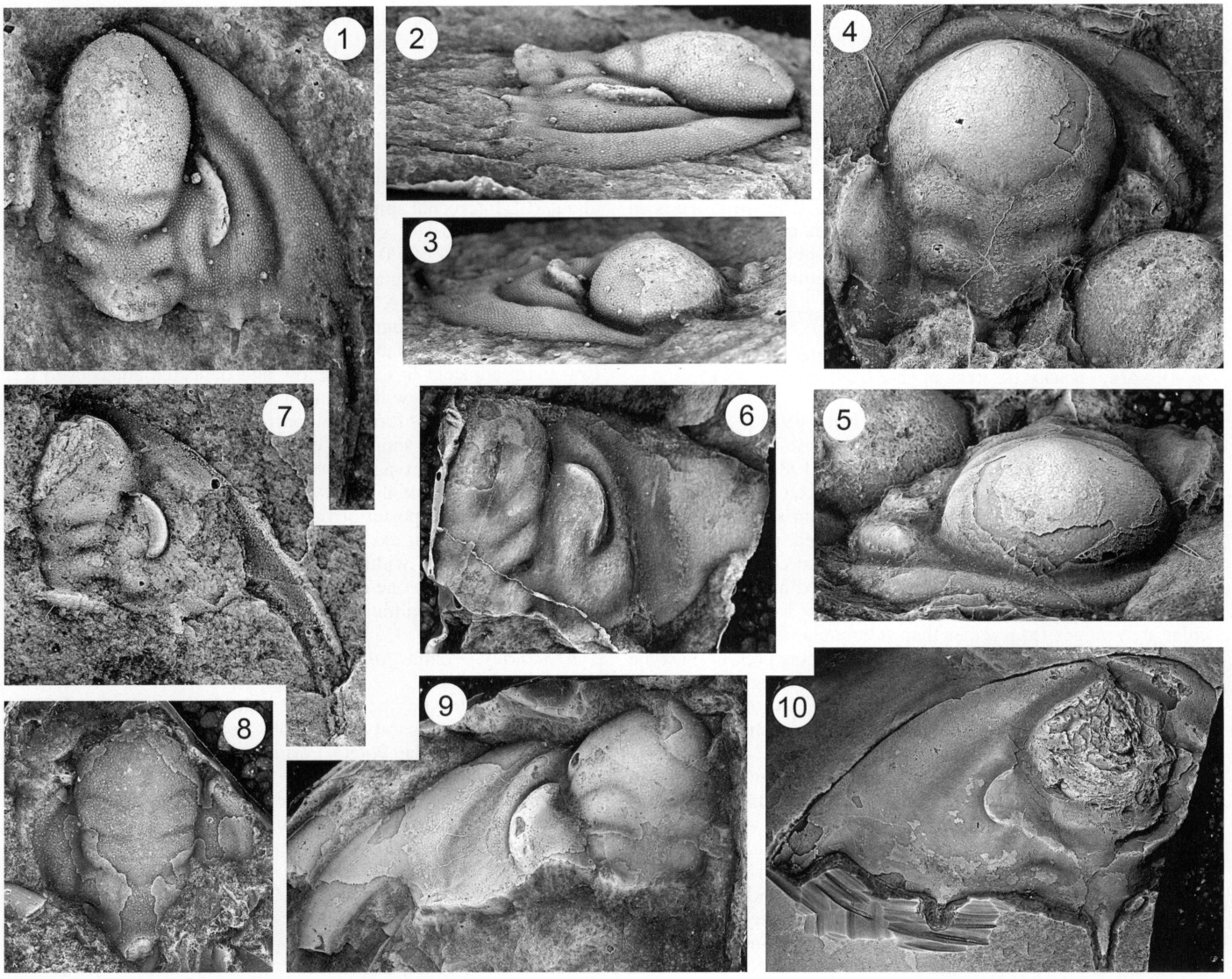

FIGURE *13—1–3, Grandinasus* sp. A n. gen., latex cast of cephalon, USNM 520997, lower member of Poleta Formation, Montezuma Range, locality 1316, ×3; *1,* dorsal view, *2,* lateral view, and *3,* anterior view. *4–7, 9, 10, Grandinasus patulus* n. gen. and sp., Montenegro Member of the Campito Formation; *4, 5,* latex cast of glabellar region, USNM 520992, Gold Point area, section GP 0, ×1, *4,* dorsal view, *5,* anterior view; *6,* latex cast of a large cephalon, ICS 3760, Stewart's Mill area, near top of Montenegro Member, locality ICS 1045, ×1.5; *7,* latex cast of partial cephalon, USNM 520994, Montezuma Range, section MS 337.5, ×3; *9,* latex cast of partial cephalon USNM 520995, Gold Point area, section GP 0, ×1.5; and *10,* holotype, large incomplete cephalon, USNM 520991, Montezuma Range, section MN-h 332, ×1. *8,* Holmiid?, genus and species undetermined, latex cast of glabellar region, USNM 520996, lower middle member of Poleta Formation, Montezuma Range, section IS 224, ×2.3.

