former stream-planation and burial by mountain wash which by stream-action at a later stage is again removed the fact remains that the finest and most extensive rock-floors are found in situations where no water-action could possibly have occurred. For all these cases other suggestions of genesis is, of course, necessary.

The local exhuming of the rock-floors of arid piedmonts by the removal of its wash mantle does not really demand any elaborate inductive reasoning in order to reach an adequate explanation of the phenomenon. It is one of the commonest features of the desert. The effect is sometimes repeated over the same district several times in a year. It has been known to take place over night—by wind action. In the semi-arid belt, or on the margin of lofty mountains, as the Sierra Nevada in California for example, the local removal of the soil layer might be at first glance ascribed to stream-action; but broader observation extending to typical desert regions, where only low hills prevail, demonstrates at once that the stream-planing hypothesis must be entirely abandoned. The extension of moist-climate principles of erosion to arid lands is done with constantly growing difficulty.

In support of the idea of the eolic derivation of many rock-floored piedmont plains there are ample published observations. The late W J McGee's descriptions of the phenomenon as displayed in Sonoran deserts are pertinent. A single experience of my own when encamped on the Jornada del Muerto at the northern end of the Mexican tableland is by no means an isolated instance. There at the foot of a mountain apparently "buried up to its shoulders in its own débris" a strong gale which suddenly arose completely swept away in a half hour's time the supposedly deep soil and laid bare the smoothest and hardest of rock-floors worn out on the upturned edges of most resistant strata. Since the situation was at the mouth of a canyon and upon the back of what appeared to be a broad alluvial fan, a day's later visit might have ascribed the phenomenon to stream work.

Charles Keyes

## NOTES CONCERNING THE FOOD SUPPLY OF SOME WATER BUGS

In the literature dealing with aquatic Hemiptera, we are informed that without exception they are predatory: those which dwell upon the surface capturing such flies and other terrestrial insects as may chance to fall into the water, and those that pass their lives beneath the surface preying upon aquatic insects and similar organisms.

In the light of recent observations along this line, the above information seems inadequate. Corixids for instance are largely herbivorous.

The bulk of the food of our common water-strider, *Gerris marginatus,* consists at certain times of the year almost exclusively of the Jassids and related forms that feed on *Juncus* and other plants bordering on and growing in the shallow waters.

Our common species of *Rheumatobates,* while it does not disdain to feed upon small insects that fall into the water, obtains its main supply from the little crustacean forms such as Ostracods and Daphnians, which swarm the quiet pools. These it captures as they rest at the surface, scooping them out and holding them aloft upon the upturned tip of the beak, while the body of the little victim is being depleted of its nutritive material. A species of the genus *Microvelia* common in Kansas has access to the same source for its food supply and similar habits of consuming it. *Mesovelia mulsanti,* our little green Gerrid, has been observed exploring the sides of stems of *Juncus* and *Typha* that lay just beneath the surface for Ostracods, which they occasionally obtained, while the well-known marsh treader, *Hydrometra martini,* stalks about over the floating vegetation in search of whatever small beings chance to come to the surface film. Its victims have been observed to consist of mosquito wigglers, mosquito pupæ, emerging midges, nymphal corixids, and Ostracods, as well as small terrestrial insects floundering on the water.

Among the bugs that live in the water, none are more common than the back-swimmers, or Notonectids, and the water boatmen, or

Corixids. The former feed in their first three stages largely upon the small crustacea—Ostracods, cyclops and Daphnians, etc.,[1] adding to this diet such other forms as they are able to master, including corixids, mosquito larvæ and their own weaker brothers, while the source of the food supply of the boatmen[2] is found in the brown, sedimentary material on the bottom of the pool. This they scoop up with the flat rakes of their fore-legs. These rakes are the somewhat spoonshaped terminal segments or *palæ,* which are most admirably equipped for their work. An examination of the contents of the digestive tract reveals much of disorganized unicellular plant matter, diatoms, oscillatoria, euglenæ, chlamodomonas, and occasionally the shell of an arcella, or the remains of other lowly animal forms.

Thus, it may be noted that the Corixids can be looked upon as members of the producing class in the waters where they are found. Gathering their food from the slimy ooze at the bottom of the pool, they in turn make forage for the many predatory animals that lurk in the shadowy places or dart in pursuit of their prey. We have witnessed their capture by Notonectids, Naucorids and nymphal Belostomas, by the larvæ of Dyticids and Gyrinids, and are forced to believe that they take their place with the Entomostraca in furnishing food supply. Their alertness and agility, however, permit them to maintain themselves even in waters swarming with carnivorous forms, while in proper waters, with an absence of a dominating predatory population, they thrive in astonishing numbers.

More might be said concerning the rôle played by the aquatic Hemiptera in the society of water forms, but this will suffice to indicate that they have a part not heretofore recorded—an intimate relation to certain of the Entomostraca, and even to the unicellular life of our ponds and pools.

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[1] We have reared *N. undulata* to end of fourth instar in a small Petri dish, its only food being ostracods supplied to it daily by means of a pipette.

[2] We have carried a species of boatmen through its entire cycle as many as twelve individuals in a single Petri dish upon such fare.

## THE DOCTRINE OF EVOLUTION AND THE CHURCH

TO THE EDITOR OF SCIENCE: In the minds of those who are beginning to be classed among the older men, there still lingers the memory of the time when the pulpit hurled its denouncements against those men of science who had the temerity to accept the doctrines of evolution as advanced by Darwin and Huxley.

An interesting instance of the entire change of opinion that has come over the clergy is shown by an experience that occurred at the exercises connected with the celebration of the one hundredth anniversary of the consecration of St. John's Church in Washington City on January 14, 1917.

A former rector of St. John's, the Rev. Dr. George William Douglas, now a canon of the Cathedral of St. John the Divine in New York City, in a sermon in which he reviewed the history of the church, spoke of a century as being a very short time in comparison with the time during which man had inhabited our earth, quoting Henry Fairfield Osborn's recent work on "Men of the Old Stone Age" as his authority, for the number of years.

It is a far cry to the Oxford meeting of the British Association in 1860 when the learned Bishop Wilberforce attempted so unsuccessfully to controvert Huxley, the youthful advocate of science, then well nigh unknown outside the narrow circle of scientific workers.

On Huxley's tomb are these words:

> And if there be no meeting past the grave,
> If all is darkness, silence, yet 'tis rest.
> Be not afraid, ye waiting hearts that weep,
> For God "still giveth his beloved sleep,"
> And if an endless sleep he will—so well.

Sir Michael Foster once said:

> Future visitors to the burial place [of Huxley] on the northern heights of London, seeing on his tomb the above lines, will recognize that the agnostic man had much in common with the man of faith.

It is interesting to note the fact that Osborn was a pupil of Huxley's and by chance was in