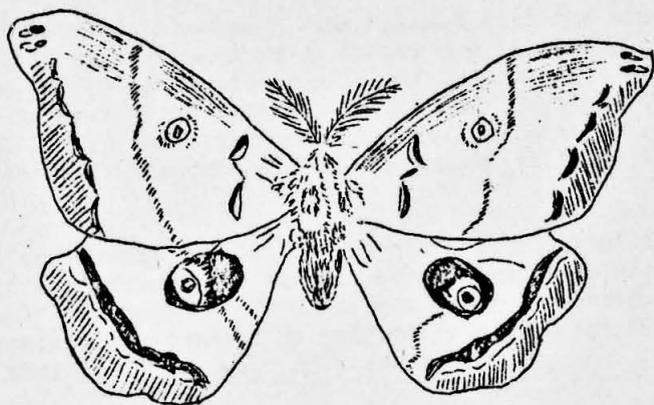


Nature Notes
of
Grand Canyon



POLYPHEMUS MOTH

Female

Found at Grand Canyon
5 July 1928

U. S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
GRAND CANYON NATIONAL PARK

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This bulletin is issued monthly for the purpose of giving information to those interested in the natural history and scientific features of the Grand Canyon National Park. Additional copies of these bulletins may be obtained free of charge by those who can make use of them, by addressing the Superintendent, Grand Canyon National Park, Grand Canyon, Arizona.

M. R. Tillotson, Superintendent. By - G. E. Sturdevant, Park Naturalist.

SATURN AS A BRILLIANT OBJECT IN THE SOUTHERN SKY

By - M. R. Tillotson, Park Superintendent.

During this particular season the "planet with the rings," Saturn, is plainly visible in the southern sky. Saturn now is in the constellation Sagittarius and may be easily located by reference to the brilliant red first magnitude star Antares, "the rival of Mars," and the alpha of the constellation Scorpius. Saturn is above and to the left of Antares removed from it a distance of about six degrees and during August it is in the due south at about 9:00 P. M.

Saturn is the second largest of the planets, exceeded in size only by Jupiter, and it is distant from the sun some 886 million miles of about nine and one-half times as far from the sun as is the earth. It takes 29.46 of our years for Saturn to go completely around the sun, this period representing, therefore, the year of Saturn.

The so called rings of Saturn are in reality swarms of tiny satellites, or "moonlets" each revolving in its own orbit around the planet, a thing unique so far as our knowledge of the universe extends.

Because of its rings and its size Saturn is one of the most beautiful and interesting of telescopic objects and the rings are plainly visible with a telescope of twenty powers or more.

Three excellent telescopes of this size or larger are available for the free use of visitors at Grand Canyon, one each at the Lookout and Kolb Bros. Studio on the South Rim and one on the observation tower at Grand Canyon Lodge on the North Rim. The new observation station at Yavapai Point on the South Rim will be equipped with three telescopes, two of twelve power and one large and especially fine instrument of fifty-two powers. Although any of these instruments are available and suitable for the use of "star gazers" that on the North Rim is most favorably located for a study of the planets since, being pointed in a general southerly direction, it can most conveniently be trained on the path of the ecliptic which is, of course, the path through the heavens followed by the planets as well as by the sun and moon.

The altitude and remarkable clarity of atmospheric conditions at Grand Canyon makes this an ideal locality for the astronomer, both professional and amateur and it was on account of such considerations that the nearby city of Flagstaff was selected as the site of the well-equipped and famous Lowell Observatory.

GRAND CANYON ILLUMINATED BY AURORA BOREALIS.

By - M. R. Tillotson, Park Superintendent.

One of the most beautiful and striking of Nature's phenomena, the Aurora Borealis or Northern Lights, was plainly visible from the South Rim of the Canyon, Saturday night, July 7th. This appeared as great streamers of light across the entire northern horizon as if a battery of powerful search lights in the far distance were being played to illuminate the sky. These streamers were constantly changing in position and intensity while during the entire evening the horizon in the due north had the appearance of an early gray dawn across the desert as if the sun had lost its bearings and were about to rise in the north rather than in its accustomed position. The display was staged as a one night stand only and observers on the Rim watched in vain during succeeding nights for a repetition of the performance.

