PEAT DEPOSITS IN THE ROCKY MOUNTAINS*

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The Rocky Mountain area is not indicated as a region of peat formation in the most recent map of peat deposits in the United States. (1) This is doubtless due to the lack of formal accounts in the literature, since the existence of the boggy areas is a matter of common repute among naturalists who know the Rockies. Elsewhere in the world, mountains are a prolific source of peat. Phytogeographically this is to be expected from their character as extensions of arctic and boreal conditions. Ecologically, it is inevitable from the youthful, often glaciated physography, low temperatures, short growing seasons, and fairly abundant moisture of high altitudes.

The writer has personally examined numerous deposits in southern Wyoming, just west of Laramie, as well as a very deep deposit on the shores of Utah Lake, at Provo, Utah. In addition he has direct information of deposits in Idaho and in the Leadville-Gunnison region of Colorado. There is every reason to believe that peat occurs throughout the Rockies, constituting a huge volume in the aggregate.

Through the courtesy of the Mountain Laboratory of the University of Wyoming it has been possible to study a group of bogs in the Medicine Bow Mountains and vicinity. The area worked centers about the Snowy Range, some 40 miles west of Laramie, and covers an area approximately 50 miles in diameter. The deposits studied are mostly above 9,000 feet in elevation.

Three principal types of bog have been found, as follows:

(1) Those due to the filling of moraine-dammed lakes in recently glaciated valleys.

(2) Those due to damming by beavers.

(3) Those due to seepage at the upper contact of impervious rock strata.

While varying in details and stratigraphy and petrography, these various types of deposit all exhibit a tendency to form convex domes. This feature of morphology indicates their affinity with the raised bogs to the north, rather than the so called "flat bogs" which occur eastward, along the same latitude, in Ohio and Michigan.

For the most part the water of these bogs is well supplied with calcareous salts at least during the initial stages. In consequence the peat is largely of the eutrophic type, only varying toward the strongly acid oligotrophic condition in late stages, if ever.

Marl generally forms until the great excess of calcareous material is deposited, when it gives way to algal ooze or jelly. This slowly becomes darker from the humus of vascular plants, and finally is overlain by sedge and moss peat, generally decomposed. Sphagnum is rare but occurs in spots. Some layers of ooze are very rich in diatom remains. In seepage bogs the formation of marl and ooze is not so conspicuous as in lakes, cushions of peat forming and growing directly in the seepage zone. The bogs may be ultimately invaded by dwarf willow and birch, along with numerous wet meadow plants and dwarf specimens of Engelman spruce, strikingly like black spruce of the northern bogs. Secondary pools may develop on the convex surface of mature bogs, reinitiating a miniature lake succession with ooze. Sluggish drainage lines may form across the surface, cutting down through the peat and lowering its water content.

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In a given valley all stages of bog formation may be seen in a chain of lakes. The rate of change depends not on the relative age of the lakes, so much as their depth and the character of the moraine dam. The latter may aggrade or be cut through and thus delay or speed up drainage.

Bogs due to seepage or beaver work tend to spread, while those formed in glacial lakes as a rule do not, once the basin is filled.

An especially interesting feature is the presence of laminations in some of the peat. As in the case of Erie Basin peat studied by the author, (2) this appears to be due to an alternation of dead sedge leaves and

Figure 1

1. General view from top of Snowy Range, Wyoming showing part of system of moraine-dammed lakes.

2. Peat bed in a moraine-dammed lake, near Carbon-Albany county line, Wyoming. 10,500 ft. elevation. Note lake remnant near moraine in rear, and convex peat bed at left.

3. Silver Lake, Wyoming. 10,300 ft. elevation. Raised bed of peat formed in seepage at rear. Sedges invading lake to form peat in foreground.

4. Old peat bed 200 ft. below fig. 2. Moraine in rear. Convex areas, secondary lakes and erosion channels visible.

5. Sloping, convex peat—part of a series of beds formed behind successive beaver dams. Hayden National Forest, Wyoming.

6. Ancient beaver dam showing peat formed above the beaver cut sticks. Hayden National Forest.

7. Clumps of sedge and rush between which algae grow in summer, to be covered by dead leaves in winter, giving rise to lens-formed annual layers.

