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The Presence of Uncinate Processes on the Ribs of a Lacertilian.

UNCINATE processes are present in Birds, in some Temnospondyli among Stegocephalia, in the Rhynchocephalia, and in the Crocodilia.[1] Besides *Sphenodon* and crocodiles, they have not been recorded so far in any other living reptile. It is interesting, therefore, to mention their presence in a common Indian Lacertilian.

While making a detailed study of the endoskeleton of the housegecko, *Hemidactylus flaviviridis* Rüppel, I found that four anterior ribs bear such processes. These ribs are borne on the fourth, fifth, sixth and seventh cervical vertebræ and are partially hidden by the sternum and the pectoral arches. The processes themselves are extremely delicate and usually break off in the common methods of the preparation of skeleton. They, however, become quite distinct in an alizarin-stained skeleton.

The point is an important one, as it adds one more fact to the resemblances of some of the least specialised Lacertilia to *Sphenodon* and may be significant in the discussion of the latter animal's affinities. As is well known, some authorities[2] regard *Sphenodon* as the sole living representative of a primitive order of the Reptilia and consider it to be equal in rank to the other orders of this class. As opposed to this view, other zoologists[3] think that the differences between some Lacertilians and this animal are "not so great as to justify placing it in a separate order, but, on the contrary, it should be included in the Lacertilia."[4]

Incidentally, I might also take this opportunity of mentioning that Bhatia and Dayal[5] are wrong when they say, "The vertebral column in *Hemidactylus* is composed of 6 cervical, 5 thoracic, 15 lumber, 2 sacral, and large number of caudal vertebræ." Careful counting in alizarin-stained skeletons shows that the cervical vertebræ are eight and the lumbars thirteen, the total number of precaudal vertebræ being 28. These numbers also appear to tally remarkably with those of *Sphenodon*, as given by Howes and Swinnerton,[6] *viz.*, 8 cervical, 3–4 thoracic, 13–14 lumbar, and 2 sacral vertebræ, making a total of 26–28 precaudals. The difference in the numbers of the thoracic and the lumbar vertebræ of these two animals can be explained by the facts that the sternum in *Sphenodon* has no posterior continuations like that of *Hemidactylus* and that two of the thoracic ribs in the latter animal are connected to these continuations.

BENI CHARAN MAHENDRA.

St. John's College,
Agra,
June 3, 1935.

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[1] Goodrich, E. S., *Studies on the Structure and Development of Vertebrates*, MacMillan, 1930, page 78.

[2] Günther, A., "Contributions to the Anatomy of *Hatteria* (*Rhynchocephalus*, Owen)", *Phil. Trans.*, 1867, **B**, **167**.

[3] *E.g.*, Huxley.

[4] O'Donoghue, Chas. H., "The Blood Vascular System of the Tuatara, *Sphenodon punctatus*", *Phil. Trans.*, **B**, **210**, 240. (He himself, however, does not subscribe to this view.)

[5] *Anat. Anz.*, **Bd. 76**, Nr. 23/24, page 432.

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The Hosts of *Eupelmus tachardiæ* How.

MAHDIHASSAN[1] under the heading "Specificity of parasiticism by *Eublemma amabilis*" raised several issues, but chiefly accused Glover for making "the glaring statement" that *Eupelmus tachardiæ* is "inimical to lac itself," and asserts that he has definitely proved it to be a parasite of *E. amabilis* caterpillars.

Replying to the above Glover and Negi[2] stated that during the last eight years many miles of lac encrustation and many thousands of *E. amabilis* larva had been examined at the Indian Lac Research Institute and that in no instance had *E. tachardiæ* been found parasitic on *E. amabilis*, but that it had always been found endo-parasitic on the lac insect *Laccifer lacca* and ecto-parasitic on the larva of *Microbracon greeni* syn. *Microbracon* (*Bracon*) *tachardiæ*. In support of this contention a number of publications of the Lac Research Institute were cited and in particular the *Proceedings of the Indian Science Congress*, 1929 and 1933, which Mahdihassan appears to have overlooked.

Mahdihassan[3] makes the following statement " 'some one has said what I say thrice is right'; acting according to the principle Negi and Glover have repeated what they have asserted twice before.[2,3] While they stress the point it is the third time their claim appears in print,—I beg equally to emphasise, thrice have they neglected to bring forth any illustrations or details with regard to the life-history of the insect or any objective information."

The *Abstract of the Proceedings of the Science Congress*, 1933, is fairly detailed and is quoted in part in the next paragraph: comparison of this abstract and Mahdihassan's statement above is interesting.

