
Survival of Aedes pseudoscutellaris eggs in seawater is copyright by Elizabeth N. Marks 1950.

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Thanks were voted to donors of gifts to the Library since the last meeting.

Mr. G. P. Holland and Captain W. S. Wright signed the Obligation Book and were admitted Fellows of the Society.

The President extended a welcome to Dr. Mohamed Ali, Government Entomologist, Hyderabad, now on a visit to this country.

The Secretary read for the first time the following names of Fellows nominated by Council to serve as Officers and Council for 1951:

President.—N. D. Riley, F.Z.S.
Treasurer.—Arthur Welfi.
Secretary.—E. B. Britton, M.Sc.
Editor.—H. Oldroyd, M.A.
Other Members of Council—
C. L. Collenette, F.R.G.S.
C. T. Gimingham, O.B.E., F.R.I.C.
N. E. Hickin, Ph.D.
Colonel F. A. Labouchere.
C. W. Mackworth-Praed.
Lieut.-Colonel W. B. L. Manley.
G. D. Morison, B.Sc., Ph.D.
L. Parmenter.
A. Roebeck.
T. H. C. Taylor, D.Sc.
B. P. Uvarov, C.M.G., D.Sc., F.R.S.
Professor G. C. Varley, M.A., Ph.D.
V. B. Wigglesworth, M.A., B.Ch., M.D., F.R.S.

Alternative nominations supported by four properly qualified Fellows of the Society must reach the Secretary before the meeting to be held on 6th December, 1950.

Miss E. N. Marks spoke on the survival of eggs of the mosquito *Aedes pseudo scutellaris* (Theobald) in sea water. Eggs of this species, laid on a porous pot and kept dry for seven weeks, were immersed in sea water. After ten days, when the eggs were transferred to fresh water, 56 per cent. hatched, while after 23 days' immersion in sea water 1 per cent. healthy larvae were obtained (more hatched). This mosquito is widely distributed on the islands of the South Pacific. The ability of its eggs to survive in sea water suggests the possibility of dispersal by the agency of small vessels, such as cacao pods and coconut husks, in which the eggs are commonly laid, in addition to other means not involving submergence.

Professor Buxton agreed that the very wide and interesting distribution of these insects, which occurred even on tiny atolls, was attributable at least in part to transport in small floating vessels, their ability to survive in salt water being obviously a great advantage. The Polynesian voyages also undoubtedly contributed to this wide dispersal.

The President exhibited a specimen of the giant Phasmid (*Palophus* sp.) reared from an egg laid by a female taken in Tanganyika Territory by Dr. E. Burtt. The specimen was exhibited when newly hatched on 1st December, 1948 (*Proc. R. ent. Soc. Lond.* (C) 13: 53); it was fed on *Pyracantha* during the winter and *C. oxyacantha* during the summer. It passed through eight nymphal instars and became adult (5) in July, 1950, dying two months later. During the third instar
it lost the right mesothoracic leg. By the sixth instar this leg had been completely regenerated. The left mesothoracic leg was lost shortly before death.

Mr. E. C. Zimmerman gave the third of his series of talks on the origin, distribution and development of island life in the Pacific, in which he discussed the evolution and development of the Hawaiian insect fauna in the light of recent studies.

In the discussion which followed, Professor Carpenter read a passage from a letter written by Darwin in 1853 to Joseph Hooker, in which he spoke of the difficulties and doubts in his mind in determining precisely what constituted a species, doubts and difficulties which led him later to the enunciation of his theory of evolution. It was interesting to look back to the days when the mutation theory was considered, as Sir Oliver Lodge said to the British Association in his Presidential Address in 1913, to hold the field in company with the quantum theory. Such cases of explosive species formation, as Mr. Zimmerman had described, which would formerly have been considered to be typical mutations, could now be brought into the scheme of evolution up an inclined plane rather than a flight of steps.

