

# RIVULARIA LIKE FILAMENTS FROM THE CHITRABHANUKOT DOLOMITE OF THE LOKAPUR FORMATION, KALADGI GROUP, KARNATAKA

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## ABSTRACT

More than two hundred specimens of Rivularia like filaments have been recognised in some of the core samples of cherty dolomites and limestones of Chitrabhanukot Dolomite of the Lokapur Formation, Kaladgi Group and the significance of their occurrence in association with other microfossils from the view-point of stratigraphy is stressed.

## INTRODUCTION

THE Kaladgi sediments (Precambrian) were earlier considered to be unfossiliferous with the exception of few reports of stromatolites. Palynological studies during the last 5-6 years proved them to be richly microfossiliferous. Filamentous microforms among others are of particular interest in view of the fact that their biological activity is probably related to the formation of stromatolites; they are also important in the study of organic evolution and biostratigraphy during proterozoic times.

## PRESENT WORK

Samples for the present work are drawn from the core material of Chitrabhanukot dolomite member (Table I) of the Lokapur Formation. The rocks are both dolomitic and non-dolomitic. Cherty and clastic material is frequently associated.

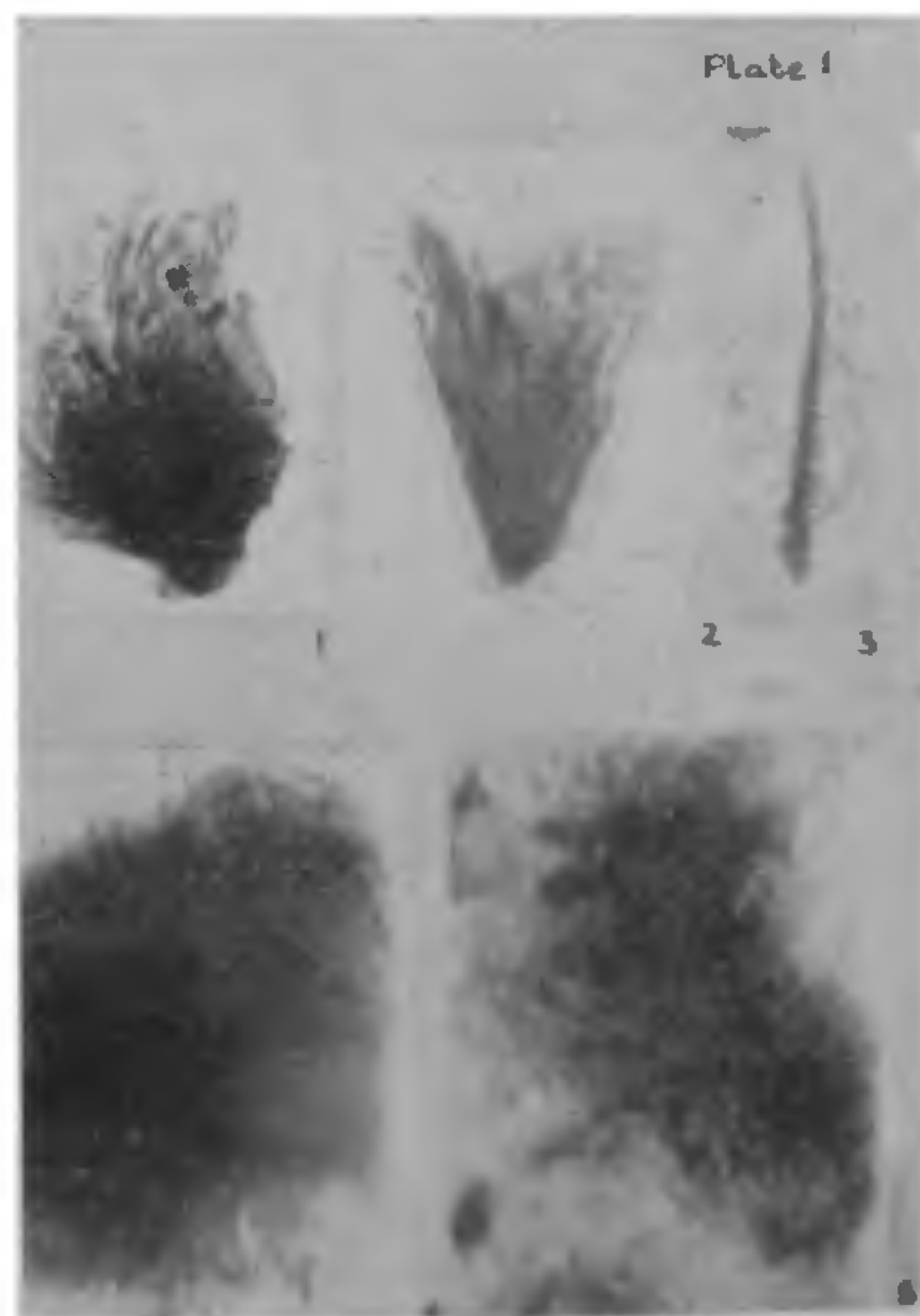
TABLE I

*Lithostratigraphic position of the Lokapur Formation*

BADAMI GROUP	
.....	Unconformity .....
MUDHOL FORMATION	
	Yadhalli Argillite
	Pettur Limestone
LOKAPUR FORMATION	
	Jalikatti Argillite
	Chikshellikeri Limestone
	Chitrabhanukot Dolomite
BAGALKOT FORMATION	
.....	Unconformity .....
DHARWAR SUPERGROUP	

The core samples of cherty dolomite and limestone, on maceration, yielded more than two hundred spec-

imens of short to long hair like filaments. The filaments are solitary to colonial in habit, brown to brownish black in colour with or without being enclosed by thin envelope (sheath). Filaments straight, tubular; septa being distinct in some specimens while indistinct in others; and the filamental bodies taper gradually towards the tip. Some of the colonial forms are found to diverge from a central organic mass (Figs. 4-5). The filaments vary in length from 5 to 100  $\mu$ , and in width from 0.5 to 3  $\mu$ . Wall 0.5 to 1  $\mu$  thick, smooth, wavy in some forms. Surface of the filaments appears translucent to subopaque.



FIGS. 1-5. Figs. 1-2, 4-5. Colonial rivularia like filaments. Fig. 3. Solitary rivularia like filament. Magnification: Figs. 1-2, 1000 $\times$ . Figs. 3-5, 500 $\times$ .

## REMARKS

The structures bear a general affinity to the Rivularian filaments<sup>1</sup> in having hair like tips, greater width at the base than at the top and in exhibiting radiating habit. But no distinct basal heterocyst cells are discernible.

