

NATIVE BEES

By O. A. Stevens

This article will deal with only the genus *Andrena* which has the most species of all the genera, especially in northern, cool, temperate regions. In size they range from quite small to larger than a honeybee. Some species have the whole body well covered with hairs; in others the abdomen is mostly bare or with only fringes on the edges of segments. They are most abundant during spring and are important for pollination of flowers of fruit bearing plants.

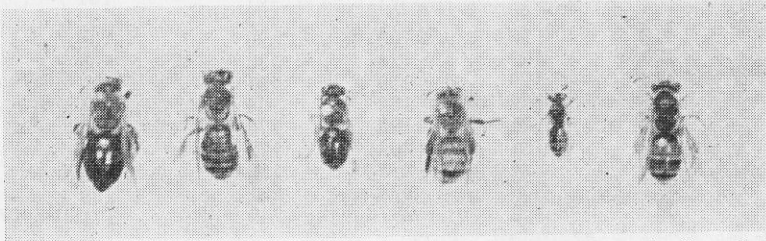


Fig. 1. Females of different species of *Andrena*, natural size. Left to right: *Andrena lupinorum*, *helianthiformis*, *grandior*, *hirticincta*, *illinoensis*, *prunorum*. Photo by Don Nelson.

These are short-tongued bees. The tongue is triangular, about one-third the length of that of leaf-cutters or other long-tongued bees of similar size. The fore wing has three submarginal cells, the basal nervure is straight and the marginal cell is pointed. (Fig. 2B). Pollen is collected on the hind legs but largely near the body.

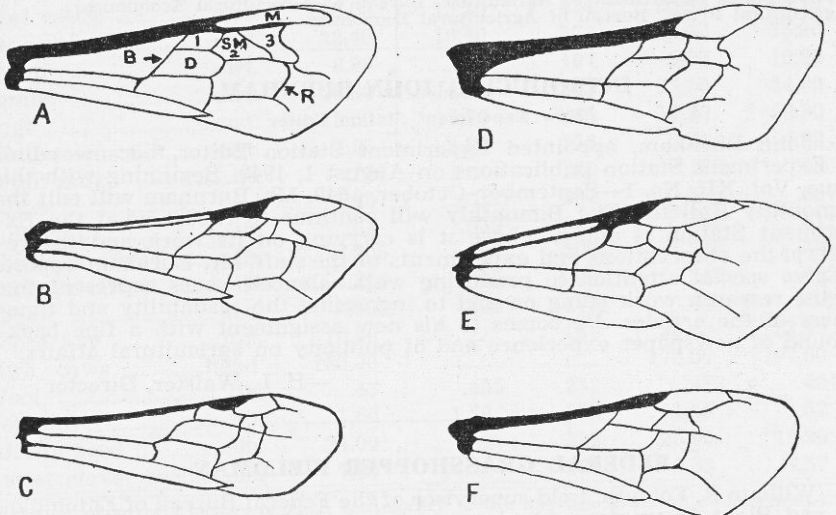


Fig. 2. Forewings of various bee genera. A, *Apis*, honeybee; B, *Andrena*; C, *Perdita*; D, *Megachile*; E, *Halictus*; F, *Pseudopanurgus*. Parts most often referred to are: m, marginal cell; sm, sub-marginals, 1, 2, 3; d, discoidal cell; b and r, basal and second recurrent veins. Drawn by Thomas Swinland.

Friese (2) called them "sand bees." However, they are abundant at Fargo where the soil is clay or silty clay with no natural sand whatever. The females of some species are reported to nest in colonies, others singly. They prefer thinly grassed slopes rather than bare ground. On account of these habits, nests are not readily found and we know little about their nesting. I have sometimes gone to look for nests when the bees were visiting the willow blossoms in numbers but had no success.

Friese described the nest as a tunnel in the ground, 8 to 12 inches long, with the cells as side branches near the end of the main tunnel. He states that in southern Europe, some species have two generations a year. Cockerell (1) stated that little had been recorded about a second brood in American species. He mentioned a number of the North Dakota species in connection with general notes on distribution and habits.