"The chalcid *E. tachardiæ* (syn. *B. annulicaudis*) is primarily an endo-parasite of the lac insect and an ecto-parasite of the full fed larva, pre-pupa and early pupa of *M. greeni* (syn. *E. tachardiæ*) a parasite of *E. amabilis* larva. The chalcid oviposits on the stages of *M. greeni* only if covered with a cocoon ......superparasitism and laying of more than one egg by the female on the same host occurs......but in either case only one egg develops to the adult. The chalcid first deposits the egg on the host and paralyses it afterwards by several stings......oviposition and longevity is described. The chalcid seems to have 14 theoretical generations in a year based on monthly life cycles."

Mahdihassan in spite of the *Abstracts of the Indian Science Congress* and other publications of the Institute, particularly the *Annual Report for the Year* 1930–1931, challenges us to produce figures and life-history data to substantiate our claim. For this reason in spite of the fact that the paper on *Eupelmus tachardiæ* has not yet been sent for final publication, we reproduce here a photograph of one of the figures shown at the Science Congress in 1933 and quote the following data.

During the last eight years during regular routine examination of lac samples a considerable number of cases have been observed of *E. tachardiæ* parasitic on both *M. greeni* and *Laccifer lacca*. In the Science Congress 1929 paper, Gupta, Negi and Misra stated that a specimen of *E. tachardiæ* had been reared from the larval stage parasitic on *Z. jujuba* lac, Mathurapur, Bengal, in March 1927, and that since then a number of males and females of this chalcid had been reared from larvæ and pupæ parasitic on lac insects at Namkum, but that it had never been found parasitic on *E. amabilis*. During the year 1930–31 *E. tachardiæ* was artificially bred in the Insectary on *M. greeni* larvæ which had spun cocoons in small glass capsules. The following life-history data were obtained, and quoted by Negi and Gupta at the Indian Science Congress, 1933.

Month in which life-history began	Egg Stage	Larval Stage	Pupal Stage	Total cycle
April 1930 ..	..	..	7 days	..
May 1930 ..	1 day	8 days	8 days	17 days
June 1930 ..	1 day	7 days	8 days	16 days
July 1930 ..	1 day	10 days	8 days	19 days
August 1930 ..	..	..	..	..
September 1930 .	..	..	7 days	..
October 1930 ..	..	..	16 days	..
November 1930 ..	..	..	34 days	..
December 1930 ..	5 days	40 days	19 days	64 days
January 1931 ..	3 days	31 days	14 days	48 days
February 1931 ..	6 days	35 days	12 days	53 days
March 1931 ..	..	..	11 days	..

In the above table the complete cycles are from *eggs laid in the Laboratory on* M. greeni *larvæ as host*: *where only the pupal stage is given it is taken from larvæ collected from the Field parasitic on* L. lacca.

We prefer to leave the reader to judge whether our claim that *E. tachardiæ* is parasitic on *L. lacca* and *M. greeni* based as it is on 8 years regular routine examination of lac samples, entailing the annual examination of over 100,000 lac cells and many thousands of *E. amabilis* larvæ, and further based on the actual breeding of *E. tachardiæ* on *M. greeni* in the Laboratory, has greater justification than Mahdihassan's claim that *E. tachardiæ* is parasitic on *E. amabilis* based on a single and rather doubtful instance.

The instance cited by Mahdihassan of *E. tachardiæ* parasitic on *E. amabilis* is as follows:—A larva was found attached to the body of an *E. amabilis* caterpillar, it pupated the following day. From our experience it seems possible that the *E.*

tachardiæ larva which was within a lac cell close to an *E. amabilis* larva was dislodged from its actual host *L. lacca* while dissecting the encrustation and came to lie

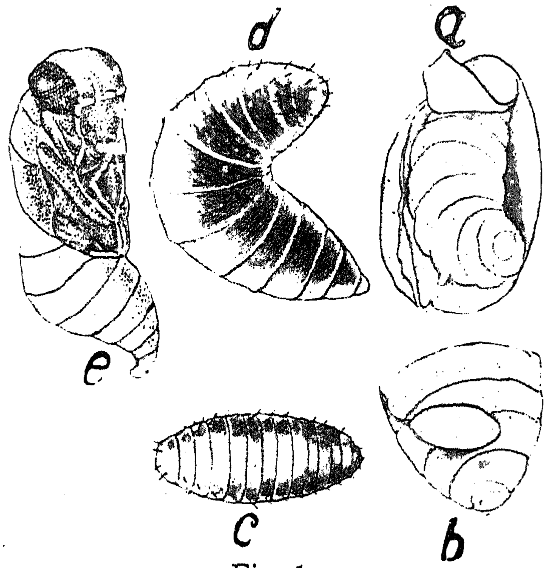

Fig. 1.

