

of the Shillong Series in the central part of the Shillong Plateau by the author, which is leading to an interesting re-evaluation of the pre-Cambrian geology of the area.

Medlicott (1869, p. 44 ff.) described a sequence of sediments which he named the Shillong Series. He thought that these could be divided into an argillaceous facies below and an arenaceous facies above deposited "consecutively". At the junction of the two facies he described from various localities a conglomerate of consistent lithologic characters; he also thought that the rocks grade from a predominantly submetamorphic suite to strongly metamorphosed quartzites, schists and gneisses but he did not discuss the distinctions between this latter group and older rocks of his 'Gneiss Series'. He described a group of porphyritic granites around Myllem as intrusive into the Shillong Series. His classifications are retained in later literature though the "Gneiss Series" is now implicitly equated with the Archæans.

Present work shows that the conglomerate on the Masura ridge north of Barapani (25° 38' 00" : 91° 32' 30"), hitherto taken as the junction of the argillites and the arenites of the Shillong Series represents a profound unconformity separating suites radically different in grades of metamorphism and styles of deformation. The strongly metamorphosed rocks below the conglomerate grade northwards into gneisses and granulites of the typical Archæans. Above the conglomerate the rocks are of the typically "submetamorphic" Shillong Series, including a group of current-bedded sandstones with minor shales (slate-phyllite). The Barapani-ridge provides a typical cross-section of the conglomerate basal to the Shillong Series. The high grade metamorphic rocks below the conglomerates, which indicate a marked unconformity, are now to be treated as forming a separate group.

The basal conglomerate is not developed everywhere; weakly metamorphosed sandstones of the Shillong Series as here defined may lie abruptly against strongly metamorphosed quartzites of the older group as seen at Mawmaram village on the road from Mawngup to Mairang; the foliation in the metamorphics may even parallel the bedding in the Shillong Series. In such cases delineation should be on contrasted metamorphism and it is necessary to distinguish between massive sandstones and massive metaquartzites. The Shillong Series sediments are post-orogenic epicontinental, evidently deposited in an intra-cratonic basin.

Within the metamorphics north of the Masura ridge occur a syn. to slightly late kinematic medium-grained granodiorite-adamellite-syenite-diorite body that has broadly concordant contacts with the metamorphics and shows very variable petrography, due to assimilation as well as granitization of various rocks. Its characteristics—gneissose borders, besides xenoliths all of high metamorphic grade—are consistent with a "parautochthonous" emplacement. These granitic rocks, well exposed on the Um Ran stream near the 41st milestone on the Gauhati-Shillong Highway, will be called the Um Ran Pluton. Later than this is a porphyritic granite of the typical Myllem type, very well seen near Nongpoh on the same highway; this type, later than the culminating metamorphism, is the better known and is associated in many areas with the non-porphyritic type. The occurrence of these associated granites all across Assam and the universal presence in these of weakly perthitic microcline rather than orthoclase as the only potash feldspar phase suggest that these are all mesozonal. This casts doubts on the current view that these granites are intrusive into the Shillong Series—a view clearly based on Medlicott's opinion of varying metamorphism referred to above. The relationship between the granites and the Shillong Series as here separated, will have to be studied.

Geol. Survey of India. SUJIT KUMAR MAZUMDER.
Assam Circle, October 12, 1966.

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1. Medlicott, H. B., Geological Sketch of the Shillong Plateau in N.E. Bengal, *Mem. G.S.I.*, 1869, 7.

OCCURRENCE OF *STIGMATOGOBIOUS ROMERI* (M. WEBER) IN RIVER NARBADA

Stigmatogobius romeri (M. Weber) has so far been recorded only from islands like Andamans, Java, etc.¹⁻² In December 1965, in the course of a survey of river Narbada seven specimens of this species ranging from 31.5 mm. to 42.0 mm. total length were collected from freshwater, six at Targhat and one at Fatheghat on Narbada (Hoshangabad District, Madhya Pradesh). This is the first record of this species from mainland of India.