The seasonal distribution of the species is limited, both in time and kind of flowers visited. Many species visited only one kind of flower or a few closely related kinds. The period of flight is short, especially for those which are limited to a certain flower. Figure 3 shows the flight period (extreme dates) for 24 species which are our more common ones according to present records. The average first appearance for the earliest species probably is about April 15 to 20. Males usually appear a few days in advance of the females.

The present records are based upon some 800 specimens identified by Mr. H. L. Viereck in 1917-20. Later collections are not included except for a few species. The early spring period seems to contain the largest number of species and comparatively little collecting has been done at that season in parts of North Dakota other than at Fargo. It is probable that we have at least 100 species in the State. In addition to those listed here the collection contained specimens of several undescribed species which are still in the collections of the Academy of Natural Sciences of Philadelphia, where Mr. Viereck was working at the time.

Accurate identification of the specimens is difficult because of the great number of species and the slight differences between them. No critical study of all North American species has been published, but reports on a few localities are available. A recent list from Boulder, Colorado (4) contains 64 species. Graenicher (3) listed 47 species for Milwaukee County, Wisconsin.

North Dakota seems to have a greater abundance of fall species than other places. The greatest number of species are found in May and June. The Boulder list has only 8.6 per cent of the species flying after June, while our records include 35 per cent for the same period. The lists from Germany (2) and Milwaukee County include 24 and 29 per cent respectively in the period July to September. The Milwaukee County records showed a decided scarcity of species in July while Figure 3 shows only a gradual shift in the seasons.

Early Spring Species

Willows are the chief attraction for this group and during late April and early May large numbers of *Andrena* and other insects may be found visiting the flowers. Buffalo berry is another popular early flower for them in western North Dakota. During the latter part of this period, wild plum, Juneberry, strawberry, gooseberry and other flowers are available. In reply to my comment that in some years the weather was unfavorable at the time when the bees should be looked for, Mr. Viereck stated that very few bees could be found some years on this account. The spring of 1910 was the opposite extreme here. The bees were flying by April 1 and the weather continued very warm and dry until the middle of the month. Nos. 1-8, especially 1-7, are common. Of Nos. 9-23, only a few specimens have been taken. Descriptions given here refer to females. The males are somewhat smaller.

1. *Andrena frigida cockerelli* Graen. Length 12 mm.; covered with long, gray hairs which stand out straight. The abdomen is less closely covered with hairs but on the whole it is a "fuzzy" bee as compared to most other species. Fargo, Grand Forks, Kulm and Dickinson, Apr. 10—May 14. Fairly common at willow. *A. frigida* was first described from Nova Scotia.
2. *Andrena mariae* Rob. Length 10 mm.; head and thorax black, abdomen all red or mostly red in female, usually mostly black in male; hairs gray but short, dense on thorax, few on abdomen. This species belongs to the subgenus *Trachandrena* and may be distinguished from *erythrogastra* by the ridges on the rear angle (propodeum) of the thorax. Fargo, Park River, Kulm, Cannon Ball, Marmarth, New England and Medora. Apr. 10—May 26. Quite common at willow, also at plum gooseberry and buffalo berry (*Shepherdia argentea*). Two specimens from Fargo, May 6 and 14 were referred to var. *concolor* (Rob.)
3. *Andrena dunningi* Ckll. Length 13 mm.; thorax densely covered with yellowish or tawny hairs, abdomen black with few hairs; under parts mostly with tawny hairs. A stout species of striking appearance because of the black, nearly bare abdomen. Specimens from only Fargo and from Moorhead, Minn., Apr. 10—May 31, at willow, waterleaf (*Hydrophyllum virginicum*), wild plum, bloodroot (*Sanguinaria canadensis*), snakeroot (*Sanicula marylandica*), dandelion and bellwort (*Uvularia grandiflora*).
4. *Andrena erythrogastra* Ashm. Similar to *mariae* but abdomen of male usually red. It belongs to the subgenus *Andrena* in which the hind angle of the thorax (propodeum) is granular, nearly smooth. In *mariae*, subgenus *Trachandrena*, this part is prominently ridged. Fargo, Park River, Jamestown, Turtle Mts., Medora, Apr. 10—June 11, at willow, anemone (*A. Canadensis*), choke cherry (*Prunus virginiana*), dandelion and meadow parsnip. (*Zizia aurea*).
5. *Andrena hippotes* Rob. Length 10 mm.; mostly black, thorax thinly short hairy, abdomen with traces of gray hair bands at sides; hind legs reddish. This also is a *Trachandrena*. The thorax between wing bases is strongly punctured, as also in *mariae*, while in the other three species just described the thorax is nearly smooth but dull. One of the most common early species, April 10—June 14, at willow, mustard (*Brassica compestris*), plum, buffalo berry, lilac (*Syringa vulgaris*), dandelion, Frenchweed (*Thlaspi arvense*) and meadow parsnip.
6. *Andrena illinoensis* Rob. Length 8 mm.; black with sparse gray hairs, these forming distinct bands on abdomen. This is a small slender species. The specimens are from the western part of the State though