No satisfactory scientific explanation for the Aurora Borealis has ever been offered although it is supposed to be due to an electrical disturbance and it is frequently accompanied by interruption of telephone, telegraph, and radio service and mariners sometimes report an erratic behaviour of the compass during the period of these displays.

The appearance of the Northern Lights in these low altitudes is quite unusual although not altogether previously unknown.

IRONWOOD (KNOWLTON'S HORNBEAM)

By - G. E. Sturdevant.

Perhaps one of the most interesting trees in Grand Canyon National Park is the ironwood (*Ostrya knowltoni*), which occurs in abundance beneath both rims.

The type specimen was collected by Mr. F. H. Knowlton near the head of Hance trail in September 1889. At that time the U. S. Biological Survey was making a collection of animals and plants from the Grand Canyon and San Francisco Mountain region. Many of the animals and plants, including the ironwood, were found to be undescribed species.

Since the description of the ironwood, several botanists have visited the type locality at Grand Canyon and failed to find any traces of the tree and it was feared by some to be extinct. In recent years it has been found at several places in the Grand Canyon, in Oak Creek Canyon, and in southern Utah.

Knowlton's ironwood has been described as a small tree twenty to thirty feet high with a diameter up to fifteen inches. The bark is scaly, being

light brownish gray in color, and separating into long loose strips. The new twigs are smooth, reddish-brown in spring, turning to pale buff-gray in late summer. The leaves are one and one-half to two inches long, perfectly ovate, slightly heart-shaped at the base, deep green and soft hairy above, paler and downy beneath while the teeth are less sharp than those of the eastern species. The fruit is hop-like, being formed of several veined, papery, hairy sacs each containing a hard nutlet. The cluster is about two inches long and slightly magenta-stained at the base.

While crossing the Grand Canyon a short time ago with Mr. Vernon Bailey, Chief Field Naturalist of the U. S. Biological Survey, who was a member of the party of 1889 that discovered the type of the species, hundreds of the trees were noted on the Kaibab and Bright Angel trails.

As this graceful little tree is the dominant species, covering several acres on each side of the Grand Canyon, the botanist as well as the American tree lover need have no fear of its early extinction.

ANALOGY OF PAST AND PRESENT LIFE.

BY - Chas. W. Merriam, Ranger - Naturalist.

Extensive investigation has shown that many of the rock layers of formations exposed in the Grand Canyon walls contain records of the life existent in in past geologic ages.

In the upturned pre-Cambrian sediments above the Archean rocks of the Granite Gorge we find the earliest known traces of life. This evidence would lead us to believe that primitive plants or algae lived in this very remote and little-known era. As we ascend and examine the overlying strata and pass through the rocks of the Paleozoic, we encounter fossilized animal and plant remains which show unmistakably more and more advance over the forms which preceded them. At first all life was aquatic and most of the forms were minute in size. If we trace these fossil records from stratum to stratum we see more coming in, which had acquired the ability of breathing air, and finally backbone or vertebrate animals appear. The fossil footprints of the Supai and Coconino formations are undisputed evidence of four-limbed amphibian life. If one desires to continue the interesting history and trace further the changes from age to age in form of living things, he may do so by travelling from sixty to one hundred miles north of the Grand Canyon where in the later rocks which rise in a flight of gigantic steps one may follow the developments of reptilian life, note its peak, and trace its decline and the appearance of modern mammalian order.

In considering the history of life from the minute antiquities at the bottom of the section to the advanced type at its summit we see that each stratum contains its own peculiar forms. In each case the animals and plants are adapted to the particular set of environmental conditions prevalent at the time the mud or sand buried their remains. Within the Canyon, from the river channel to the bordering elevated plateau, we today see an excellent example of the adaptation of different types of animals and plants to different environments. This is of great importance in helping us to understand how life changed from era to era throughout earth's history.

