

## NATIVE BEES (Con't. from page 22)

O. A. Stevens<sup>1</sup>

This article will deal with a number of small bees which are of much interest to the student of insect life, especially because of their flower visiting habits. Popularly they are completely unknown and would pass for ants, flies or almost any other small insect. In contrast to *Andrena*, they are summer bees, are not thickly covered with hairs and often have spots or bands of yellowish color in the surface of the body. The variations in facial markings, especially of the males, form one of the chief means of distinguishing the species (fig. 2).

Most of the species described here were at one time placed in a family, *Panurgidae*. They are considered to be related to *Andrena* and are put in the same family by some authors. The wings of most of them have only two submarginal cells (fig. 3 C, F). The tongue is slender, more elongated than in *Andrena*, but not highly modified. The pollen collecting hairs on the leg are not dense and the pollen usually is moistened with honey to form a ball as with honeybees and bumblebees. We know little of their nesting habits, but they apparently are all burrowers in the ground.

Several species of *Panurgus* occur in Europe and northern Africa. Friese (7) called them "deceptive bees," though the reason for this is not clear unless it was their lack of hairs. He said they were "distinguished from all other bees by the black, rather smooth, unbanded, shining body." This would apply equally well to the American species, which have been placed in *Panurginus* or *Pseudopanurgus*, both of which names indicate a close relationship to *Panurgus*. Friese states that *Panurgus calcaratus* is a common



Fig. 1. Some small bees (enlarged one-half). Left to right: *Pseudopanurgus innuptus*, *Perdita canadensis*, *Perdita zebrata*, *Macropis morsei*, *Hesperapis carinatus*, *Calliopsis coloradensis*. Photo by Don Nelson.

summer bee all over Europe and so closely attached to certain flowering plants related to the dandelion that in one area where yellow flowers are rare none of the bees can be found. Our species, likewise, visit the yellow flowers of gumweed, sunflower and other members of the composite group. There are some species, however,

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which visit quite different kinds of flowers. One other feature is the fact that those bees, especially *Pseudopanurgus*, *Perdita* and *Calliopsis*, are commonly found mating on the flowers. This is much less frequent in most other groups.

1. *Panurginus malvastri* Sw. & Ckll. Length 8—10 mm.; brownish black, somewhat shining; head a little wider than long; clypeus and legs of male yellow. This might well be called the mallow bee because it visits our prairie mallow (*Sphaeralcea coccinea*). Specimens from Dickinson, Mott and Gascoyne, June 18—July 7, all on the mallow. This bee was first described from Nebraska in 1907.

### Pseudopanurgus

The numerous species of this genus are much alike. They are slender black bees, 6—10 mm. long with short, gray or brownish hairs on thorax, few on abdomen. They differ from *Panurginus* in certain technical characters: face nearly square, labrum quadrate (rounded in *Panurginus*), first recurrent vein much beyond the first transverse above (meeting in *Panurginus*).

The females of most species lack yellow face markings so that they are more difficult to recognize than the males. The abdominal segments of the females are smoother, more shining and less punctured than those of the males. Mr. J. C. Crawford Jr. identified a number of specimens and published a partial report (5) on the material. The present writer published (9) some further records which are now brought up to date. The differences between the North Dakota species are indicated by the following key for males.

No yellow above clypeus; scape (1st joint) of antennae black.

Thorax dull, densely and finely punctured. 2. *P. stevensi*

Thorax shining, coarsely punctured.

Labrum black; first abdominal segment strongly punctured.

3. *P. innuptus*

Labrum yellow; first abdominal segment shining, not punctured.

4. *P. simulans*

A yellow spot above clypeus.

Small spot above clypeus and labrum yellow; thorax closely punctured; first abdominal segment finely punctured; wings dusky.

5. *P. asteris*

Large, quadrate yellow spot above clypeus.

Scape of antennae black.

6. *P. piercei*

Scape yellow in front.

Antennae nearly black; first abdominal segment with a smooth medial line.

7. *P. nebrascensis*

Antennae brown beneath; first abdominal segment without a smooth medial line.

