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NEW FOSSIL FINDS FROM THE LOWER VINDHYAN ROCKS (PRECAMBRIAN) OF CENTRAL INDIA

THIS note records definite evidence of worm and arthropod remains from the Lower Vindhyan rocks of Katni area, Madhya Pradesh. More than 200 worm and a lone arthropod remains are collected from an abandoned limestone quarry about 2 km, south-west of Katni railway station from the Rohtas Limestone.

The worm remains have been classified under the phyllum Annelida and appear to be a new genus (Figs. 1 and 2). They are coiled, bent on themselves and segmented. The arthripod remain is carbonised, laterally preserved and classified under class Insecta, on the basis of the presence of head, thorax with three jointed legs and segmented abdomen (Fig. 3). It is the first record of insect from Precambrian of India and possibly from the world.

The discovery of arthropod and worm remains from the Rohtas Limestone will throw a new light on the evolution of arthropod and annelids which must have evolved from primitive forms in still older rocks.

Detailed work is in progress and systematics will be published shortly (Tandon and Kumar[1]).

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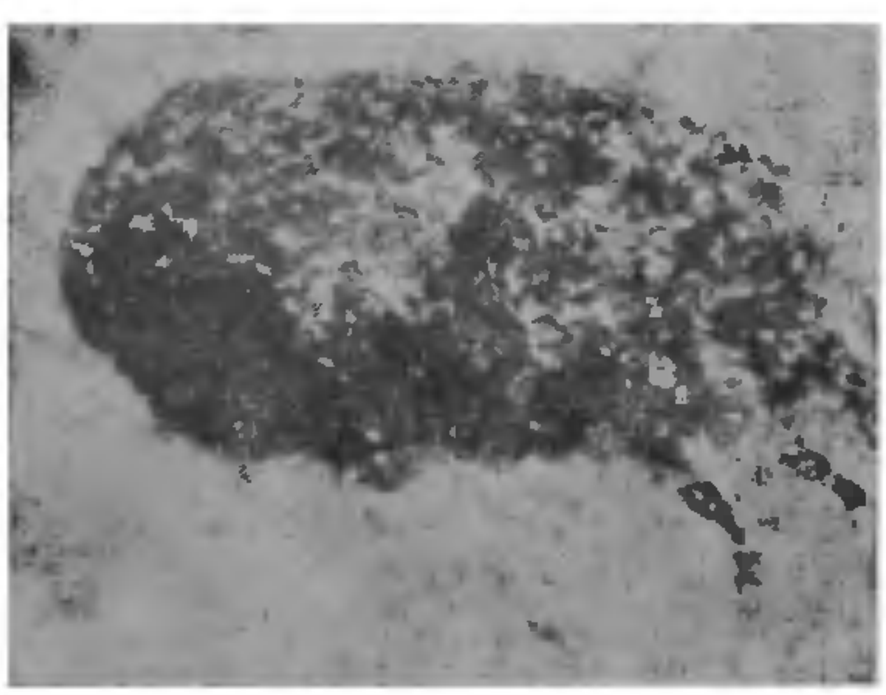

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FIGS. 1–3. Fig. 1. Annelid remains, × 0·8 (approx.). Fig. 2. Annelid remains 3·8 (approx.). Fig. 3. Arthropod (insect) remain, × 18·2 (approx.).

AIR-BREATHING IN THE CATFISH, *MYSTUS VITTATUS* (BLOCH)

THE catfish, *Mystus vittatus* (order : Physostomi; sub-order : Siluridae; family : Bagridae) inhabits tropical ponds and rivers and is not known to leave water. It has no well defined accessory air-breathing organs. However, if kept out of water, the fish survives for about 5 to 8 hours under laboratory conditions (28° C;

80% R.H.). This appears to indicate that the fish has some air-breathing ability.

The present study is undertaken to assess the air-breathing potentiality of the fish. Oxygen consumption in air was measured using a manometer (adopted from Umbreit *et al.*[6].). Oxygen obtained from air and water, when the fish was kept in water with free access to air, was determined using a respiratory chamber[5] which contains water with an accessible gas phase above. Oxygen consumption from water was determined by estimating the loss of oxygen using Winkler's method (Welsh and Smith[7]) and oxygen consumed from air was determined using a manometer connected to the gas phase. Oxygen consumption under water with no access to air was also estimated using the method followed by Job[3]. All measurements were made at 28 ± 1° C and the results are presented in Table I.

TABLE I

Oxygen consumption of Mystus vittatus (*ml/kg/hr* ± *S.E.*)
N = 12

	From water	From air	Total
Oxygen consumption			
from air ..		38·65± 3·48	38·65± 3·48
from water with access to air	60·91± 3·40 (67%)	29·43± 1·14 (33%)	90·34± 3·19
from water without access to air ..	116·81± 12·53	..	116·808± 12·53

From Table I, it is clear that *Mystus vittatus* utilizes atmospheric oxygen both when it is in air and in water with access to air. Under natural condtions, the fish living in water with free access to air appears to utilize atmospheric oxygen to supplement aquatic breathing. Higher metabolic rate of the fish kept under water with no access to air might be suggested to imply a stress factor under forced conditions of submersion.

Mystus vittatus is a physostomous fish, with air-bladder opening by a small duct on the dorsal surface of the oesophagus. Whether the air-bladder contributes to aerial gas exchange is not proved. The air-bladder serving a respiratory function is not unknown among teleosts.[4] *Mystus vittatus* in aquarium tanks swims slowly in an inclined position in contact with the surface film of water with its mouth occasionally projecting beyond the surface into the air. Air bubbles are sometimes expelled through the opercular openings. The fish appears to lock up a certain amount of air in the oral cavity to enrich the water with oxygen and/or to facilitate direct diffusion of oxygen through the surface of the oral cavity. Whether this is a means of utilizing atmospheric oxygen in times of need is not establshied. The possibility of the skin and gills serving in aerial gas exchange when the fish is kept out of water, as reported in other air-breathing fishes[1,2], may not be totally ruled out Further investigations on the routes of aerial gas exchange are now in progress.

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NEW RECORD OF FRESHWATER OLIGOCHAETE *AULOPHORUS FLABELLIGER* STEPHENSON, 1930, FROM INDIA

DURING the course of our investigations on the aquatic oligochaete fauna of Guntur District, Andhra Pradesh, we came across a species of the family Naididae, *Aulophorus flabelliger*, Stephenson, which hitherto has not been reported from India. This species was previously described by Stephenson (1930)[2] from Lake Naivasha, Kenya. Of a total of 16 valid species known under the genus *Aulophorus*, only six were reported from India till now (Naidu, 1962)[1].

We have collected this species along with *Aulophorus tonkinensis* (Vejdovsky, 1894), a closely related tube dwelling form, from a semi-permanent freshwater pond at Moparru, situated 35 km south-east of Guntur, associated with the roots of *Pistia* sp. Hydrographic conditions prevalent at the time of collection are, pH 8·0, air temperature 36·6° C, water temperature 34·5° C; water turbid, alkalinity 237 ppm, dissolved oxygen 2·83 ppm. Only two worms were collected.

Worms small, delicate, transparent inhabiting tubes of plant material, 3·5 mm long, body diameter 0·32 mm, total number of segments (*s*) = 26 + undifferentiated