tra	0.75
		trp	0.79

Order Soricomorpha Gregory, 1910
Family Geolabididae McKenna, 1960a
Genus *Batodonoides* Novacek, 1976
Batodonoides walshi new species

Holotype—Lm2, LACM 153709.

Type Locality—LACM 5876, bed 30A of the middle member, Sespe Formation, Simi Valley Landfill and Recycling Center, Ventura County, California.

Referred Specimens—RP4, LACM 153708; Lm3, LACM 153710; Lm3, LACM 153711.

Fauna and Age—Simi Valley Landfill Local Fauna, middle Eocene (Duchesnean), or about 38.0-37.8 Ma.

Etymology—Named in honor of the late Steven L. Walsh of the Department of Paleontology, San Diego Natural History Museum, California, for his extensive contributions to our understanding of Eocene mammals of the Pacific Coast.

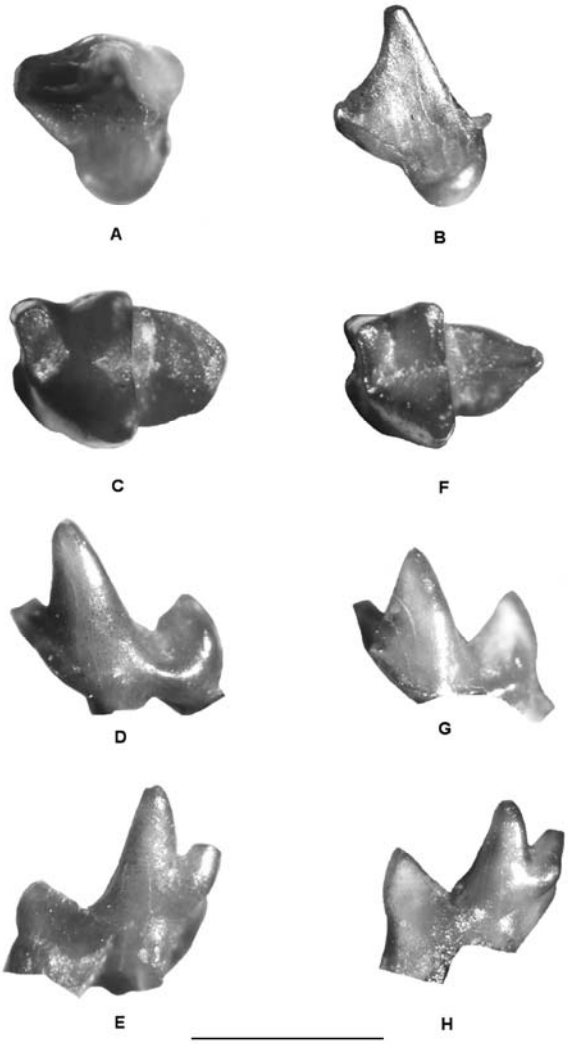

FIGURE 2. *Batodonoides walshi* n. sp. from Simi Valley Landfill Local Fauna. A-B, RP4, LACM 153708, A-occlusal view, B-lingual view. C-E, Lm2, holotype, LACM 153709, C-occlusal view, D-labial view, E-lingual view. F-H, Lm3, LACM 153710, F-occlusal view, G-labial view, H-lingual view. Scale = 1 mm.

Diagnosis—Differs from *Batodonoides powayensis* Novacek, 1976, and *B. vanhouteni* Bloch et al., 1998, by a distinctive talonid morphology including the following: 1) relatively much narrower and more anteroposteriorly orientated m2-3 talonid basins; 2) single, tall talonid cusp (hypoconulid or labially displaced hypoconid) positioned at posterior most point of talonid basin; and 3) lacking a notch at the posterior aspect of talonid. Further differs from *B. powayensis* by having the m3 paraconid slightly taller relative to the protoconid height. Further differs from *B. vanouteni* by having the following: 1) P4 with distinct, small protoconule and incipient metaconule present; 2) m2 metaconid slightly taller relative to protoconid height; and 3) larger size.