8. *P. renimaculatus*

2. *Pseudopanurgus stevensi* Cwfd. Length 6 mm.; dull black, very finely and closely punctured; clypeus and lateral face marks about as in *innuptus*; labrum of male nearly three times as wide as long, yellow. This is smaller than the other species and quite dull, not at all shining. It was described by Crawford (5) in 1932 after long consideration as to whether it was identical with *P. parvus* Rob. Lucca, Kathryn,

Nicholson, Valley City, New Rockford, Kenmare and Turtle Mts., July 8—Aug. 26, at false anise (*Agastache anethiodora*), thistle (*Cirsium undulatum*), fleabane (*Erigeron philadelphicus*), blue lettuce (*Lactuca pulchella*), wild bergamot (*Monarda fistulosa*) and prairie-clover (*Petalostemum purpureum*).

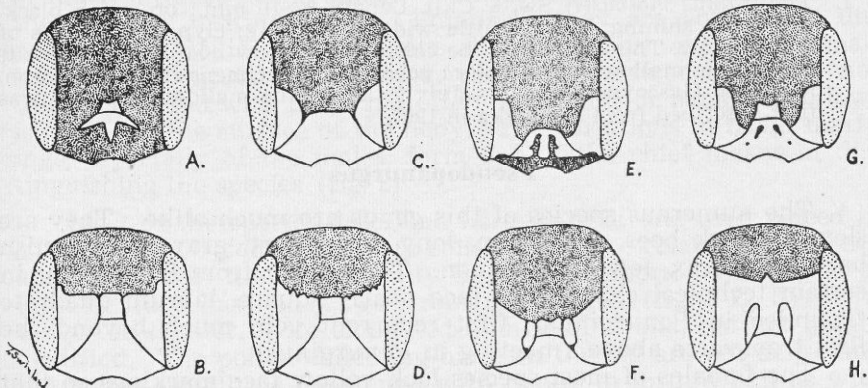


Fig. 2. Face markings of panurgine bees. A, *Pseudopanurgus renimaculatus*, female; B, male of same; C, *P. innuuptus*, male; D, *P. nebrascensis*, male; E, *Perdita bruneri*, female; F, male of same; G, *Perdita swenki*, female; H, male of same. Drawn by Thomas Swinland.

3. *Pseudopanurgus innuuptus* (Ckll.). Length 8 mm.; thorax somewhat shining, the punctures well separated; clypeus and rounded lateral spots yellow in male (fig. 2C), punctures well separated; first segment of abdomen strongly but not closely punctured; wings pale. This seems our most common species, represented by about 80 specimens from many localities all over the State, June 29—Sept. 5, at prairie dandelion (*Agoseris glauca*), purple coneflower (*Brauneria angustifolia*), cornflower (*Centaurea jacea*), *Gaillardia aristata*, gumweed (*Grindelia squarrosa*), sunflower (*Helianthus annuus, maximiliani, petiolaris, rigidus, rydbergii, tuberosus*), evening primrose (*Oenothera serrulata*), coneflower (*Ratibida columnifera*) and dandelion (*Taraxacum officinale*).
4. *Pseudopanurgus simulans* (Sw. & Ckll.). Similar to *innuuptus*, slightly larger; labrum of male yellow, the raised portion strongly narrowed; first segment of abdomen shining, not at all punctured in both sexes, but other segments finely punctured in male. Specimens mostly from Fargo, also Dickinson, Wales and Williston, July 26—Sept. 8, all at sunflowers except one from Wales on gumweed.
5. *Pseudopanurgus asteris* (Rob.). Length 6 mm.; thorax finely and closely punctured; first segment of abdomen shining, finely punctured in male; face of male with clypeus, labrum and rounded, lateral yellow marks, also a broad, low spot above clypeus; entire face closely punctured; wings dark. Taken only at Fargo on three occasions. Aug. 1—Sept. 8. Mr. Crawford identified two specimens and I had over a dozen more. It was found near woods visiting flowers of aster (*Aster paniculatus*), tall coneflower (*Rudbeckia laciniata*) and goldenrod (*Solidago canadensis*).
6. *Pseudopanurgus piercei* (Cwfd.). Length 10 mm.; thorax somewhat shining, closely punctured in male; first segment of abdomen shining, finely punctured in male; face markings of male as in *renimaculatus* (fig. 2B) but dark, wedge-shaped areas extending down between lateral and central marks. About 30 specimens from various localities, Aug. 11—Sept. 13 mostly at sunflowers and gumweed, one male at goldenrod (*S. rigida*). This is our largest species.