it is a widely distributed species. Apr. 20—May 19, at willow and buffalo berry only. Graenicher (3) reported this species nearly as early as *frigida*.

7. *Andrena nigrae* Rob. Another small species, 8 mm. long, abdomen red or partly black, hair bands not well developed. Fargo, Park River and Jamestown, Apr. 21—June 2, only at willow.
8. *Andrena forbesi* Rob. Length 9 mm.; black with gray hairs, the abdomen lightly banded, mostly on last two segments. Six specimens at Fargo, May 7 to June 24, at flowers of willow, plum and meadow parsnip.
9. *Andrena andrenoides* (Cress.), Length 10 mm.; closely covered with gray hairs which form distinct bands on abdomen; fore wings with only two submarginal cells; male with clypeus and lateral face marks yellow, underside of antennae reddish. One male from Muskoda, Minn., 15 miles east of Fargo, Apr. 3, 1910, at pasque-flower (*Anemone patens*) was identified by Viereck. There is also a series of 12 males and 1 female from Sheldon, N. D., Apr. 27, 1934, at willow.
10. *Andrena moesta albihirta* (Ashm.) Length 10 mm.; thorax with long gray hairs, abdomen black except base. Two males, Cannon Ball and Dickinson, Apr. 15 and May 8 at willow.
11. *Andrena nigrihirta* Ashm. Length 10 mm.; black with sparse gray hairs, especially on abdomen, some black hairs on face of male. Fargo, and Kulm, Apr. 29—May 7, at willow and pasque flower.
12. *Andrena claytoniae* Rob. Length 11 mm.; thorax with short gray hairs, abdomen distinctly banded. One male, Fargo, May 9 at willow, 3 from Marmarth, Apr., 20 at buffalo berry. Also several of each sex from Sioux Falls, S. D., May 8 and 14 at cultivated plum.
13. *Andrena tacitula grossulariae* Vier. & Ckll. Similar to *grandior*. One female, Fargo, Apr. 23 at willow was referred to this by Viereck with a question. A note attached by Cockerell says "not *grossulariae*".
14. *Andrena clarkella* Kby. Length 13 mm.; thorax gray haired above, face, abdomen and underparts black haired, hind legs golden. Fargo, Grand Forks and Kulm, Apr. 25—May 12. Four females at willow. This occurs also in Europe where it is regarded as the earliest *Andrena* (hardly agrees with our records.)
15. *Andrena placida* Sm. Length 10 mm.; black with short, dense, gray hairs on thorax, abdomen strongly banded. One female, Park River, Apr. 23, 1910, at willow. Several of other species were taken at the same time.
16. *Andrena bisalicis* Vier. One male, Dickinson, May 9, C. H. Waldron, at willow. Females collected by C. H. Waldron in North Carolina are 9 mm. long; hairs yellowish, including legs; abdomen banded.
17. *Andrena imitatrix profunda* Vier. Similar to *claytoniae*. One female, Fargo, May 4 at willow and one from Mandan, May 5 at wild plum (*Prunus americana*).
18. *Andrena rugosa* Rob. Similar to *hippotes*. One female, Fargo, May 7 at willow.
19. *Andrena rufosignata* Ckll. Similar to *hippotes* in general appearance, but thorax not punctured and nearly smooth on rear angle. One female, Moorhead, Minn., May 8 at dandelion.
20. *Andrena carlini* Ckll. Resembles *dunningi* but hind legs and whole underparts black haired. Several from Dickinson and Medora, May 11-19; all by C. H. Waldron, mostly at flowers of currant and gooseberry (*Ribes odoratum* and *setosum*), one at willow and one at false Solomon's seal (*Smilacina stellata*).
21. *Andrena pruni* Rob. Similar to *dunningi*. Two males, Fargo, May 7 and 11 at buffalo berry and bloodroot.

