

or less the proper rhythmic movement necessary to the production of a musical note, according as the intensity of the agitation of effervescence is greater or less.

The dead sound of a cracked glass is probably owing to a similar cause. For in that case, as soon as the vibrations travelling round the glass arrive at the crack, the edges of which are wholly or partially in contact, they are transmitted from edge to edge, and as, owing to the friction of the edges one against the other, their vibrations do not synchronise, a reflex wave is impinged upon each, having a less velocity than the original wave. This reflex wave will correspond to the vibrations caused by effervescence. If the crack be cleanly cut out, so as to separate the edges by a well-defined interval, the glass will again emit a musical note. In the latter case, the sonorous vibrations, on arriving at the cut portion, return by the way they came, synchronising with those which they meet.

The dead sound of the glass, when filled with honey or treacle, is probably owing to the circumstance of these fluids being not sufficiently mobile to vibrate in unison with the glass; and thus they destroy its musical tone as effectually as if they generated an independent and non-synchronous vibration.

London, July 4

ALLEN BEAZELEY

The Names Cambrian and Silurian in Geology

WILL you allow me to express, as an humble worker among the rocks of North Wales, my sense of the high value of the contributions to your pages recently by Prof. Sterry Hunt on the "History of the names Cambrian and Silurian in Geology?" I have long felt—and have not hesitated to express my feeling—that a great wrong was done to Prof. Sedgwick when the North Wales groups of rocks from the Baia Beds to the Lingula Flags—the order of which he was the first to unravel in that difficult region—were unceremoniously engulfed in Siluria.

It has also appeared to me one of the greatest anomalies in English geological classification, that the magnificent and well-defined groups of North Wales should be typified by their attenuated and broken easterly outcrops in the Silurian district of South Shropshire. What Llandeilo section of Siluria is there that worthily represents the Arenig and lower Bala rocks immediately east or west of the Berwyn Mountains? What Caradoc section of Siluria is there at all worthy of the fine series of the Upper Bala rocks of Glyn Cefriog? Of the unworthiness of the schists near the Stiper stones to represent the Lingula beds of North Wales, Prof. Hunt justly speaks in his papers.

I am glad that justice seems at last likely to be done to the veteran, Prof. Sedgwick, than whom a more philosophical geologist I am persuaded does not exist. Let but a sufficient number of scientific men resolve to use his older and truer, because more natural classification, and the justice will soon be complete.

D. C. DAVIES

ON THE VARIATION OF SPECIES AS RELATED TO THEIR GEOGRAPHICAL DISTRIBUTION, ILLUSTRATED BY THE ACHATINELLINÆ

IT has long been known that island species are usually different from, but allied to, those of the neighbouring continents. Darwin has also made us familiar with the fact that each of the Galapagos Islands has a fauna, and to some extent a flora, of its own. Other explorers have called attention to the somewhat limited distribution of species in the West Indies and on other islands. I have been informed by Mr. T. Bland, who has given special attention to the terrestrial molluscs of the West Indies, that if Cuba should be divided into two islands by the submerging of the central portion, about half of the species on either of these islands would be different from those on the other. Some of the most remarkable facts of this kind appear in the distribution of the Achatinellinæ on the Sandwich Islands. As they have never been fully recorded, I make the following brief statement of the leading facts, gathered from the results of personal exploration, and suggest a few inquiries.

Many types of the Sandwich Island Helicidæ have at different times been classed under the generic name of

Achatinella. These widely differing forms have, in the structure of the shell, one point of correspondence that holds them together. The columella has a spiral twist which is more or less apparent in all. In most of the species this character is so strongly developed that the columella seems to be armed with a lamellated tooth revolving within the shell. This common characteristic, in connection with the fact that they are all confined within the limits of one small geographical area, affords sufficient reason for regarding even the most divergent of these types as belonging to one group. As the humming birds are peculiar to America, so the Achatinellinæ are peculiar to the Sandwich Islands.

Though the forms thus brought together evidently constitute a natural group, it has long been apparent that they should be classed under more than one generic name. Some of these genera are restricted to one or two islands.

Genera on Kauai

Several large turreted species of a peculiar type, found only on the island of Kauai, had been provided for at different times under the names of *Achatina*, *Achatinella*, and *Spiraxis*; but no resting-place was found for them till shelter was provided under the separate name of *Carelia*, given by H. and A. Adams. *Carelia turricula*, a species which is sometimes three inches in length and about an inch in diameter, may stand as the representative of this genus. Besides the six or eight species of *Carelia* which have been described, there are many other species of land shells peculiar to this island, the most northern and western of the group. Some of these are *Helices*; the others belong to *Amastra* (H. and A. Adams) and *Leptachatina* (Gould), two genera which are also represented on the other islands of the group. None of the species of this island present any of the brilliant colours that are so common in the shells of Oahu. The peculiar forms of some of the species, as of *Amastra kauaiensis* and *Carelia cumingiana*, as well as the relations of these aberrant types to the types found on the other islands, render them objects of great interest.

Genera on Oahu

On the island of Oahu, which lies next to Kauai on the south-east, we find a remarkable development of the Helicidæ. The ground species belong to the two genera just mentioned, *Amastra* and *Leptachatina*. *A. ventulus* is an example of the former, and *L. vitrea* of the latter. Over twenty-five species of each have been found on this island. Two arboreal genera—the *Bulimella* (Pfeiffer) and *Helicterella* (Gulick)—are found only on this island. The ellipsoidal form, as in *B. rosea*, characterises the former; and the conical form, as in *H. apiculata*, the latter. Of *Bulimella* there are about thirty known species; of *Helicterella* thirty-five. The different species of *Bulimella* present a great variety of colours, ranging from bright green and rose, through yellow, brown, and ash, to simple black and white. The prevailing colours of the *Helicterella* are white, black, and brown, variously arranged in bands and stripes. The arboreal genus *Achatinella* (Swainson) may also be regarded as belonging especially to Oahu, as it is here represented by fifty-four species, and elsewhere by but three, which are found only on the island of Molokai, about fifteen miles to the east. *Achatinella producta*, about one inch in length, is one of the largest of the family. The *Auriculella* (Pfeiffer) is a genus of small arboreal species found on Oahu, and also on the islands to the east. Many of them are unnamed; but those on Oahu probably number more than ten. *Auriculella auricula* is given by Pfeiffer as the type. Two other arboreal genera—*Partulina* (Pfeiffer) and *Laminella* (Pfeiffer)—which find their chief development on the islands of Maui, Molokai, and Lanai, are represented on this island by three species each. The types, as given by Pfeiffer, are *Partulina virgulata*, found on Molokai, and *Laminella gravida*, on Oahu.