7. *Pseudopanurgus nebrascensis* (Cwfd.). Length 6—7 mm.; thorax of female shining, little punctured medially but rather closely at edges; thorax of male little shining, closely punctured; first segment of abdomen shining and faintly punctured in female, closely punctured in male; face of male yellow to base of antennae (fig. 2D) also lower side of scape of antennae; wings somewhat dusky. About 60 specimens, many localities, Aug. 3—Sept. 10, mostly at gumweed, also golden aster (*Chrysopsis villosa*), dodder (*Cuscuta gronovii*), *Eriogonum annuum*, prairie-clover (*Petalostemum oligophyllum*) and goldenrod (*S. canadensis*).
8. *Pseudopanurgus renimaculatus* (Ckll.). Size of *innuptus*; thorax closely punctured, slightly shining; first segment of abdomen smooth and shining in female, closely punctured in male; female with a low yellow mark above clypeus and a 3-pronged mark on clypeus (fig. 2A); face of male yellow to base of antennae, but upper edge irregular (fig. 2B); scape of antennae yellow in front; wings pale. About 60 specimens, many localities, Aug. 3—Sept. 22, mostly at gumweed also aster (*Aster ericoides* and *paniculatus*, *Callistephus chinensis*), false aster (*Boltonia latisquama*) and sunflower (*H. petiolaris*).
9. *Pseudopanurgus labrosus* (Rob.). Two females, taken at Fargo, Aug. 19, 1923, on tall coneflower, were referred to this by Crawford and there is one more of the same lot. They resemble *asteris*.
10. *Psaenythia asclepiadis* (Ckll.). Length 10 mm.; black with few, short hairs; rather closely and coarsely punctured; wings smoky, with 3 submarginal cells, the marginal obliquely truncated at tip; female with a 3-lobed yellow mark on clypeus, male with face yellow to base of antennae; legs of male largely yellow. Two females from Minot, Aug. 22 at prairie-clover, were identified by Crawford. There are also 3 females from Marmarth, July 4, also on prairie-clover and 4 males from the same place, taken on *Astragalus gracilis* in the early evening. This bee has usually been called *Protandrena*, but Michener (8) includes it in *Psaenythia*. It is somewhat larger than our species of *Pseudopanurgus* and differs by having three submarginal cells in the wing. The female carries pollen in a compact ball as in *Pseudopanurgus*.

### Calliopsis

The species of this group are less slender, less black and more hairy than those of *Pseudopanurginus*. We have one species which is common and two others which are apparently uncommon.

11. *Calliopsis coloradensis* Cress. Length 9 mm.; black, closely and finely punctured on both thorax and abdomen; thorax well covered with short, gray or yellowish hairs, few on abdomen but that of female distinctly banded; face of female with yellow lateral marks, a T-shaped mark on clypeus and spot above; face of male all yellow below antennae, lateral marks sloping upward toward eyes; feet and tibiae of male pale yellow; eyes greenish. This is a common bee, especially at gumweed, July 27—Sept. 11. Also taken at golden aster (*Chrysopsis villosa*).
12. *Calliopsis nebrascensis* Cwfd. Similar to *coloradensis*, the body more shining, less closely punctured; female with greenish yellow face markings, short lateral spots and a transverse band across clypeus; male with yellow clypeus and lateral spots which run to a slender point next the eyes; legs of male all dark. Taken only at Valley City, July 26, at vervain (*Verbena hastata*). Several specimens were identified by Crawford.
13. *Calliopsis andreiformis* Sm. Similar to *coloradensis*; yellow marks on face of female; rectangular lateral, long vertical on clypeus, a rounded one above and a smaller one on each side between others; face of male all yellow to above antennae, lateral marks tapering but wide at top; legs of male all lemon yellow. Three or four of these were taken

at Fargo, June 28—Sept. 11, at sweet clover, wild buckwheat (*Polygonum convolvulus*) goldenrod (*S. canadensis*) and tamarix (*T. pentandra*); a pair at Marmarth, July 4, 1949 at blue lettuce (*Lactuca pulchella*). It is a common bee farther east and south and the first species of the genus to be described in 1853. In Nebraska it has been found to be one of the regular visitors to alfalfa flowers.

### Perdita

This is an interesting group found only in North America and most abundantly in the southwestern states. It was first named in 1853 by the noted British hymenopterist, Frederick Smith. He knew only one species. When Prof. Cockerell came to New Mexico in 1893, he found these bees most interesting. At that time only 17 species had been described. By 1896 (1) he had added 55 more and in 1911 (2) listed 132 species. Many have been described since that date.

