once lived in the Chelly cañon. A very old woman of Moki still lives whose mother was born in a Chelly cañon cliff house. The cliff house may have been very old at that time, however. There are some very old cliff houses, while others are comparatively modern.

Discussion: Dorsey, Holsinger and ex-Governor Prince, of New Mexico. Governor Prince said the territory of New Mexico had offered the Old Palace in Santa Fé as a branch of the Smithsonian Institution.

A paper by J. Crawford on 'Sculptured Stone Images of Man by the Aborigines in Nicaragua,' and one by Charles E. Slocum, entitled, 'A Plea for Greater Simplicity and Greater Accuracy, in the Writings of the Future, regarding the American Aborigines,' were read by title.

On Tuesday, at 4 p. m., Section H adjourned to hear Mrs. John Hayes Hammond's lecture on 'The Cliff Dwellings of Colorado,' illustrated by lantern slides.

Dr. Fewkes's lecture Friday evening, on 'The Moki Snake Dance,' illustrated by lantern slides, was also of special interest to anthropologists, though not a part of the regular program.

A letter was read from Miss Alice C. Fletcher, who, in her enforced absence on account of illness, sent greetings to the Section; also a letter from Mrs. Daniel G. Brinton, to the effect that a new edition of 'The American Race' would appear in September of this year.

The report of the 'Committee on the Teaching of Anthropology in America,' which was read before Section H by Dr. McGee, was printed in SCIENCE of September 6, p. 353.

The report of the 'Committee on Anthropometric Measurements,' including the request for a grant of $50, was recommended and later adopted by the Council.

Section H was authorized to hold a winter meeting, the time and place to be decided upon by the Sectional Committee. The winter meeting will be held in Chicago during Convention Week of 1901–02.

The newly elected officers for the Pittsburg meeting are:

Vice-President, Stewart Culin, of the University of Pennsylvania.

Secretary, Harlan I. Smith, of the American Museum of Natural History, New York.

The invitation extended to Section H by Mr. and Mrs. Gilbert McClurg, of Colorado Springs, to inspect their cliff dwelling collection on Monday, September 2, was very generally accepted. The same week, a party of anthropologists visited the cliff dwellings of the Mesa Verde in southwestern Colorado as guests of the ladies of the Directorate of the Colorado Cliff Dwellings Association, of which Mrs. McClurg is Regent.

GEORGE GRANT MACCURDY,
Secretary of Section H.

---

*EARLY WINTER COLORS OF PLANT FORMATIONS ON THE GREAT PLAINS.**

ONE who has not been upon the Great Plains in the early winter, after the autumn frosts have changed the prevailing green of the landscape, can have little conception of the variety of the colors which meet the eye. These include several shades of red, two or more of orange, one or more of yellow, two of green, a dark blue, a purple, several browns and blacks, and many grays. With a little practice the eye can distinguish from twenty to twenty-five shades of color, sometimes blending into one another almost insensibly, or standing out in marked contrast upon the landscape picture.

It does not require long study to show that so far as the natural vegetation is concerned these colors conform to the distribution of the various plant formations, and

* Read before the meeting of the Botanical Society of America, in Denver, August, 1901.

that we have here a natural color-scheme in which the plant formations are mapped on the landscape. Let me attempt to reproduce some of the color pictures I have seen.

First, give the picture a general gray tone, which may include the sky as well as the earth surface. In the background where the hills slope away to the horizon are great patches of dull red or purple, bordered by the silvery gray of the buffalo grass. Here in the foreground may be a stretch of light yellow marking the area of a field of maize stalks still standing where they grew, and there may be a gray, velvet-like meadow of buffalo grass, with dashes of brick-red now and then on its surface where the bunch grasses stand, or where the red stems of the knotweeds mark the winding course of a 'draw.' Here and there the landscape shows a black spot where the farmer has plowed up the rich soil in readiness for the spring's plantings. Crossing a ravine we find the sloping sides red with the bunch grasses, below which is a belt of yellow 'prairie grass' bordering the dry bed of the brook, the latter marked here and there with red-twigged willows. In the distance, where a stream winds its way along, is a black line of cottonwood trees, whose trunks and larger branches show black against the gray background, and on nearer approach we note the silvery sheen of their twigs contrasting with their dark stems and branches. A plum thicket in a ravine forms a dark-blue patch, with a background of dull red knotweeds, or bunch grass, further back shading into the silvery gray of the buffalo grass.