Description—The P4 (LACM 153708) has a triangular occlusal outline and is in early wear (Figures 2A-B). The paracone is very tall, sharply pointed, and the dominant cusp. There is no metacone present. A very steep parastylar crest (precrista) descends sharply from the anterior apex of the paracone to join with the preprotocrista. A small, but distinctive, protoconule is present along the preprotocrista, just lingual to the junction of the preprotocrista and parastylar crest. A distinctive, large, long, blade-like postcrista extends posterolabially from the apex of the paracone to a small metastyle. A small, crescentric parastylar lobe is present that is low and rather flat with a raised external rim. Along this rim or cingulum, at the anterolabial corner of the tooth, is a small parastyle. A narrow, shelf-like, labial cingulum, which is continuous with the rim or cingulum along the parastylar lobe, extends posteriorly from the parastylar lobe to the metastyle. There are no stylar cusps present. The preprotocrista and postprotocrista form a continuous rim along the lingual aspect of the tooth from the posterolingual base of the paracone to a small, distinct protoconule, completely enclosing the trigon. Although a distinct, elevated protocone is not present, a thickening of this rim occurs at its most lingual aspect, which appears to be an incipient protocone. Also, on this rim at the junction of the posterolingual base of the paracone and the postprotocrista is a distinct, raised, circular swelling that appears to be a small metaconule. The postmetacrista is a distinct crest that ascends posterolabially from the metaconule to the metastyle. The talon is relatively flat, but curves rapidly upward at the junction with the lingual base of the paracone. Anterolingual and posterolingual cingula are lacking.

The m2 is in early wear (Figures 2C-E, 3A). It is characterized by a well-developed trigonid with the apexes of the protoconid and metaconid significantly higher than the talonid. The talonid is transversely narrower than the trigonid. The protoconid is the largest and tallest cusp (height = 1.01 mm from labial base to apex) with the metaconid only slightly lower in height. The paraconid is the lowest cusp of the trigonid with its apex 0.29 mm lower than that of the protoconid. The bases of the protoconid and metaconid are fused for just over half their height, forming a steep wall along the anterior aspect of the talonid basin, and above which they are separated by a deep V-shaped protocristid notch. The protoconid and metaconid are slightly compressed anteroposteriorly, so that the protocristid (= metalophid) forms a continuous, sharp,

blade-like edge from the apex of the protoconid to the bottom of the protocristid notch and back up to the apex of the metaconid. The paraconid is positioned

TABLE 2. Measurements (in mm) of *Sespedectes singularis* from Simi Valley Landfill Local Fauna.

LACM #	Position/Dimension		Measurement
153698	RM2	ap	1.52
		tra	2.25
		trp	2.03
153699	LM3	ap	1.15
		tra	1.69
		trp	1.12
153701	LM3	ap	1.18
		tra	1.87
		trp	1.15
153707	RM3	ap	1.12
		tra	1.82
		trp	1.13
153700	partial LM3	ap	–
		tra	–
		trp	1.14
153702	partial LM3	ap	–
		tra	–
		trp	1.14
153703	partial LM3	ap	1.21
		tra	–
		trp	–
153704	partial LM3	ap	–
		tra	–
		trp	1.14
153705	partial LM3	ap	–
		tra	–
		trp	1.14
153706	partial RM3	ap	–
		tra	–
		trp	1.13
153696	Lm1	ap	1.65
		tra	1.35
		trp	1.47