They are small bees, our largest one only about  $\frac{3}{8}$  in. long. Some are mostly yellow. Many are marked with yellow cross-bands or spots on the abdomen. The thorax is often greenish or blackish, thinly hairy and without significant markings. The very short, truncate marginal cell in the wing (fig. 3C) makes them easy to distinguish from other bees. The tongue is slender, fairly long for a small bee. The hind tibia of the female is sparsely covered with hairs which serve to hold the small ball of pollen moistened with honey. In 1896 Prof. Cockerell stated that their nesting habits were unknown. They are found mostly where the soil is sandy. Their visits to flowers are largely confined to certain plants or to a few related species. The flight period is chiefly in July and August. Distinctions between species are made largely on size and color markings, especially the markings on the face.

14. *Perdita canadensis* Cwfd. This is our largest species, about 9 mm. long. The wings are very pale ("milky"); abdomen of male black, edges of segments brownish enough to form a noticeable band; abdomen of female with bands of yellow, that on the first segment divided into two large spots. The face is dark in both sexes. In about half of my specimens the female has a trace of yellow on the clypeus and at the sides of the face.

Localities represented are: Dickinson, Medora, Slope Co., Pleasant Lake, Sheldon, Tappen, Washburn and Williston; July 2—Aug. 28. By far the most specimens were taken on *Helianthus petiolaris*, which is the predominant sunflower where the soil is very sandy. *H. annuus* and *rigidus* are represented, also blue lettuce (*Lactuca pulchella*).

15. *Perdita albipennis* Cress. One female from Mott has been verified by Timberlake. There is also a pair from Washburn on coneflower (*Ratibida columnifera*). The male has the lower fourth of the face yellow, the female similar but the color broken up into 5 spots—a vertical line on the clypeus, a pair of spots at the sides of this and another pair just above them. Further observations are needed to show whether the coneflower is the usual plant for this bee. Cockerell (3) questioned whether *canadensis* and some other named forms are not merely forms of *albipennis*.
16. *Perdita octomaculata* Say. Two males from Mott, collected by C. N. Ainslie, one verified by Timberlake. This species is one of the few found in eastern U. S. The thorax is dark green; abdomen brownish with 3 or 4 pairs of narrow, well separated yellow spots; clypeus and two, elongated spots next the eyes yellow.



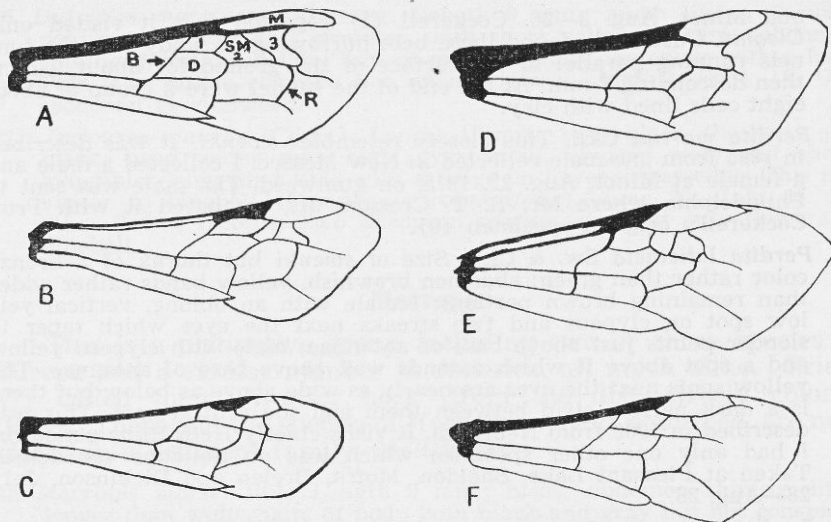


Fig. 3. Forewings of various bee genera. A, *Apis*, honeybee; B, *Andrena*; C, *Perdita*; D, *Megachile*; E, *Halictus*; F, *Pseudopanurgus*. Parts most often referred to are: m, marginal cell; sm, submarginals, 1, 2, 3; d, discoidal cell; b and r, basal and second recurrent veins. Drawn by Thomas Swinland.