Now we see a silvery gray meadow of buffalo grass with faint patches of reddish color scattered over it; back of it a fringe of cottonwood and box elder trees with dark trunks, the latter loaded with their light brown fruits, and still back of these the slopes with alternating silvery gray patches of buffalo grass and the dull red of the bunch grasses, running up to the sky line of light ochre where a field of maize is still standing. To complete the picture add a few stacks of alfalfa, now dark brown or black, and a spectral windmill here and there outlined in somber colors.

Allow me to show you one more picture seen near Minden, under the ninty-ninth meridian. Here is a little valley framed in with a brick-red border of bunch grass which grew on its sloping sides: next to it are patches of yellow switch grass and silvery gray buffalo grass, and a rich, velvety maroon spot where the ripe fruits of the smooth sumach give their color to the scene. The floor of the valley is covered with the red knotweed whose red is deepened in a central strip to a rich purple-red where a water course has encouraged the red-stemmed *Polygonums* to grow.

I need not attempt to place before you more of these general views. In all cases the picture has a basis of gray, and on this are laid reds, yellows, blues, purples, browns and blacks, etc. Let us inquire into the meaning of these strips and patches of color.

When the autumn drought and the early winter frosts stop the growth of vegetation the green shades of summer, themselves by no means uniform, are replaced by the hues indicated in the preceding paragraphs. The practiced eye can distinguish the plant formations on the open plains by their shades of green when the vegetation is in its vigor, and it appears that the early winter coloration is in a measure related to this fact. The boundaries of the formations are more sharply defined in the early winter, since the color differences are emphasized. I have not, however, been able to determine any law of color change in the plants of different formations. In fact it appears that each plant is a law unto itself. Thus the light green of the low bunch grass (*Andropogon scoparius*) gives place to a red,

as does the still lighter green of the tall knotweed (*Polygonum ramosissimum*), while the nearly similar pale green of the buffalo grass (*Bulbilis dactyloides*) turns to a silvery gray. On the other hand, the richer green of the switch grass (*Panicum virgatum*) turns to a red orange below and a light yellow above, and the dark green of stinkweed (*Dysodia papposa*) as seen in the summer is replaced in early winter by a pronounced brick-red. Yet in the midst of these changes the clumps of dagger weed (*Yucca glauca*) and the bunches of cactus (*Opuntia humifusa* and *O. polyacantha*) retain their green color, and in fact, are the only green things in the landscape.

I may summarize the facts so far as I have observed them by grouping the plants under the colors they assume, as follows:

RED.

Bunch grasses (*Andropogon furcatus*, and *A. scoparius*).

The first (tall bunch grass) is sometimes of a rich orange-red running to dull red, and the second (low bunch grass) is from brownish red to brick-red and purple, fading out sometimes to a dull gray.

Knotweeds (*Polygonum ramosissimum* and *P. emersum*), with the stems of various shades of red, in the second species running to purple red.

Willows (*Salix fluviatilis*) with red twigs.

Stinkweed (*Dysodia papposa*), whole plant becoming brick-red.

ORANGE.

Bunch grass (*Andropogon furcatus*); as noted above, this species sometimes assumes a rich orange-red color.

Switch grass (*Panicum virgatum*) the lower portions of the seeding plants are often of a red-orange color.

YELLOW.

Maize fields during the autumn and early winter assume many shades, from the deepest yellow to a pale straw color.

Switch grass (*Panicum virgatum*); the upper portions of the seeding plants are often of a light yellow color.

GREEN.

Dagger weed (*Yucca glauca*) and prickly pear cactus (*Opuntia hemifusa* and *O. polyacantha*) constitute the only green vegetation on the plains in the winter.

BLUE.

Plum thickets (*Prunus americana*), seen at a little distance are distinctly of a dark blue color.