anterolingually with its apex in line with that of the metaconid. A weakly developed paracristid (preprotocristid plus parastylar cristid = protolophid) extends from the protoconid to the anterolabial apex of the paraconid. A well-developed anterior cingulid is present that extends upward from the anterolabial base of the protoconid to the anterolabial base of the paraconid. The talonid is distinctive, in that it is narrower than the trigonid with a moderately deep talonid basin that is much narrower than the overall width of talonid. The talonid basin is rimmed by a distinct, continuous cristid (= entoconid cristid plus cristid obliqua) This talonid cristid ascends sharply from the posterolingual base of the metaconid to the posterior most point of the talonid basin and then descends sharply as a cristid obliqua, and terminates very close to and just lingual of the middle of the fused bases of the protoconid and metaconid, wherein a small notch separates the cristid obliqua from the wall. This small notch is a continuation of a transversely orientated, small, shallow valley that lies along the anterior aspect of the talonid basin. The cristid obliqua portion of the continuous talonid cristid is lower than the lingual portion. No indication of an entoconid is present along the lingual aspect of the talonid cristid. A single, distinct, elevated cusp is present at the posterior most point of the talonid basin along the talonid cristid with its position central to the long axis of the talonid. The position of this cusp would indicate that it is a hypoconulid. There is no indication of a hypoconid along the posterolabial aspect of the talonid basin or talonid cristid. Whether this cusp is homologous with a hypoconulid or a lingually displaced hypoconid cannot be determined. No matter which cusp it represents, the morphology of the talonid is very distinctive with the combination of a very, narrow talonid basin and a single, tall, posteriorly positioned cusp, which gives the talonid a sectorial appearance.

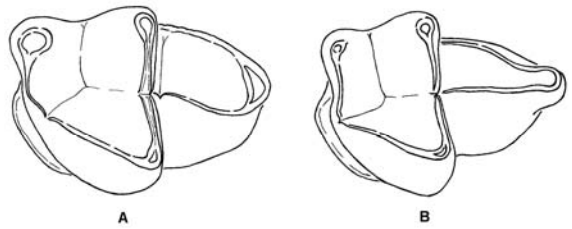

FIGURE 3. Line drawings Lm2-3 of *Batodonoides walshi* n. sp. from Simi Valley Landfill Local Fauna showing occlusal outlines of trigonid and talonid basins, A, Lm2, holotype, LACM 153709. B, Lm3, LACM 153710. Occlusal views, scale = 1 mm.

Two m3s are represented; one is barely worn (LACM 153710) and the other is in moderate wear (LACM 153711). The m3 is smaller than the m2 with the trigonid not as tall (Figures 2F-H, 3B). The morphology of the m3 trigonid and anterior cingulid are very similar to those of the m2, but the paraconid is positioned slightly closer to the metaconid. The m3 talonid exhibits a similar morphology with that of the m2 talonid, but differs by being even more compressed transversely and the single, posteriorly positioned hypoconulid (or displaced hypoconid) is relatively taller (m3 talonid height = 66% of trigonid height, whereas m2 talonid height = 56% of trigonid height). The talonid basin has also a slight constriction labially

and lingually just anterior to the hypoconulid (or displaced hypoconid), making the cusp even more distinct and the talonid basin more sectorial in appearance. Measurements of the teeth are presented in Table 3.

TABLE 3. Measurements (in mm) of *Batodonoides walshi* n. sp. from Simi Valley Landfill Local Fauna. See methods for abbreviations for dimensions.

LACM #	Position/Dimension		Measurement
153708	RP4	ap	0.91
		tr	0.93
		ht	0.87
153709	Lm2	ap	1.01
		tra	0.63
		trp	0.47
		ht-tri	1.01
		ht-tal	0.62
		tr-talb	0.21
153710	Lm3	ap	0.91
		tra	0.62
		trp	0.42
		ht-tri	0.82
		ht-tal	0.54
		tr-talb	0.18
153711	Lm3	ap	0.87
		tra	0.53
		trp	0.39
		ht-tri	0.80
		ht-tal	0.53
		tr-talb	0.17

