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INDEPENDENCE Mt.

GEOLOGY.—*Supplementary notes on Pleistocene glaciation in the Great Basin.*¹ ELIOT BLACKWELDER, Stanford University.

Since the publication of my paper on the glaciation of the Sierra Nevada and Basin Ranges,² I have extended my studies among the ranges of Utah, Nevada, and eastern California. The results, so far as they concern glaciation, are here presented.

Stansbury Range, Utah.—A view from Grantsville affords clear evidence of glaciation near Mt. Deseret (10,250 feet). The topographic forms show that several glaciers occupied canyons in the eastern slope, probably during the Tahoe glacial stage, and descended about half way to the base of the range, leaving moraines of considerable size in the bottoms of the valleys. It seems probable also that the cirques made at that time were refreshed by glacierets during the later Tioga stage. Marsell,³ who has climbed Mt. Deseret, confirms this opinion and adds the information that several tarns were found in the cirques.

Oquirrh Range, Utah.—According to Marsell, Mt. Lowe (10,200 feet) formerly had glaciers on its eastern slope. The freshness of the cirques indicates the Tioga as well as the Tahoe stage.

Deep Creek Mountains, Utah.—This short range on the western edge of Utah reaches an altitude of 12,100 feet. My only information regarding its glacial history is from Marsell who states that deep cirques and glacial canyons, which he saw from the adjacent plain, indicate vigorous glaciation in both Tioga and Tahoe stages. This range is probably very similar to the Snake Range, farther south, in both form and glacial history.

Pilot Range, Nevada.—A valley head on the northeast side of Pilot Peak suggests by its form and rugged surface a cirque of Tahoe age, but the locality has not been examined closely.

Independence Range, Nevada.—About fifty miles north of Elko, a small group of glaciers once clustered around Jack's Peak (altitude about 11,000 feet). In the Tahoe stage a glacier descended McAfee canyon, on the eastern slope, about $4\frac{1}{2}$ miles and built a moraine on the edge of the plain. The terminal portion has since been eroded away and replaced by a wedge shaped alluvial fan, but the old lateral moraines extending down to the base of the range are still conspicu-

¹ Received Jan. 22, 1933.

² BLACKWELDER, ELIOT. *Pleistocene glaciation in the Sierra Nevada and Basin Ranges.* Geol. Soc. Amer. Bull. 42: 865-922. 1931. In this paper four glacial stages are recognized as follows, beginning with the oldest: 1, McGee; 2, Sherwin; 3, Tahoe; and 4, Tioga. The last of these is believed to be equivalent to the latest Wisconsin moraines of northern United States.

³ MARSELL, R. E. University of Utah. Oral Communication.

ous. Two smaller glaciers occupied unnamed canyons immediately to the north and another across the ridge to the south. In the Tioga stage there were apparently only three glaciers in this group and the largest was not much more than a mile long. Their existence is indicated by the presence of tarns and by the freshness of the cirques and moraines. Farther south there is similar evidence of two stages of glaciation at the heads of Pratt and Foreman Creeks. No doubt when the western slope of the same mountains is examined evidence of similar glaciation will be found there also.

Along Foreman Creek at least there are two well defined sets of gravel terraces—one 10 feet above the modern flood plain and the other 36 feet. Reasoning from better known terraces elsewhere in the West, I infer that the lower terrace was formed as a valley train at the time of the Tioga glacial advance and the upper terrace during the Tahoe stage.

When these mountains are more carefully examined it is probable that evidence of still older glacial stages will be found.

Jarbridge Mountains and Copper Mountain.—As the highest peaks of this group are, if anything, somewhat higher than Jack's Peak, it is almost certain that they were glaciated likewise. Distant views through a hazy atmosphere were not sufficient to permit me to draw satisfactory inferences.

Ruby Mountains.—The northern part of this range lying between Wells and Secret Pass was formerly known as the East Humboldt Range. Its summits rise to elevations of 10,500 to 11,300 feet but its relief is greater and its slopes steeper than those of the Independence Range. Many of the larger canyons on both flanks were glaciated in both Tahoe and Tioga stages. Those on the west side were apparently the largest—5 to 7 miles long in the Tahoe stage—but did not reach the plain. On the east side those of the same age extended down to the base of the range. The glaciers in Leach and Steel canyons appear to have been the longest—about 3 miles. As usual, the older (Tahoe) terminal moraines have been eroded away, leaving only the lateral ridges. Excellent cirques, still ragged and bare, and small fresh moraines clearly indicate glaciers of the Tioga stage, but none of them came far down the mountain sides. South of Johnson Creek, on the eastern slope and Boulder Creek on the west side, no definite evidence of glaciation was observed.