22. *Andrena sigmundi* Ckll. Length 12 mm.; similar to *grandior*. One female, Fargo, May 13 at willow.
23. *Andrena nivalis* Sm. Very similar to *dunningi*. Three from Fargo and Moorhead, Minn., May 14—June 24, at flowers of gooseberry (*Ribes missouriense*), raspberry (*Rubus idaeus*) and snakeroot (*Sanicula marylandica*).

Early Summer Species

In late May and early June many species of flowers are in bloom. The bees are not so concentrated upon a few kinds, but often the species of bees are limited to one kind of flower. Nos. 24-31 are common, 32-42 rare according to present records.

24. *Andrena commoda* Sm. Length 13 mm.; thorax with short, yellowish hairs, abdomen black with few hairs, legs quite red. Fargo, Lisbon and Medora, May 19—June 30, mostly at meadow parsnip, also willow and sweet clover (*M. officinalis*).
25. *Andrena lincolni* Vier. & Ckll. Length 11 mm.; thorax with short gray hairs, abdomen banded mostly at sides, legs red except femora. One of the *Trachandrena* group. Fargo, Lisbon, Mandan and Medora, May 19—June 13, at plum, rose, willow and meadow parsnip. Apparently less common here than farther south. A larger species are represented from Sioux Falls, S. D., on plum.
26. *Andrena nasoni* Rob. Length 10 mm.; short tawny hairs on thorax and legs, very few on abdomen. Taken only at Fargo, May 18—June 14, at meadow parsnip.
27. *Andrena geranii* Rob. Length 9 mm.; bluish black with sparse, short, gray hairs, weak bands on abdomen. The bluish color of this species is unusual in our species. Fargo, also Moorhead and Detroit Lakes, Minn., May 28—June 21, mostly at waterleaf, also at *Anemone canadensis*, raspberry (*Rubus idaeus*), meadow parsnip and violet (*V. eriocarpa*).
28. *Andrena ziziae* Rob. Length 8 mm.; shining black with sparse, short, gray hairs, abdomen scarcely banded; clypeus of male pale yellow. Fargo, Valley City, Lisbon, and Turtle Mts., May 30—June 29, all at meadow parsnip except one specimen from Blue Rapids, Kans., at *Polytaenia nuttallii*.
29. *Andrena grandior multiplicatifomis* Vier. Similar to *lincolni*; abdomen less distinctly banded, legs dark. One of the commonest species. Fargo, Lisbon, Cleveland, Bismarck and Turtle Mts., June 4—July 13 at wild indigo (*Amorpha fruticosa*), mustard (*Brassica compestris* and *juncea*), dragonhead (*Dracocephalum parviflorum*), western wallflower (*Erysimum asperum*), cow parsnip (*Heracleum lanatum*), alfalfa (*Medicago sativa*), sweet clover (*Melilotus alba*), silverweed (*Potentilla anserina*), tall cinquefoil (*Potentilla arguta*), rose, snakeroot (*Sanicula marylandica*), water parsnip (*Sium suave*), goldenrod (*Solidago gigantea*), wild spiraea (*Spiraea alba*), wolfberry (*Symphoricarpos occidentalis*), dandelion (*Taraxacum officinale*) and meadow parsnip (*Zizia aurea*). The largest numbers of specimens are from meadow parsnip.
30. *Andrena idahorum* Vier. Length 13 mm., thorax with short, tawny hairs, abdomen black, with few hairs; legs dark with some pale, tawny hairs. Fargo and Detroit Lakes, Minn., June 14-25, at waterleaf, sweet cicely (*Osmorrhiza longistylis*), sumac (*Rhus glabra*), rose, wolfberry and meadow parsnip.
31. *Andrena thaspiae* Graen. Length 12 mm.; black with sparse gray hairs, abdomen faintly banded with rather long hairs. Only a few specimens but widely distributed: Fargo, Langdon, Mylo, New Rockford, Rugby,