The great difference in altitude between the bottom of the Canyon and its rim is accompanied by corresponding changes in climate. Between the river and the plateau above we find all gradations from a hot arid climate to a cool fairly moist one. Hence there must in general be quite a diversity in the life between the hot dry Canyon bottom and the moister cooler upland. As we ascend the steep slopes we see the plant and animal life about us changing. The life in each zone is adapted to its own set of moisture, temperature, and soil conditions. Certain desert plants, such as the false sage brush, could not live on the plateau, and the Douglas Fir of the rim, for instance, would find life impossible in the depths of the Canyon. Similarly, certain lizards are adapted to the environment well down in the Canyon while others must live at higher horizons or on the plateau above. All life is limited to zones or regions where those conditions for which it suited prevail.

Hence we see that in the geologic history of the Grand Canyon region, as deep seas changed to shallow seas, warm waters to cool waters, clear waters to muddy waters and sea bottoms to land surfaces, life of absolute necessity changed accordingly. Old forms migrated out or became extinct - some perhaps adjusted themselves to the change - and new kinds of animals and plants came in. As the eons passed layer upon layer of rock was laid down. With each new set of conditions, each new type of deposit; we find corresponding changes in the kinds of life forms. Those types which existed before them in lower formations never re-appeared.

There is then in a sense an analogy between changes in the nature of living things today from zone to zone in the Canyon and the rock sequence from stratum to stratum. In the rocks, time and crustal movement were the principal limiting factors. Today on the Canyon sides from bottom to top each climatic zone has confined to it a particular assemblage of animals and plants differing from those above or below. In both cases the keynote is adaptation and limitation of each type to one environment and one ecologic niche.

THE POLYPHEMUS MOTH.

By - Edwin D. McKee.

Adaptability to a variety of conditions - especially those of climate and food supply - must undoubtedly be recognized as very significant factors in the success of animal types. For this reason the insect now stands at the very peak of his line of descent - perhaps just as highly developed along his path as man along his, ⁶²⁴ in many ways must be considered a powerful rival of the human.

The versatility of ants and bees has frequently been presented as proof of this success in life through adaptability, yet little mention has ever been given our common moths in this connection. The recent discovery in the Grand Canyon National Park of the presence of *Telia Polyphemus*, beautiful member of the Giant Forest Moths, seems to suggest this feature. The magnificent Polyphemus, then, is not only one of the most abundant moths of eastern North America but also one which has extended its range throughout the south west and is now one of the few species of large moths to reach the brinks of the Grand Canyon. What is the explanation? This

beautiful moth certainly has many enemies—parasitic, feathered, and human, yet it still appears to be a very successful competitor in the game of life.

In this case, adaptability and range of food plants seem to be the best conclusions. *Telia Polyphemus* is known to eat birch, maple, elm, cherry, linden, oak, hickory, basswood, chestnut, sycamore, beech, and many other plants. In the Grand Canyon where it was recently found in the Transition Zone of the south side, its larva probably feed upon the white oak (*Quercus gambelii*) or perhaps even on the Yellow Pine. In any case, it is significant that this beautiful silk-spinner has found food and thrived where near relatives who are apparently on an equal basis, yet unable to adapt themselves to new foods and conditions, have failed.

DUSKY GROUSE ON SOUTH RIM.

Ranger Geo. M. Niles, stationed at the Navahopi Ranger Station near Desert View, sighted four adult Dusky Grouse (*Dendragapus obscurus*) at Lipan Point during the month. Although grouse are very common on the north rim, this is the first record of their occurrence on this rim of the Grand Canyon. One hen grouse was reported by Dr. C. Hart Merriam of the U. S. Biological Survey on San Francisco Peaks in 1889. Ranger Niles is familiar with this species of grouse and his observations are undoubtedly correct.