Discussion—Four genera are usually assigned to the Geolabididae (McKenna, 1960a; Novacek, 1976; Lillegraven et al., 1981, Bloch, et al., 1998; Gunnell et al., 2008); the late Cretaceous *Batodon* Marsh, 1892, the Wasatchian to Uintan *Batodonoides*, the Wasatchian to Arikareean *Centetodon* Marsh, 1872, and the late Wasatchian to Bridgerian *Marsholestes* McKenna and Haase, 1992 (= *Myolestes* of Matthew, 1909). However, Wood and Clemens (2001) did not assign *Batodon* to any family and referred it to Placentalia, *incertae sedis*, whereas Kielan-Jaworowska et al. (2004) assigned *Batodon* to the family Cimolestidae Marsh, 1889, order Cimolesta McKenna, 1975. *Batodon* and *Marsholestes* are monotypic, represented by *B. tenuis* Marsh, 1892, and *M. dasypelix* (Matthew, 1909), respectively.

Batodonoides is a relatively rare taxon with two species previously recognized; *B. powayensis* from the Uintan of southern California and *B. vanhouteni* from the Wasatchian of Wyoming (Novacek, 1976; Kelly, et al., 1991; Walsh, 1991, 1996; Bloch et al., 1998). This rarity is probably due its very small size, wherein most all specimens have been recovered by wet screen sieving of matrix or acid preparation of freshwater limestones (Block et al., 1998; Bloch and Bowen, 2001; Silcox and Rose, 2001). The Sespe geolabidid can be confidently assigned to *Batodonoides* because it exhibits the following suite of characters (Novacek, 1976; Bloch et al., 1998; Gunnell et al., 2008): 1) the P4 is lacking a metacone and stylar cusps; 2) the lower molar trigonids are very tall, with the protoconids and metaconids fused for much of their height, and the talonids are narrower than the trigonids; 3) m3 smaller than m2; and 4) very small size. Except for the distinctive lower molar talonid occlusal morphology, the lower molars of the Sespe *Batodonoides* are overall very similar morphologically to those of *B. powayensis* and *B. vanhouteni*. The P4 occlusal morphology of the Sespe *Batodonoides* is also very similar to that of *B. vanhouteni*, differing primarily by having a small protoconule and incipient metaconule present.

FIGURE 4. cf. *Oligoryctes*, genus and species undetermined, from Simi Valley Landfill Local Fauna, partial LM1 or 2, LACM 153688, occlusal view. Scale = 1 mm.

The m2-3 talonids of the Sespe *Batodonoides* have taken the trend seen in *B. powayensis* and *B. vanhouteni* of a transverse narrowing of the talonid basins and reduction of the talonid cusps to an extreme, giving the talonids an almost sectorial appearance, especially m3. The m2-3 greatest talonid basin transverse widths of the Sespe *Batodonoides* are 43-44% of the m2-3 trps, whereas those of *B. powayensis* and *B. vanhouteni* are 60-78% of the trps. The occlusal outlines of the talonid basins of the Sespe *Batodonoides* are > -shaped with a single, tall cusp at the posterior most point of the trigonid basin, which is also centrally positioned relative to the long axis of the

tooth. In *B. powayensis*, weak lower molar entoconids are usually present and positioned near (or sometimes fused with) a distinct hypoconulid, whereas entoconids are lacking in the Sespe *Batodonoides*. Lower molar entoconids are also lacking in *B. vanhouteni*. In *B. powayensis* and *B. vanhouteni* a moderately to well-developed hypoconid is present that is positioned posterolabially along the rim of the talonid basin and separated from the hypoconulid by a distinct notch at posterior aspect of the basin. In the Sespe *Batodonoides*, this notch is completely lacking and there is no cusp present along the entire lingual rim of the talonid basin.

Although the sample of *Batodonoides* from the Simi Valley Landfill Local Fauna is extremely small, the very distinctive talonid morphology clearly separates it from all other species of *Batodonoides* and justifies recognizing a new species, *B. walshi*. This is the first record of the genus from the Duchesnean and, thus, the youngest known occurrence of the genus.

Family Oligoryctidae Asher et al., 2002
Genus *Oligoryctes* Hough, 1956
cf. *Oligoryctes*, genus and species undetermined

Referred Specimens—partial LM1 or 2, LACM 153688.