This species has been described in detail by Mukerji³ and Koumans¹⁻²; the latter has done much in bringing out the synonymy involved. A comparison of these specimens from the

Narbada with the specimens from Andamans which are in the collection of the Zoological Survey of India, Indian Museum, Calcutta, does not reveal any significant differences between them. One variation noticed is that whereas the interorbital pores in the specimens from Andamans are indistinct,¹⁻² they are quite distinct in the specimens from Narbada. The ventral fins are oval in the specimens from both the localities, although Koumans¹⁻² stated that they are rounded in the specimens from Andamans. According to Koumans, the maxilla in this species extends to behind eye in males and to middle of eye in females; in the Narbada specimens, however, the maxilla extends only to below posterior third of eye in males and to below anterior third of eye in females. The scales before ventral fins are imbedded in the skin which can only be observed when a piece of the skin is examined under a binocular microscope. However, in the absence of any significant differences in the body proportions, meristic characters and colouration, the Narbada specimens cannot be treated as a separate subspecies in spite of the geographical separation.

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Central Regional Station, V. VISWESWARA RAO.
Zoological Survey of India,
Jabalpur, November 23, 1966.

1. Koumans, F. P., *Mem. Indian Mus.*, 1941, 13, 244, 262.
2. —, *The Fishes of the Indo-Australian Archipelago*, 1953, 10 (Gobiidae), 113, Fig. 26.
3. Mokerji, D. D., *Rec. Indian Mus.*, 1935, 37 (3), 268, Pl. 6, Figs. 3-4.

BACTERIAL BLIGHT DISEASE OF *CYNODON DACTYLON* PERS.

Cynodon dactylon, a perennial grass commonly known as Hariali, is extensively used as green fodder for cattle in Western India. A bacterial disease which is systemic in the vascular strands was noticed during the rainy seasons of 1963-66 in South Gujarat. The disease is easy to recognise, since by sectioning the infected portions, the bacterial ooze from the vascular strands becomes quite conspicuous.

The disease first appears as water-soaked, translucent, linear, pale yellow to dark green streaks, running parallel to the leaf veins or along the midrib of the lamina. When the infection is heavy, several streaks coalesce and

develop into brown, translucent lesions measuring about 1 cm. long.

Isolation of the disease-inciting pathogen was done by both the streaking and the dilution poured plate techniques using potato dextrose agar medium. Inoculation experiments were carried out on both the young and mature plants of *Cynodon dactylon*. Typical disease symptoms were obtained, and the bacterium reisolated from the artificially inoculated leaves corresponded in all its characters with the pathogen isolated from the natural lesions. Cross-inoculation experiments carried out on *Eleusine coracana* Gaertn, *Oryza sativa* L., *Panicum miliaceum* L., *Paspalum scrobiculatum* L., *Sorghum vulgare* (L.) Pers., *Setaria italica* Beauv., *Pennisetum typhoideum* Rich., *Zea mays* L., *Triticum aestivum* L., *Hordeum vulgare* L., and *Avena sativa* L., showed that these were not susceptible. The morphological, cultural and physiological characters of the pathogen undoubtedly place it in the genus *Xanthomonas*. The pathogen under study differs from *Xanthomonas translucens* in its host range and a few biochemical characters. It is, therefore, proposed to name the pathogen as *Xanthomonas cynodontis* nov. sp., whose technical description is as follows:

Short rods with rounded ends, usually single, occasionally in pairs, measuring 1.1-1.8 × 0.5-0.7 microns, motile by a polar flagellum, Gram-negative, encapsulated, no endospore and non-acid-fast. Colonies on potato dextrose agar plates are circular with entire margin, smooth, pulvinate, butyrous and glistening yellow. Growth on potato dextrose agar slants is abundant, filiform, convex, glistening, smooth, opaque, butyrous and lemon yellow; medium unchanged. On nutrient agar slants, growth is moderate, filiform, convex, glistening, smooth, opaque, butyrous and lemon yellow; medium unchanged.

Gelatin liquefied, starch hydrolysed, casein digested, tributyrin and several other fats hydrolysed, milk peptonised and litmus reduced; ammonia and hydrogen sulphide produced from peptone; nitrates not reduced to nitrites; indol not produced; V.P. and M.R. tests negative; citrates utilised but not uric acid; tolerates 3% sodium chloride; acid without gas from arabinose, xylose, glucose, fructose, galactose, mannose, lactose, maltose, sucrose, cellobiose, glycogen, dextrin, and mannitol but not from rhamnose, inulin, salicin, sorbitol, dulcitol, and inositol. Seventeen amino-acids supported growth as source of nitrogen while DL-serine, DL-nor-leucine and L-tyrosine failed to do so.