L0 broadens (sag.) medially by half the width (exsag.) at lateral margin. Prominent upward-angled node or spine at posterior margin. Ocular lobe narrow, one-sixth width (tr.) of L0, slightly curved, sèparated from LA by distinct axial furrow, posterior tip opposite S1. Width of cephalon between distal margins of ocular lobes three-quarters length of glabella. Interocular area has longitudinal ridge or swelling extending to posterior border furrow. Extraocular area about equal in width (tr.) to interocular area with swelling parallel to border furrow. Cephalon uniformly covered with coarse granules.

←

locality 1721, ×3. *10–14, Grandinasus auricampus* n. gen. and sp.; *10, 11, 14,* from the Montenegro Member of the Campito Formation, Montezuma Range; *10,* holotype cephalon, latex cast of external mold, USNM 520990, section MN-h 332, ×3; *11,* latex cast of external mold, cephalon, USNM 520988, section MS 326.5, ×2; *12, 13,* small, partial cephalon, USNM 520989, lower member Poleta Formation, Gold Point area, locality 1473, ×6, *12,* dorsal view, *13,* lateral view; and *14,* latex cast of external mold, cephalon, distorted on the right side, USNM 520987, section MN-h 337–338, ×3. *15–17, Grandinasus auricampus*? n. gen. and sp., latex cast of cephalon, ICS 3759, top of lower member of Poleta Formation, Gold Point area, locality ICS 1053, ×6, *15,* anterior view, *16,* dorsal view, *17,* lateral view.

Occurrence.—The single cephalon, 15.8 mm long, occurs in the shale unit in the middle of the lower member of the Poleta Formation in a collection not on a measured section (locality 1316, Fig. 3), northern Montezuma Range, Esmeralda County, Nevada.

Discussion.—This form differs from *Grandinasus argentus* in having a long narrow LA, flat lateral border, and coarse granular sculpture. Also the posterior margin from the intergenal spine to the genal angle is slightly backward-directed. The specimen is an external mold preserving full relief in metamorphically indurated mudstone. The notably increased granular sculpture may reflect some unidentified environmental change (Palmer, 1965).

Genus HOLMIELLA Fritz, 1972

Holmiella FRITZ, 1972, p. 25; PALMER AND REPINA, 1993, p. 25; 1997, p. 415–416; LIEBERMAN, 1998, p. 65–67, 71; 1999, p. 85–87.

Type species.—*Holmiella preancora* Fritz, 1972.

Included species.—*Holmiella falcuta* Fritz, 1972, *H. falx* n. sp., *H. millerensis* n. sp., ?*H.* sp. Ahlberg et al., 1986.

Emended diagnosis.—Holmiid with advanced genal spines initially directed outward to slightly forward from anterolateral margin of cephalon, posterolateral margin rounded, intergenal spines or node a short distance in from posterolateral corner, or may be absent. Glabellar sides concave, LA expanded and front broadly curved against anterior border furrow. Ocular lobes long. Extraocular area ranges from wider than interocular area to much less than interocular area width. Small occipital spine present on some species. Thorax of 17 segments, pleural regions slightly narrower than axis. Pygidium large for a holmiid, wide, one axial ring clearly defined and a second defined by pits and a shallow furrow. Posterior margin transverse, bearing short spines.

Occurrence.—Upper middle and upper Montezuman Stage, in Esmeralda County, Nevada, and Mackenzie Mountains, Northwest Territories, Canada; ?Sweden.

Discussion.—The addition of *Holmiella millerensis* to this genus requires the above amendments to the diagnosis. This assignment is made with some hesitation because the wide extraocular area of *H. millerensis* is a major departure from the type species. Also the relatively narrow axial lobe of the pygidium suggests an overall thoracic shape quite different from the type species (see discussion in Lieberman, 1999, p. 87). The fact that the single specimen of *H. millerensis* is so large raises some concern that these differences may be ontogenetic in the adult stage.