Bowman and Detroit Lakes, Minn., June 17—July 14, mostly at wolfberry, also *Eriogonum flavum*, basswood (*Tilia americana*) and meadow parsnip.

32. *Andrena prunorum* Ckll. Length 13 mm.; head and thorax black with few, short hairs; abdomen black and red banded, a wide red band on second segment, also with prominent hair bands; clypeus and small lateral marks yellow in male. Missouri River westward, May 25—Aug. 4 at flowers of apple, sweet clover, prairie-clover and wolfberry. A very distinctive western species. It seems to have an unusually long flight period.
33. *Andrena cressonii* Rob. Length 12 mm.; hairs fairly long, very pale; abdomen prominently banded. One female, Jamestown, June 2 at western wallflower (*Erysimum asperum*).
34. *Andrena hitei* Ckll. Length 13 mm.; black below, thickly covered with bright red hairs above. Fargo, Lisbon and Muskoda, Minn., May 20—June 5 at meadow parsnip, waterleaf and black haw (*Viburnum lentago*). Three were found in the porch of my house, May 20, 1922 (another May 8, 1949). A very striking species.
35. *Andrena campanulae* Vier. & Ckll. Length 11 mm.; very black with sparse, short, gray hairs; abdomen faintly banded. Cavalier, Mandan and Marmarth, July 4-15, at flowers of bluebell (*Campanula rotundifolia*). One specimen is marked "metatype." The species was first described from Colorado and Nebraska in 1914.
36. *Andrena crataegi* Rob. Similar to *grandior*. One male, Fargo, June 12 at meadow parsnip. Two females, Detroit Lakes, Minn., June 17, at rose and wolfberry.
37. *Andrena perdensa* Vier. One female from Detroit Lakes, Minn., June 17 on meadow parsnip by C. H. Waldron, was labeled this with a question. Prof. Cockerell added a note that it is not that species.
38. *Andrena fragilis* Sm. One male, Fargo, June 17, at flowers of sweet cicely (*Osmorrhiza longistylis*).
39. *Andrena obscura* Rob. Close to *grandior*. One female, Cleveland, July 13 at tall cinquefoil (*Potentilla arguta*) and a male, Fargo, June 24 at meadow parsnip.
40. *Andrena auricoma* Sm. One male, Fargo, June 24 on meadow parsnip, was labeled "near *auricoma*."
41. *Andrena protuberans* Mall. One male, Rugby, July 7 at mustard (*Brassica arvensis*) was referred to this species by Viereck but Cockerell has marked it "not."
42. *Andrena persimulata* Vier. One female, same record as last. It is a small species with narrow, abdominal hair bands.

Late Summer Species

After mid-July, asters, goldenrods, gunweed and other composites are the predominating flowers. These are much alike in structure and the bees are not closely restricted to a particular species unless it happens to be the main one at the time and place of their flight. Nos. 43-50 are common, 51-58 rare so far as now known.