From Secret Pass the main body of the Ruby Range extends southward about 60 miles. Its crest is above 10,000 feet through perhaps half of its length and culminates in Lamoille Peak (altitude

11,128 feet). The east side of the range afforded less catchment area for meltwater of the glaciers reaching the plain, although the Dawley Creek discharges meltwater of the plain. Most of the meltwater of the Dawley Creek discharges meltwater of the plain. Most of the meltwater of the Dawley Creek discharges meltwater of the plain. Most of the meltwater of the Dawley Creek discharges meltwater of the plain.

On the western side (about 100 miles long) and Rattlesnake Creek flows out upon the adjacent plain at the base of the range. This valley long occupied the high

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⁴ As mentioned in Sherwin stage were for the range.

ment of nearly 300 feet on a fault along the base of the range then caused this deposit to be deeply trenched, leaving gravel terraces of corresponding height along the sides of the canyon. The large fan at the mouth of the present canyon is therefore probably of late Pleistocene and Recent age. It is still growing by the addition of bouldery mudflows at frequent intervals.

Spring Mountain Range, Nevada.—This southernmost range of high mountains in Nevada attains an altitude of 11,910 feet, but apparently it was too far south to receive snow enough for glaciers during the Tioga epoch. The somewhat excavated heads of the canyons surrounding the highest peak afford a suggestion of glaciation during the Tahoe stage. It is still more probable that glaciers were present in the Sherwin stage, but observational evidence is not yet available.

Panamint Range, California.—Although Telescope Peak reaches an elevation of 11,045 feet no good evidence of glaciation has been afforded by views from the base of the range on either side. However, because of its altitude and geographic position, it seems possible that glaciers were present in the Sherwin stage, but scarcely probable that even small glaciers occupied any of the valley heads during Tahoe time.

Other Great Basin ranges of which the highest peaks reached elevations between 10,000 and 11,000 feet may well have possessed small glaciers during the Sherwin and even the Tahoe glacial stage. Most of these mountains have not been examined for evidence of glaciation. In some, the record will doubtless be obscure, and in others, quite lacking.

SUMMARY

The facts which have been derived from this reconnaissance indicate rather clearly that the distribution and intensity of mountain glaciation are influenced by three factors—latitude, humidity, and altitude. In the mountains of Nevada which attain elevations of 11,000 to 12,000 feet the severity of glaciation decreases steadily from north to south, as would be expected. In northernmost Nevada mountains scarcely 11,000 feet high were inhabited by small but vigorous glaciers of Tioga stage, whereas near the southern end of the state, mountains nearly 12,000 feet high had no glaciers at that time.

The influence of humidity is conspicuously shown by the extensive glaciation of the Sierra Nevada, whereas the equally high White Mountain Range, which lies directly east and therefore in the rain-shadow of the Sierra, had only a few relatively small glaciers.

The Ruby Range illustrates the importance of altitude as a factor. In the section where the peaks range in elevation from 10,500 to more than 11,000 feet every canyon held a vigorous glacier. Farther north along the same ridge, where the highest summits rise to only 9,500 to 10,000 feet, there is little evidence of glaciation.

In keeping with the well known fact that the last three glacial episodes in western United States form a declining series, it is clear that in the Great Basin each successive member of that series could form glaciers only at a higher altitude than the one preceding. In central Nevada the mountains below 11,500 feet developed no glaciers during the Tioga ice stage and those below 10,700 feet none in the Tahoe stage. Much less is known about the Sherwin glacial stage but from the greater extent of the ice lobes of that time it seems probable that an altitude of about 9,500 to 10,000 feet may have been sufficient then to induce glaciation. It seems very improbable that any mountains whose summits are less than 9,000 feet in altitude in northern Nevada or 10,500 feet in extreme southern Nevada will be found to show any evidence of Pleistocene glaciation. It is not to be forgotten that some vertical diastrophic movements have occurred in the region since the Sherwin stage, but available evidence indicates that in most places the increase of relief from that cause has been negligible.

BOTANY.—*Microsporum of cats causing ringworm in man.*¹ VERA K. CHARLES and ALINE FENNER KEMPTON, Bureau of Plant Industry.²

It has been recognized for some time that domestic animals and pets may be a source of danger to man as carriers of disease. A case of ringworm infection transmitted by a cat, which came to our attention in 1933 not only demonstrated this fact but enabled us to work out very definitely the exact stages in the transmission of the ringworm fungus from cat to man. The following is a brief outline of the history of the case.

The first victim we will designate as Case I. In this instance a three-months-old Persian kitten had been acquired, and after having it about 3 weeks the new owner developed a few suspicious spots on the throat. The original owner of the kitten had observed a few dandruff-

¹ Received January 29, 1934.

² Acknowledgment is made of the assistance of Dr. L. T. Giltner, of the Bureau of Animal Industry.

like particles on the r had attributed their seemed to have been new owner, or Case I. had not been effected so carefully that no note that the kitten. As previously mentioned required several red, o eously on the throat, shoulders of the new the body. These spots infected area became tion of particles of sl of mycelium but no f particles in the hair p on the scalp.

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