17. *Perdita maura* Ckll. Two females from the sandhills near Sheldon, June 18, 1921, and Aug. 20, 1949, both on sunflower. The body is nearly black with 3 pairs of very small yellow spots on the abdomen. No others have such a dark color nor have been taken so early in the season. Dr. P. H. Timberlake has identified this specimen as *Perdita maura*, described in 1901 from Nebraska. It ranges eastward to eastern Wisconsin and Indiana, west to Colorado, usually visiting flowers of groundcherry (*Physalis*). It may prove fairly common when groundcherry flowers are watched for it. It flies from mid-summer to late fall according to observations in other states.
18. *Perdita bruneri* Ckll. This seems the commonest of all. It is about 8 mm. long, dull greenish on thorax and four light yellow bands on abdomen; clypeus of the female yellow but with two dark marks like parentheses (fig. 2E); two narrow lines next the eyes yellow but no spot above clypeus; male with a yellow spot above clypeus and from there to eyes somewhat higher up (fig. 2F). Dates are Aug. 6—Sept. 5. Many localities are represented including Fargo where I have suspected the nests may have been brought in gravel. The commonest flower on which they were found is gumweed (*Grindelia*). Others are *Cleome serrulata*, *Eriogonum annuum*, sunflowers, sweet clover and goldenrod.
19. *Perdita swenki* Cwfd. Very similar to *bruneri* but slightly smaller. Female with a yellow spot above clypeus and black spots on clypeus short, heaviest at top (fig. 2G); yellow on face of male straight across the face, slightly above base of antennae (fig. 2H). It is apparently less common than *bruneri* and was taken most abundantly at golden aster (*Chrysopsis villosa*); also at *Eriogonum annuum*, sunflower and goldenrod. Aug. 11—21.
20. *Perdita zebrata* Cress. A small species, about 6 mm. long. Markings much as *bruneri* and *swenki*. The female has a transverse spot above the clypeus, the male a pair of small spots between this mark and those next the eyes. The thorax is very smooth and shining. This was collected only at flowers of *Cleome serrulata* at Cannon Ball, Medora

and Minot, Aug. 3—20. Cockerell (1) reported that it visited only *Cleome*. Custer (6) found these bees burrowing in sandy soil, the tunnels running parallel to the surface of the ground for about 9 mm., then descending 7 mm. At the end of the tunnel were a group of about eight cells lined with clay.

21. *Perdita martini* Ckll. This closely resembles *swenki*. It was described in 1895 from one male collected in New Mexico. I collected a male and a female at Minot, Aug. 22, 1915, on gumweed. The male was sent to Philadelphia where Mr. E. T. Cresson, Jr., compared it with Prof. Cockerell's original specimen (9).
22. *Perdita laticincta* Sw. & Ckll. Size of *swenki* but thorax of a bronze color rather than green; abdomen brownish, yellow bands rather wider than remaining brown portions; female with an oblong, vertical yellow spot on clypeus and two streaks next the eyes which taper to slender points just above base of antennae; male with clypeus yellow and a spot above it which extends well above base of antennae. The yellow spots next the eyes are nearly as wide above as below but there is a dark narrow strip between them and the central spot. This was described in 1906 from Nebraska. It visits chiefly *Helianthus petiolaris*. I had only one other specimen which was on *Solidago canadensis*. Taken at Pleasant Lake, Sheldon, Moffit, Breien and Dickinson, July 28—Aug. 28.
23. *Perdita tridentata* Stevens. Size of *laticincta* but darker colored. Thorax greenish brown, abdomen brown with very narrow bands; male with a 3-pronged, yellow clypeal mark—a rounded lobe in middle and a narrow pointed one along each side on upper edge; also a small spot above the clypeus, usually divided into two spots, and a triangular spot next each eye. The face of the female is all brown. I described this in 1919 from Pleasant Lake (9) and later found it at Moffit, Sheldon and Slope Co., July 2—Aug. 28. It is another *Helianthus petiolaris* bee—one specimen from *H. rigidus*. Timberlake (10) recognized specimens of this in material from Kansas which had been collected in 1901.
24. *Perdita citrinella* Graen. As indicated by the name, this is a lemon-colored bee. It is slightly larger than *tridentata*, hardly as large as *bruneri*. Female with 2 or 4 spots or streaks of brown on upper part of face; male usually with larger spots; basal edges of the abdominal segments brown. In some specimens the thorax has brown spots in several places.  
This was described in 1910 from Wisconsin. It seems a fairly common species, visiting chiefly flowers of prairie-clover (*Petalostemum*). I had it from Minot, Granville, Steele, Washburn and Price on *Petalostemum oligophyllum*; also on sweet clover (*M. alba*) at Washburn and at St. Cloud, Minnesota, on *Petalostemum purpureum*. Dates are July 8—Aug. 22.
25. *Perdita perpallida* Ckll. This is similar to *citrinella* but is of a very pale yellowish color. July 13—Aug. 21, chiefly on *Petalostemum villosum* at Sheldon. One specimen each from Steele and Amidon on *P. oligophyllum*. It was first described in 1901 from the sandhills of Nebraska.