43. *Andrena lupinorum* Ckll. Length 15 mm.; head and thorax densely covered with short, red hairs, abdomen black with few hairs, legs black. Many localities, chiefly western half of State, July 4—Aug. 15, at lead plant, *Eriogonum flavum*, sweet clover, prairie-clover, butte candle (*Plagiobothrys bradburiana*), scurf pea (*Psoralea lanceolata*) and wolfberry. This is a large, striking species, the red-haired thorax contrasting with the shining black abdomen. One Fargo specimen might be considered as having been introduced with gravel ballast but there is another from Union in southeastern Cavalier County.

44. *Andrena runcinatae* Ckll. Length 10 mm.; black with moderately abundant gray hairs and distinct abdominal bands; thorax with black hairs between wing bases. Many localities west to Mandan, July 3—Sept. 6, chiefly at prairie thistle (*Cirsium undulatum*) and blue lettuce (*Lactuca pulchella*); also at prairie dandelion (*Agoseris glauca*), gumweed (*Grindelia squarrosa*), coneflower (*Ratibida columnifera*) and wolfberry. Only females were seen by Mr. Viereck, but there is one male, July 4, 1920, which seems to be this species.
45. *Andrena integra* Sm. About 20 males of this were represented. The lack of females suggests that they may belong with those of some other species. They are 8-9 mm. long with faint abdominal bands; head wider than high. Taken mostly at Fargo, also at Lakota and Monango, July 3—Sept. 3, at gumweed, sunflower (*H. maximiliani*), blue lettuce, sweet clover (*M. alba*) obedient plant (*Physostegia parviflora*), goldenrod (*S. canadensis*) and dandelion.
46. *Andrena nubecula* Sm. Length 8 mm.; smooth, somewhat shining black; thorax with few hairs but abdomen strongly banded, the hairs slightly yellowish; wings smoky at tips. A striking species because of the abdominal bands and smoky wings. Fargo, only, mostly at goldenrod. (*S. canadensis*) Aug. 20-26, 1917; one specimen each on *Solidago gigantea* and tall white aster (*A. paniculatus*).
47. *Andrena canadensis* D. T. Length 9 mm.; black, thorax quite smooth and shining; abdomen with prominent bands of gray hairs. Slightly larger and rougher appearing than *nubecula*, wings clear. Taken at Fargo but mostly farther west: Mandan, Mott, Sentinel Butte, Crary, Devils Lake, Pleasant Lake, Williston and Schafer, Aug. 8—Sept. 6, at gumweed and goldenrod. (*S. Canadensis*).
48. *Andrena hirticincta* Prov. Length 12 mm.; entirely covered with rather long, greenish yellow hairs; bases of abdominal segments with the hairs fewer and more erect, so that there are wide hair bands. One of the common fall species, easily recognized by its thick covering of greenish yellow hairs. All over the State, Aug. 7—Sept. 17, mostly at gumweed, also asters (*A. ericoides* and *paniculatus*), *Boltonia*, sweet clover and goldenrods (*S. canadensis*, *flexicaulis* and *rigida*).
49. *Andrena helianthi* Rob. Length 13 mm.; thorax densely covered with tawny hairs, abdomen smooth, nearly bare, a few hairs at tip and faint suggestions of bands. The male has the clypeus yellow with two small, black dots and the abdomen more distinctly banded. This is a common sunflower bee, all over the State, Aug. 2—Sept. 13; single specimens from gumweed and goldenrod (*S. canadensis* and *rigida*).
50. *Andrena clypeonitens* Ckll. Length 10 mm.; much like *canadensis*, but thorax dull. Fargo, Jamestown, Lakota, Perth, Crary, Devils Lake and Rugby, Aug. 13—Oct. 1, mostly at gumweed; also aster (*A. ericoides* and *paniculatus*), *Boltonia*, sunflowers (*H. annuus*, *maximiliani*, *rigidus*, *tuberosus*), sweet clover, goldenrod (*S. canadensis*) and dandelion. Only females are represented by about 30 specimens, which suggests that these might be *A. integra* Sm. Mr. Viereck had determined these as *A. apacheorum* Ckll. but Dr. Timberlake advises me that they are *clypeonitens*. Graenicher reports this as flying relatively earlier at Milwaukee, July 26—Aug. 20.
51. *Andrena robertsoni* D. T. Length 10 mm.; moderately shining black with few hairs, but abdomen distinctly banded; clypeus of male yellow. This is really a mid-summer species. It has been taken only at Fargo, June 19—July 1, at sumac (*Rhus glabra*). One specimen from Whiting, Kansas, was on wild indigo (*Amorpha fruticosa*).
52. *Andrena helianthiformis* Vier. and Ckll. Length 15 mm. similar to *helianthi*, but body dull, strongly punctured; bands of abdomen narrow but distinct. It flies earlier than *helianthi* and visits purple cone-