Ahlberg et al. (1986, p. 53–54, figs. 13,14) describe a pygidium that is about two-thirds the size of the pygidium of *Holmiella millerensis*, but differs markedly from the pygidia of all other *Holmiella* species in that the axis makes up two-thirds of the anterior pygidial width. Lieberman (1999) suggests that this pygidium belongs to an indeterminate holmiid but it is much closer to *H. preancora* and *H. falcuta* than to *H. millerensis*. The Swedish pygidium does display the two pairs of spines as observed on other *Holmiella* species.

HOLMIELLA FALX new species
Figure 11.1–11.4

Olenellus? *argentus* WALCOTT, 1910, pl. 40, fig. 14, non figs. 12, 13, 15, 16.

Holmiella? FRITZ, 1972, p. 25.

Diagnosis.—Cephalon slightly subtrapezoidal, narrowing forward, with rounded posterolateral margins, intergenal spine or node absent. Genal spine, long, advanced to align with anterior quarter of LA, slightly forward-directed at base, then curved backward. Ocular lobes long. Extraocular area narrower than interocular area.

Description.—Cephalic width about one-half greater that cephalic length (sag.). Genal spines slightly forward-directed from anterolateral angles, base aligned with anterior quarter of LA, curve smoothly back to approach thoracic margin, length over twice cephalic length, generally round in cross section. Posterior margin transverse, slightly posteriorly inclined from axial furrow where posterior margin is indented, rounded at posterolateral corners, lateral margin forward-directed, inclined toward axis at about 20°. Intergenal spine or node absent. Anterior border slightly narrowed ahead of glabella, lateral border width (tr.) greater than length (sag.) of L0. Posterior border narrow, subtle. Border furrow deep ahead of glabella, shallow otherwise. Glabella slightly narrowed at S2. LA 1.6 times wider (tr.) than length (sag.), width slightly more than width (tr.) of L0, length of lobe (sag.) two-fifths length of glabella, slightly inflated dorsally. Axial furrow sharp adjacent to LA, shallow and deflected adjacent to L2, L1, and L0. S0 furrow deep and wide at axial furrow, shallow at axis. S1 deep at axial furrow, S2 narrow, straight, adjacent to axial furrow. S3 shallow, short. L0 expanded posteriorly, length (sag.) up to twice length (exsag.) at axial furrow. Ocular lobes separated from LA by deep axial furrow, outward-directed from LA then backward-directed, posterior tip opposite S0 to posterior third of L1, at distance from axial furrow three-tenths width (tr.) at L0, lobe width one-fifth width (tr.) at L0. Width between distal margins of ocular lobes one-eighth greater than glabellar length. Interocular area flat; width (tr.) of extraocular area two-thirds width of interocular area.

Etymology.—Latin, *falx*, sickle-shaped weapon, for the shape of the genal spines.

Types.—Holotype cephalon, ventrally exposed, USNM 521001, and three paratype cephala from the shale unit in the lower member of the Poleta Formation east of Mount Jackson (locality 1721).

Other material examined.—One cephalon in field collection and replica, ICS 3257, of one of Walcott's (1910) paratype, USNM 56812c, of *Holmia*? *argenta.*

Occurrence.—Shale unit in the lower member of the Poleta Formation east of Mount Jackson (locality 1721), Walcott's material from same interval at locality 1v, Mineral Ridge (see *Discussion* of *Grandinasus argentus*).

Discussion.—This species differs from *Holmiella preancora* and *H. falcuta* in having the genal spine distinctly more advanced. The genal spine of *H. millerensis* n. sp. is even more advanced and forward-directed, and the ocular lobes are smaller and located close to the glabella. These cephala average about 7 mm in length. A late-stage meraspid cephalon of *H. falx* (3.0 mm cephalic length) has genal spines aligned with the anterior part of LA, but initially directed outward and slightly backward (Fig. 11.2).

HOLMIELLA MILLERENSIS new species
Figure 14

Holmiella sp. NELSON, 1976, pl. 3; LIEBERMAN, 1999, p. 87.

Diagnosis.—Cephalon subtrapezoidal with rounded posterolateral margins. Genal spine advanced to anterior portion of cephalon, initially forward-directed then curving outward to straight backward to a length greater than length of entire carapace. Glabella slightly expanded anteriorly with shallow S3 furrow. Ocular lobes very close to glabella; extraocular area is about 2.5 times width (tr.) of interocular area. Pygidium wide (tr.), more than twice pygidial length, pygidial axis narrow, about one-fourth pygidial width.

Description.—Cephalon subtrapezoidal, narrowing forward, maximum width 1.8 times cephalic length, lateral margins rounded. Posterior margin transverse, regularly curved at posterolateral