PURPLE.

Sumach fruits (*Rhus glabra*), ranging from a dull purple to a rich maroon-purple.

Low bunch grass (*Andropogon scoparius*), as noted above this species ranges from dull red to purple.

Knotweed (*Polygonum emersum*) although usually red, sometimes it becomes a purple-red.

BROWN.

Russian thistle (*Salsola tragus*), brown to blackish-brown, and the same may be said for weed fields in general.

Plum twigs (*Prunus americana*); although plum thickets when seen at a little distance are dark blue, the twigs when seen near at hand are reddish brown.

Box elder fruits (*Acer negundo*), light brown, and as they are very abundant they give the trees their color when seen near by.

BLACK.

Cottonwood tree trunks and branches (*Populus deltoidea*) seen at some distance are brownish-black to black.

Plowed land, burned areas and wagon trails all show black or nearly so on the landscape.

GRAY.

Buffalo grass (*Bubilis dactyloides*), from a light or silvery green in the summer, this species changes to a light gray or silvery gray in the winter.

Grama (*Bouteloua oligostachya*), gray.

Beard grass (*Aristida* sp.) light gray.

Tickle grass (*Panicum capillare*), silvery gray.

Low bunch grass (*Andropogon scoparius*); as indicated above, this may fade out to a dull gray.

Cottonwood twigs (*Populus deltoidea*), grayish-white.

I may close this paper with a couple of sections observed between Oxford and Minden, Nebraska.

In the one case (Figs. 1 and 2) a ravine, with moderately abrupt but regularly sloping sides, was observed to have a central band

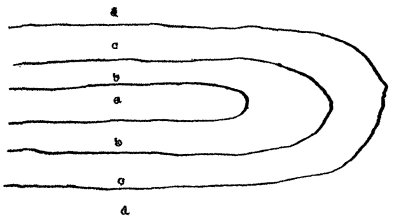

Fig. 1. Ground plan of ravine. *a*, yellow; *b*, red; *c*, gray; *d*, red.

(*a*) of yellow (switch grass) which occupied the entire floor. On each side was a belt (*b*) of red (bunch grass) which occupied the lower and more sloping part of the side of the ravine. On the shoulder of the ravine, running down to the more precip-

Fig. 2. Section of ravine; *a*, yellow; *b*, red; *c*, gray; *d*, red.

itous part and back to the edge of the level ground was a broader belt (*c*) of gray (buffalo grass and grama), and back of this again came the red of the bunch grass (*d*) which colored the general surface of the plain.

In another case (Fig. 3) a gentle slope with somewhat terraced surface was observed with a peculiar distribution of color. There were three steps on the slope, each not more than twenty to thirty centimeters

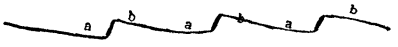

Fig. 3. Section of terraced slope; *a*, *a*, *a*, red; *b*, *b*, *b* gray.

in height, and a couple of meters apart, the surface sloping gently from step to step. On each terrace the upper edge near the step (*a*) was red with bunch grass, while the lower portion (*b*) was gray with Buffalo grass and grama. This was repeated exactly upon each terrace, giving the whole view a very singular appearance.

Charles E. Bessey.
The University of Nebraska.

RUDOLPH KOENIG.

On the second day of October, 1901, Rudolph Koenig passed away at his home in Paris in his sixty-ninth year. He had been in failing health for several years.

Rudolph Koenig was born in Koenigsberg, Prussia, on the 26th of November, 1832. At his home he received nothing beyond the usual high school training given in the local gymnasium, in which his father was the teacher of mathematics and physics. He went to Paris at the age of nineteen years, and in the French metropolis he spent most of his manhood. Here he began life as an assistant in the manufactory of a celebrated violin maker, Vuillaume, where he manifested unusual aptitude both as a mechanician and as the possessor of an extraordinarily delicate and correct ear for music. Such leisure as he could command was devoted to the study of mechanics and physics.

Within a half-dozen years the young acoustician was enabled to undertake business on his own account, having already attracted the notice of men of science by his ingenuity, patience and accuracy. In 1859 he issued his first catalogue of acoustic