

burst upon us in the valley, and rain with blasts of wind obscured the scenery.

I went to sleep for awhile, and when I awoke, behold the earth had grown green with grass. A refreshing coolness succeeded the hot breath of the desert. The mountains came closer and the valley rose between them, and cultivated fields of alfalfa began to appear. Finally, groves of red-limbed fruit trees, with shining threads of irrigation waters, lined our way, and at sunset the cows came trooping home to the farm yards wading knee deep in clover. This was the end of the desert and the summit of the divide at Beaumont. Thence we whirled downwards in the darkness, passing towns innumerable, with junctions to Pasadena, Redlands, Pomona, and many others, well remembered names. At last we saw the twinkling lights of a great city, and the various stations of Los Angeles were called.

LETTERS FROM THE SOUTHWEST.

Salton Lake in the Colorado Desert and Its Insect Fauna.

By H. G. HUBBARD.

YUMA, ARIZ., *March 30, 1897.*

In regard to what you say of the insects collected by me in the desert washes at Palm Springs, that the California desert was once an arm of the California gulf, you are surely mistaken. The shells found in all this region are all fresh-water remains; and the marine shells are found only to the south of the divide which bounds the Salton Sea. The desert sands bordering this depression are white with small shells, but they are all of the usual fresh-water forms. I have preserved a few of the smaller and most abundant forms. I believe even from my short visit to Salton that I have got the essential character of the fauna. It contains absolutely no marine forms and none at all modified by the peculiar environment, except, perhaps, the brine fly (*Ephydra*), which is quite different from the species inhabiting the Great Salt Lake of Utah. There is no Brine Shrimp (*Artemia*) in any of the saline springs, and it is very evident that the origin of the saline deposit is quite recent and even now in process of formation from the numerous saline springs which surround the basin both on the north and south. At the surface these springs contain only from 1 to 6 per cent. of solid saline matter, but at a depth of one or two feet the brine has a density or 27 per cent., consisting of both chloride of sodium and sulphate of soda (Glauber's salt). At no very remote period this basin was filled with fresh water, but neither this nor any other part of the Colorado desert north of the San Jacinto range was ever marine.

The Salton Sea or Lake is one of the greatest natural wonders of the world. It is a shallow deposit, only one or two feet in depth, of *solid* saline matter and is 8 miles wide and 20 miles long, surrounded by saline springs which build up mounds and cones of saline matter and matted roots of cane grass, back of which is the ordinary desert vegetation, gradually disappearing as it descends from the level of 260 feet to about 265 feet, at which point only one plant flourishes, and this plant is the only peculiar saline plant, outside of the grasses, to be found in the basin as far as I know. This plant is *Allenrolfea occidentalis*, and I mail you herewith a few sticks which contain larvæ of a Ptinid beetle¹ and also a Clerid enemy and perhaps some other things. It yields at last to the solid indurated crust of salt and soda which becomes finally an unbroken plain of pure salt, the lowest depression being 280 feet below sea level at four miles from the edge of the salt plain. Here the soda sinks below and forms a layer about a foot thick and solid as a rock. Above this is a layer of black mud and then a surface layer of pure salt from a foot to 18 inches in thickness. The surface of the salt is dry and hard, resembling ice and glistening in the tropical sun with the million scintillations of a polar ice floe; white, harder and smoother than a sheet of snow.

I reached Salton late on Saturday (March 28). Sunday was a fine day and I devoted the morning to an examination of the salt springs and the fauna of the basin. The line of debris from the great overflow of the waters of the Colorado River in 1891 was plainly visible upon the surface of the salt near the shores. But every stick and floated railroad tie was solidly fastened down and only a few spiders lurked under the fragment, evidently living upon insects blown out upon the salt plain.

Far back from the margin of the lake the earth is stiffened with saline matter, and the feet break through as in walking over cultivated fields on frosty mornings in spring. Here there is no vegetation except the *Allenrolfea* bush growing upon small mounds, and the grass about the salt springs, but even this last is encumbered and encrusted with snowy incrustations. There is little chance for insect life because of these thick incrustations, which bind down and solidify every particle of soil and wood, but on the mounds and about the roots of the *Allenrolfea* beneath the thin crust is a dry and dusty soil, largely consisting of pulverized saline matter, and here are a few Hemiptera and spiders; and in the larger stems of the *Allenrolfea* I found the larvæ mentioned before. Where the springs break forth in larger volume and form small flowing streamlets there are patches of grass encrusted with mineral matter, and even the mud along these rivulets is

¹The Ptinid beetle was successfully bred at Washington and proves to be *Ctenobium cinereum* Horn, originally described from southwestern Texas. The Clerid larva has not been bred.—E. A. S.

bordered with ice-like crystals and crusts. Where these enter the water, when turned over they are lined with green algæ and upon these there is in vast numbers a small Hydrophilid (*Creniphilus* n. sp.) with pale elytral tip, and in almost equal number, in the mud beneath, a pale Philhydrus (*Ph. diffusus* Lec.) of large size, and less commonly two species of Ochthebius (*O. rectus* Lec., and n. sp.). In the surface of the slimy pools is common a salt fly, evidently an Ephydra, of bronze color, its pupa to be found in the rust-colored mud and algæ under the water. A few insignificant looking Staphylinidæ (*Homalota* and *Trogophlæus*) are to be found in the salt-grass around the edges of flowing springs; there is also *Actobius pæderoides* Lec. a small Dyschirius (*D. integer*) and some semiaquatic Hemiptera (*Salda*) in the pupa stage. There is finally a small black Tachys (*Tachys corax*) running commonly about on the salt mud.

Around some of these springy places are large clumps of a very tall cane grass, which form mounds several feet in height. These are too dense and matted to enter usually, but sometimes, where the mounds are abrupt and not too wet, there is a hard crust of saline soil, under which is a moist and even pasty mass of rotten grass in which two species of ants have formed extensive colonies. One of these is a small red species (*Cremastogaster* sp.), the other a very large pellucid, honey-yellow form (*Camponotus fragilis*), and always in, under, or about these colonies are found specimens, in considerable numbers, of two species of the Carabid genus *Thalpius* (*Th. dorsalis*, Lec., *hornii* Chd.). I do not suppose that these beetles are so much myrmecophilous as they are attracted by the honey dew of a Homopteron which occurs in large colonies among the ants. The mature insect of this Homopteron is grey, with thin broad wings, and the young with wide flaring caudal tufts of wax.

I have very few other insects from Salton, but I saw many fragments of a summer fauna preserved in the salt crust, and among them there is *Cicindela hæmorrhagica*, which certainly belongs to the saline fauna.

The saline fauna of Salton seems to be very poor; in fact, there is too much salt here, and I did not find any of the Great Salt Lake species. Moreover, the investigation of this fauna is very difficult because everything is cemented solidly by salt and soda sulphate.

Some discussion ensued on the question as to whether the Colorado desert had been occupied at any modern period by an arm of the sea, Messrs. Vaughan, Schwarz, and Gill taking part.

—As the time for adjournment had not quite been reached at