Dr. Taylor said he was impressed not so much by the developments that had occurred in particular groups of insects in oceanic islands, remarkable though they were, as by the high degree of speciation in general, unparalleled elsewhere, which had proceeded with great rapidity in geological time. The fundamental causes appeared to be extreme geographical isolation, lack of competition for suitable habitats and food, and absence of natural enemies. He contrasted the extreme isolation of the Hawaiian Islands with the partial isolation of Krakatao, where the fauna and flora were completely wiped out by the volcanic eruption of 1883, and where repopulation took place very rapidly, without sufficiently long isolation for the development of new forms. The process of the establishment of species in complete isolation on newly formed volcanic islands is difficult to imagine, but presumably, after various plants and animals have arrived at intervals of perhaps hundreds of years but have failed to survive, certain species of plants eventually succeed in establishing themselves, thus providing food for certain insects or other animals that may subsequently arrive.

The Hawaiian Hemerobiids mentioned by Mr. Zimmerman were a most interesting case and served as a good example of forms that must have been derived from ancestors that arrived via a chain of pre-existing and probably widely separated islands. Insects such as these could hardly have reached Hawaii otherwise. He asked whether any similar degree of speciation was known to have occurred in any of the oceanic groups of islands in the South Pacific, and Mr. Zimmerman replied that the same process had occurred there. 43 species of one genus of weevils having developed on an island only five miles across.

Dr. J. W. Evans asked what constituted a long time in the production of a species, and if there was any evidence of the approximate time required. Dr. Zeuner in *Dating the Past* having suggested a million years. Mr. Zimmerman replied that the rate of evolution varied enormously in different groups and at different times, and northern climates could not be compared with the tropics, where many generations, instead of one, occurred within a year. He personally felt a million years "an enormous length of time." He mentioned the elevated coral atoll known as Henderson Island (near Pitcairn Island), which could not have existed in its present form for more than a few thousand years, but it had developed an endemic fauna of birds, plants and insects. There was evidence that a million years was not required for the evolution of all species, some may
have required more, some less. He called attention to changes brought about in some animal populations isolated on islands in recent historic time.

Professor Buxton said he was not quite in agreement with Mr. Zimmerman's theories of the structure and evolution of the islands. If they were due to the erosion and subsidence of larger islands he would have expected them to be connected by relatively shallow seas, whereas in point of fact each appeared to be perched on the top of a kind of pinnacle. In reply Mr. Zimmerman recalled the illustrated explanation put forward in his first talk. After the islands were built up by volcanic activity, they were reduced by the extremely active processes of erosion, and in some places considerable submergence was indicated (drilling had shown that a submergence of at least 1,200 feet had taken place at Honolulu). The stresses set up in the earth's crust by the great piles of thousands of cubic miles of extruded lava which made up some of the islands were very great, and some submergence might be expected over long periods of time. This was one of the ways by which atolls might be formed, and he considered many atolls were coralline "tombstones" marking the sites of former high islands which at one time had supported well-developed floras and faunas on which some of the ancestral stocks of some of the contemporary biotas of other islands had been developed. In the light of recent surveys Professor Buxton's conceptions were untenable. He had already discussed this question in *Insects of Hawaii* (1948, 1).

Mr. E. S. Brown inquired how the dragonfly, *Megalagrion oahuense* (Blackburn), which had become terrestrial, respired and whether the caudal gills were retained. To this Mr. Zimmerman replied that the gills remained in a distinctive form, having become thick and hairy, and retained a layer of moisture on them.

Dr. Richards asked if there was any independent evidence of invasion and re-invasion, or was it merely a convenient likely hypothesis. Mr. Zimmerman cited evidence of double invasions in Hawaii and in islands off Australia, but Dr. Richards did not feel this was in itself sufficient proof.

In thanking Mr. Zimmerman for his talks the President said he was left with the impression that extraordinary resistance was being offered to evolution by the occupation of every available niche. The fact that the present was an era of geological calmness was doubtless responsible for the current belief that evolutionary processes were so slow as to be almost imperceptible. As, however, it was our doubtful privilege to stand on the threshold of the atomic age, it might well be that opportunities all too great lay in store for those who survived to study theories of evolution and development.

N. D. RILEY, Honorary Secretary.

The next meeting (Annual Meeting) will be held on 17th January, 1951.