Description—LACM 153688 is broken with a partial occlusal outline that is anteroposteriorly narrow and most similar to those of the M1-2s of *Oligoryctes* Hough, 1956 (Figure 4). The tooth is zalambdodont (no metacone present) with a single, tall paracone whose apex is sharp and centrally positioned. The parastyle and metastyle are well-developed with a moderately deep ectoflexus occurring between them. Distinct anterior and posterior cingula are present. The talon is broken away, but the tooth exhibits a distinct widening and thickening of the enamel just labial to the broken edge, especially posteriorly, suggesting that a protocone was present. Measurements of the partial upper molar are ap = 1.52 mm and tr = 0.76 mm.

Discussion—Five genera of soricomorph lipotyphlans that have or are presumed to have zalambdodont upper molars (lacking metacones) are currently recognized (Asher et al., 2002; Lopatin, 2006; Gunnell et al., 2008) as follows: from North America, Wasatchian *Parapternodus* Bown and Schankler, 1982, and *Koniaryctes* Robinson and Kron, 1998; Uintan through Whitneyan *Oligoryctes*; Duchesnean through Orellan *Apternodus* Matthew, 1903; and from Mongolia, middle Eocene *Asiapternodus* Lopatin, 2006. *Koniaryctes* is the only genus whose upper molars are unknown, but they are presumed to be zalambdodont based on its lower dentition (Robinson and Kron, 1998; Asher et al., 2002). Although most of these genera were previously assigned to the Apternodontidae (e.g., Matthew, 1910; Hough, 1956; Bown and Schankler, 1982; Robinson and Kron, 1998), Asher et al. (2002) recognized three separate families for these taxa: Apternodontidae (including *Apternodus*); Parapternodontidae (including *Parapternodus* and *Koniaryctes*); and Oligoryctidae (including *Oligoryctes*). Subsequently, Lopatin (2006) added *Asiapternodus* to the Apternodontidae. A third unnamed oligoryctid was also recognized from the Bridgerian of Colorado, Nevada, Utah, and Wyoming (Asher et al., 2002). Walsh (1996) included *Oligoryctes* in a faunal list from the early Uintan Poway Fauna of California, but this material has never been formally described. Asher et al. (2002) provided evidence that these genera form a monophyletic clade wherein *Apternodus* is the sister taxon to *Oligoryctes*, which is the sister taxon to a soricid-parapternodontid clade.

The Sespe partial upper molar is most similar to those of *Oligoryctes*, including a distinct anterior cingulum, small size, possibly a small protocone present, and lacking a metacone (zalambdodont). However, because of the broken condition of the specimen, generic assignment is unwarranted, so it is referred to an undetermined oligoryctid close to *Oligoryctes*. This is the first record of Oligoryctidae from the Sespe Formation and Simi Valley Landfill Local Fauna.

Order Primates Linnaeus, 1758
Family Microsyopidae Osborn and Wortman, 1892
Uintasoricinae Szalay, 1969
Genus *Uintasorex* Matthew, 1909
cf. *Uintasorex* sp.

Referred Specimen—LM3, LACM 153954.

Description—The LM3 is moderately well-worn resulting in the three primary cusps being of about equal height (Figure 5). The paracone, metacone and protocone are well developed with the paracone larger than the metacone and the protocone about equal in size to the paracone. The metacone is slightly compressed laterally. The protocone is positioned slightly anterior of the center of the tooth so that its apex is more aligned with that of the paracone than with that of the metacone. The trigon basin is relatively wide and shallow. The preprotocrista is a low crest that extends anterolabially to a small, but distinct protoconule, which is positioned anteriorly, near the anterolingual base of the paracone. The postprotocrista is distinct and extends labially to about the middle of the lingual aspect of the metacone. Possibly due the worn condition of the tooth, a distinct metaconule is not visible on the tooth, so whether or not it was present cannot be determined. Similarly, a distinct posterolingual cingulum cannot be discerned, but a

very slight shelf along the posterior aspects of the protocone and postprotocrista suggests that a weak posterolingual cingulum was present. The anterolingual cingulum is weakly developed and extends lingually from the anterior base of the protocone to the anterolabial base of the paracone. Measurements of LACM 153954 are ap = 0.73 and tr = 0.75 mm.