## DISCUSSION

The rocks under investigation, as pointed out earlier are distinctly stromatolitic in nature. The cherty dolomitic limestones display concentrations of the filamentous structures in abundance which in turn are intimately associated with such microfossil taxa as *Menneria roblotae* Lopukhin, *Eomycetopsis robusta* Schopf, *Leiosphaeridia aglutinata* Venkatachala and Rawat, *L. insigna* Venkatachala and Rawat and other coccoidal forms.

Abundance of cherty matter of grey and white colours commonly with the stromatolitic rocks is of particular interest, since such associations in carbonate rocks suggests algal mat construction<sup>2</sup>. The diversified domal and other columnar structures of Chitrabhanukot rocks bearing great resemblance to similar structures recorded in the pre-Phanerozoic rocks of other parts of the world by several workers including Cloud and Semikhatov<sup>3</sup> and Hofmann<sup>4,5</sup> have been attributed to biogenic origin.

These filamentous structures, in view of their specific morphology, comparable modern analogous forms, biotic association with other microfossils cited and specific lithologic confinement demonstrate beyond doubt their affinities to blue-green algae. Thus the taxonomic composition of the algal community is generally considered to be the determining factor on which the stromatolitic laminae depends<sup>6</sup>. Comparable stromatolites occurring at the base of Pongola system, for instance, of northern Natal Province, S. Africa<sup>2</sup> are also identically wavy, laminated (Crypt algal) dolomites. Recognition of these filaments in the Chitrabhanukot rocks strongly suggests the existence of CaCO<sub>3</sub> precipitating and sediment binding cyanophytic microbiota. Further, the filamentous structures are either absent in the so called non-stromatolitic rocks or if present show tendencies of extreme depletion<sup>7</sup>. Thus there appears to exist specific relationship

between the blue-green algae (*Rivularia* like filaments), other associated microfossils on one hand and the stromatolitic rocks of the area on the other. Also, the morphology and associated biotic characteristics of the Rivularian forms presumably throw light on the mode of occurrences, evolution and biogenic activity of blue-green algae during this period in this part of the Peninsula. Based on the associated microfossil assemblage represented by *Menneria roblotae*, *Eomycetopsis robusta*, *Leiosphaeridia aglutinata*, *L. insigna* and others, the Rivularian bearing stromatolitic rocks were earlier dated as Middle Riphean—1375–1000 m.y.<sup>8</sup> This inferential correlatory relationship of the microbiota tentatively facilitates assessment of the age of the Rivularian material of the type presently described at least as confined to the limits of the Kaladgi basin. Caution however has to be exercised while examining this aspect in the different isolated *Rivularia* bearing outcrops of the basin for a broad stratigraphic correlation.

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