8. Dry laminated peat from a depth of 2-3 ft. showing cracks along the irregular annual laminations. Hand lens shows fairly regular thickness of about 1/10 inch for these short laminae.

algal jelly. The sedge leaves of a preceding season are overgrown by algae in spring and summer. In winter dead sedge leaves fall over the algal remains. Such layers are lensiform rather than strictly horizontal—never continuous. Yet they may be measured and their mean thickness approximated. A series of such measurements suggests an annual increment of about ⅛ to 1/12 of an inch—roughly, an inch represents 10 years. Since these deposits are often frozen a few feet below the surface, even in mid-summer, it is unlikely that much compression occurs, nor were any indications of it found in older laminated peat.

SUMMARY

Small peat deposits occur at high elevations over a wide area in the Rocky Mountains. Those examined are the result of damming by moraines or beavers, or of seepage. They develop under conditions of good mineral nutrition as a rule and tend to assume a convex form. Laminations studied indicate a growth rate of about 10 years per inch.

REFERENCES

1. Dachnowski-Stokes, A. P. Research in regional peat investigations. Journ. Amer. Soc. Agron. 22, 4: 352-366. 1930.

2. Sears, Paul B. and Janson, Elsie. The rate of peat growth in the Erie Basin. Ecology. 14, 4: 346-355. 1933.

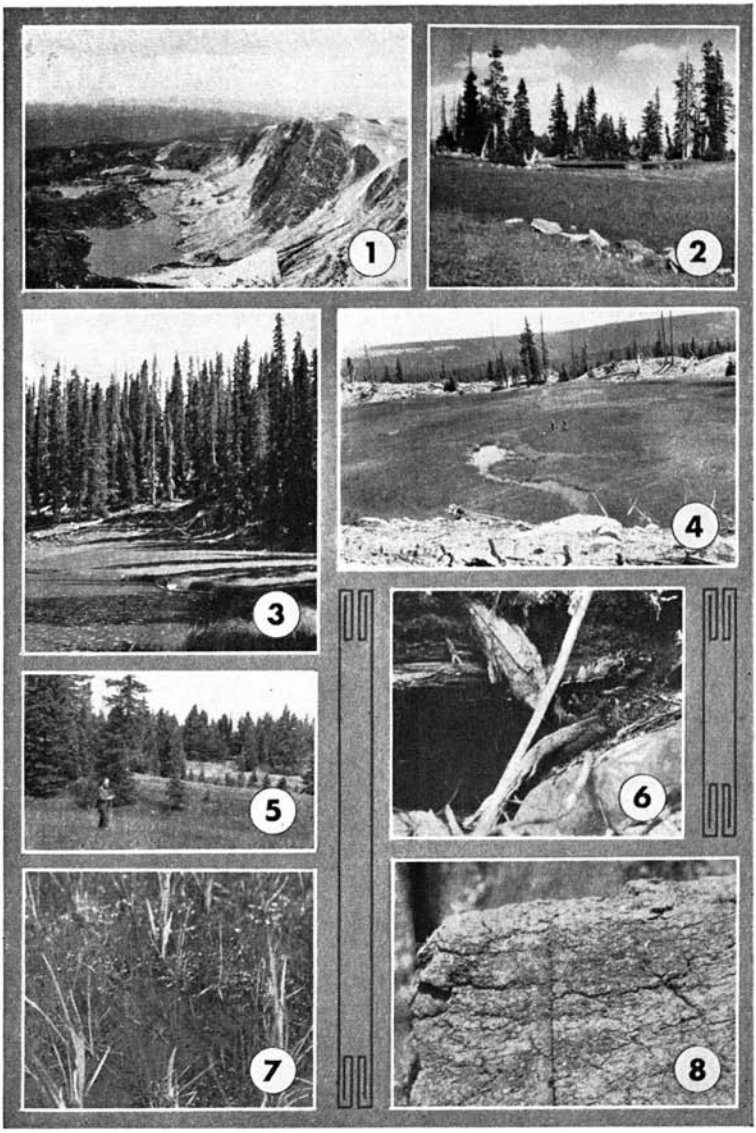

Figure 1