(*a*) A *Microbracon greeni* cocoon opened to show the paralysed *B. tachardiae* larva and the pencils and punctures formed between the larva and its cocoon as a result of the *E. tachardiae* (*B. annulicaudis*) pricks.

(*b*) The *E. tachardiae* egg lying over the posterior end of the *M. greeni* larva.

(*c*) Just hatched larva of *E. tachardiae*.

(*d*) Nearly full fed *E. tachardiae* larva (details not fully shown).

(*e*) The *E. tachardiae* prepupa casting the larval skin to turn into pupa.

on the *E. amabilis* larva before it was observed by Mahdihassan.

If Mahdihassan is still not fully convinced may we suggest that he try to breed *E. tachardiæ* in the Laboratory on both insects, *M. greeni* and *E. amabilis* and he will discover for himself that the former is a host of *E. tachardiæ*.

As regards Mahdihassan's other observations, we prefer at present to disregard them as they are of secondary importance and merely confuse the issue of the present discussion regarding the host of *E. tachardiæ*.

We should like to point out, however, that our specimens of *Eupelmus tachardiæ* were identified by Dr. Ch. Ferriere of the Imperial Bureau of Entomology, an expert on the *Chalcidoidea*.

P. M. GLOVER.
P. S. NEGI.
S. N. GUPTA.

Indian Lac Research Institute,
Namkum, Ranchi,
Bihar and Orissa.

[1] Mahdihassan, *Curr. Sci.*, 1934, **3**, 260.
[2] Glover, Negi, *Curr. Sci.*, 1934, **3**, 426.
[3] Mahdihassan, *Curr. Sci.*, 1934, **3**, 562.

Alkaline Quartz-Dolerites, from Bijawar, and Their Chemical Relationships.

FOR some time the author has been working on the trappean[1] rocks which are found associated with the Bijawar system in the type area. Certain interesting results of chemical nature have been obtained and it has been thought desirable to publish them in the form of a short communication. The results of detailed investigation will be published later. A collection of rock specimens was made from intrusive masses occurring in the central part of the Bijawar outcrop. Under the microscope the rocks present a very decomposed appearance and are found to be medium-grained quartz-dolerites with a pale brown pyroxene and plagioclase felspar as their main constituents. Uralite, chlorite, biotite and epidote occur as secondary minerals. Micropegmatite occurs in the interstices, and needles of apatite are generally present. Iron oxides are very prominent and have crystallised later than the pyroxene and plagioclase. The pyroxene has been considerably altered to uralite and the plagioclase looks extremely clouded. Some plagioclase laths are so much crowded with decomposition products that they are indeterminable. Fresh felspar is rare, but when it is present it gives an extinction angle corresponding to labradorite.

TABLE I.

Chemical Comparison of the Bijawar Quartz-Dolerite with Deccan Basalt and Spilite.

	1	2	3	4	5	6
SiO_2 ..	50·30	51·00	49·50	50·27	49·68	51·22
Al_2O_3 ..	11·53	13·38	12·02	12·31	12·95	13·66
Fe_2O_3 ..	2·16	1·68	3·20	2·35	3·47	2·84
FeO ..	10·66	9·36	9·36	9·79	10·10	9·20
CaO ..	10·15	9·86	10·15	10·05	10·09	6·89
MgO ..	6·07	5·32	6·97	6·12	5·69	4·55
Na_2O ..	6·14	6·33	5·59	6·02	2·27	4·93
K_2O ..	·89	·64	1·12	·88	·52	·75
TiO_2 ..	1·23	1·13	1·17	1·18	2·00	3·32
P_2O_5 ..	·35	·42	·14	·30	·33	·29
MnO ..	·09	·08	·08	·08	·20	·25
$H_2O(+)$	·75	·90	·73	·79	1·71	1·88
$H_2O(-)$	·10	·16	·22	·16	·29	
CO_2 ..	N. D.	N. D.	N. D.	N. D.	..	·94
Incl ..	..	..	..	..	·04	..
TOTAL.	100·42	100·26	100·25	100·30	99·94	..

(1) Quartz-dolerite, Chopra, Bijawar. (2) Quartz-dolerite, Rampur, Bijawar. (3) Quartz-dolerite, near Bajno, Bijawar. Analyst: M. P. Bajpai. (4) Average of 1, 2, and 3. (5) Average Deccan basalt, H. S. Washington's analyses, 4, 12, 13, 15, 16 and 23 in *Bull. Geol. Soc. Amer.*, 1922, **33**, 774. (6) Average spilite, *Geol. Mag.*, 1930, **67**, 9.