### Dufourea

Our species of this group have long been known as *Halictoides*, meaning similar to *Halictus*. Michener (8) puts them in *Halictidae* rather than *Andrenidae*. *Dufourea* is named for Leon Dufour, a noted early French entomologist. Friese (7) described the nests as similar to those of *Andrena*. The females evidently collect dry pollen, not moistening it to form a ball. These bees resemble our species of *Pseudopanurgus*, but the marginal cell is pointed.

26. *Dufourea marginatus* (Cress.). Length 9 mm.; much like a *Pseudopanurgus*; thorax dull granular, with short yellowish hairs; abdomen shining, faintly punctate; face of male all black, antennae rather long. This is a rather common bee on sunflowers, Aug. 9—Sept. 18. One specimen at gumweed.
27. *Dufourea maurus* (Cress.). Length 10 mm.; very black, the hairs also black; head wider than high, eyes small, clypeus wide and short, mandibles long; hind tibia with a bulge on lower, inner edge. This is a visitor to bluebell (*Campanula rotundifolia*), June 30—July 25. No other flower records. Two European species also visit only flowers of bluebell.

### Macropis

This is a distinctive group including two or three species in Europe and a similar number in America, all much alike. Friese (7) called them "trouser bees" from the distinctively colored tibiae. These and the species of *Hesperapis*, next described, are now placed in a different family, *Melittidae*.

28. *Macropis morsei* Rob. Length 8 mm.; black, abdomen shining, little longer than wide; hairs of body both black and gray but not conspicuous; hind tibiae of female covered with long white hairs, the middle ones also whitish; first joint of foot broad as in honeybee; male with clypeus yellow, hairs of tibia gray but not conspicuous.

These bees also moisten the pollen to form a ball. They seem short and stubby in form and the white tibiae are conspicuous. The abdomen is smooth and shining with few hairs above but with long hairs below, almost as in leaf-cutter bees. They visit consistently species of loosestrife (*Lysimachia*) for pollen. Friese records that they also visit raspberry, cow parsnip and thistle. I found them on dogbane (*Apocynum androsaemifolium*), blue lettuce (*Lactuca pulchella*), evening primrose (*Oenothera strigosa*), wolfberry (*Symphoricarpos occidentalis*) and dandelion. It is a midsummer bee, June 26—July 26.

### Hesperapis

This name means eveningbee but I am not aware of its significance. It was described in 1898 from southwestern U. S. where there are a number of species. Michener (8) states that it is well represented in South Africa. It was a great surprise to find a species in North Dakota (9).

29. *Hesperapis carinata* Stevens. Length 13 mm.; thorax and legs well covered with short, tawny hairs; abdomen black, distinctly banded with gray hairs; male with no yellow on face; marginal cell pointed, first submarginal long, first recurrent nervure only slightly beyond first submarginal cell, stigma poorly developed. This is a sunflower bee of late summer. It was taken a number of times in the sand dune area in northern Richland County, Aug. 10—30. The only females were taken Aug. 30 and one seems to have moistened pollen formed into a ball.

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#### CORRECTION

Two errors in the article on *Andrena*, Vol. XII, No. 1, were: Page 19, next to last line in No. 25, should read "series is" in place of "species are".

Page 22, the record for Slope County under No. 55, should have been under No. 54, *Andrena haynesi*.

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#### NORTH DAKOTA WINTER RYE

North Dakota's winter rye acreage of 279,000 acres seeded the fall of 1949 was about six per cent over the previous year but still far below the 679,000 acres for the 10-year average, says C. J. Heltemes, USDA statistician at Fargo. He believes dry weather in the fall cut winter rye plantings. While North Dakota ranked first in rye production in the nation in 1949, our 1949 fall seeding was third, being exceeded by South Dakota and Nebraska, where fall planting was increased 40 and 12 per cent respectively.

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#### 1949 PIG REPORT

Eleven per cent more pigs were raised in North Dakota in 1949 than in 1948, according to the USDA bureau of agricultural economics. The combined spring and fall crops amounted to 855,000 head, compared with 767,000 in 1948 but still significantly below the 10-year average of 1,044,000. Iowa led the nation in 1949 with over 19 million head, followed by over 10 million in Illinois.