flower (*Brauneria angustifolia*). Minot, Mott and Marmarth, July 4-25. A large series was taken at Blue Rapids, Kans., also on purple coneflower. The species was first described from Montana in 1914.

53. *Andrena grindeliae* Vier. Similar to *canadensis*. Pleasant Lake, Aug. 11 on goldenrod (*S. canadensis*). One specimen, labeled "paratype."
54. *Andrena haynesi* Vier. & Ckll. Length 15 mm.; similar to *helianthi*; abdomen dull but not punctured. Four females from the sand hills near Sheldon, Aug. 28 and 30 on sunflower (*H. petiolaris*). First described from Nebraska in 1914.
55. *Andrena asteris* Rob. Much like *helianthi*, hairs nearly gray, abdominal bands narrow but distinct. Three females, Medora, Aug. 30, on goldenrod (*S. rigida*) and one, Sheldon, Aug. 28. Both sexes were found on sunflower and purple coneflower in Slope County, July 4, 1949. One has 4 sub-marginal cells in one wing by a nervure vertical from the angle of the last one.
56. *Andrena colletina* Ckll. A pair from Schafer, Sept. 6 on goldenrod (*S. canadensis*). Much like *hirticincta* but the female is 15 mm. long.
57. *Andrena pertarda* Ckll. Much like *hirticincta*. One from Schafer, Sept. 6 on broomweed (*Gutierrezia sarothrae*) and one from Mandan, Sept. 6 by P. W. Fattig.
58. *Andrena chromotrichia* Ckll. One from Fargo, Sept. 15; retained in Mr. Viereck's collection.

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4. Lanham, Urless N. Bees of the genus *Andrena* of Boulder, Colorado. Ann. Ent. Soc. Am. 34:702-718. 1941.

NEW SEED FARM OBTAINED

"Another milestone in the agricultural progress of North Dakota," says NDAC experiment station Director H. L. Walster, in referring to the gift of a 435½ acre farm at Casselton, N. D., to the college as a seed farm. Donors are the North Dakota Crop Improvement Association and the hundreds of farmers and businessmen whose contributions made the purchase possible. Donors raised \$107,114 about half of it being for the land (at \$125 per acre) and the balance to pay for building construction, machinery and other expenses connected with placing the farm in shape as a unit for producing and increasing quality field seeds. The tract and its operation will be administered by the NDAC experiment station.

DAIRY CATTLE BREEDS

Dairymen, county agents, agriculture teachers, club leaders and dairy plant operators all will find interest in "Dairy Cattle Breeds," the USDA farmers' bulletin No. 1443. This is a 1949 revision of old bulletin No. 893 issued in 1925. Those still using the older bulletin should discard it in favor of No. 1443. It may be obtained by writing Superintendent of Documents, U. S. Government Printing Office, Washington 25 D. C. Price is 10 cents. The bulletin is desirable because it includes 1948 statistics. It deals primarily, however, with what it terms the five major breeds of dairy cattle—Ayrshire, Brown Swiss, Guernsey, Holstein-Friesian and Jersey. This will seem an incomplete tabulation to North Dakotans, who have great pride in fine herds of Milking Shorthorns and Red Polls, both dual-purpose breeds shown in local and state dairy shows.