FIGURE 5. cf. *Uintasorex* sp. from Simi Valley Landfill Local Fauna, LM3, LACM 153954, occlusal view, scale = 0.5 mm.

Discussion—Two species of *Uintasorex* are currently recognized, *U. parvulus* Matthew, 1909, from the Bridgerian of Wyoming (Matthew, 1909; Szalay, 1969; Rudman, 1981), and *U. montezumicus* Lillegraven, 1976, from the Uintan of the San Diego area, California (Matthew, 1909; Szalay, 1969; Lillegraven, 1976; Golz and Lillegraven, 1977; Walsh, 1991, 1996; Silcox and Gunnell, 2008). The only previous record of *Uintasorex* from the Sespe Formation was a single lower molar from the Uintan Tapo Canyon Local Fauna referred to *U.* sp., cf. *U. montezumicus* by Kelly and Whistler (1994). *Uintasorex parvulus* and *U. montezumicus* are similar in size and overall dental morphology, differing primarily in relative cusp positions and degree of development of cingula/cingulids and lophs/ lophids (Lillegraven, 1976). The Tapo Canyon *Uintasorex* sp., cf. *U. montezumicus* differs from *U. montezumicus* by its smaller size and having the widths of the m1 trigonid and talonid slightly smaller relative to the corresponding ap length (Kelly and Whistler, 1994). The M3 from the Sespe Formation at the Simi Valley Landfill differs from those of *U. montezumicus* by having the following: 1) the posterolingual cingulum is less developed or lacking; 2) the transverse width is slightly larger relative to the ap length (ap/tr = 0.973 versus 0.883 for *U. montezumicus*); 3) a distinct metconule lacking; and 4) smaller in size. Storer (1995) described an isolated M3 of *Uintasorex* sp. from the late Duchesnean Lac Pelletier Upper Fauna of Saskatchewan. The Sespe M3 is much smaller than the Lac Pelletier M3. Gazin (1958) referred a sample of isolated teeth to *U. parvulus* from the Bridgerian Green River Formation, but Szalay (1969) assigned this sample to *Uintasorex* sp. because the teeth are smaller in size than those of *U. parvulus* from the Bridger Formation. The Sespe M3 differs from those of this taxon by having the following: 1) the protoconule slightly less developed; 2) a distinct metaconule is lacking; 3) the posterolingual cingulum is less developed or lacking; 4) the transverse width is slightly larger relative to the ap length; 5) and slightly smaller size. The Sespe M3 can be easily distinguished from those of Wasatchian *Niptomomys* McKenna, 1960b, the only other genus of the Uintasoricinae, by having the following: 1) the paracone and metacone are positioned relatively further apart resulting in the occlusal outline being more triangular (less ovoid) and the greatest ap width occurs across the labial aspect of the tooth; 2) a more weakly developed protoconule; 3) lacking a incipient metastyle; and 4) much smaller size.

At least two million years separate the *Uintasorex* sp., cf. *U. montezumicus* specimen (Lm1) of the Tapo Canyon Local Fauna from the uintasoricine specimen (LM3) of the Simi Valley Landfill Local Fauna (Kelly et al., 1991; Prothero et al., 1996). Whether the two uintasoricine teeth from the Sespe Formation represent the same or different species cannot be determined, but they are both characterized by their small size. Until a much larger sample from the Sespe Formation is available, LACM 153954 is herein referred to cf. *Uintasorex* sp. This is the first record of the Uintasoricinae from the Duchesnean portion of the Sespe Formation.

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