786, −1007, −1011, −1009, −1005) and 2040 ± 110a BC at Langhnaj (TF-744). Thus our inference on the red-brown soil horizon appears reasonable from both the climatological and archaeological viewpoints as also from the fact that the sand underlying this red-brown zone dates to 22 ka which makes it far too young to qualify as Middle-Palaeolithic.

To summarize, the present study indicates that,

(i) The dune-building activity at Budha Pushkar occurred during two periods at *ca* 25 ka and 15 ka.
(ii) The so-called Rotlehm soil and its association with the Middle-Palaeolithic is not tenable and consequently the earlier inference of a wet-Middle Palaeolithic phase at Budha Pushkar does not withstand the scrutiny of chronological studies.
(iii) The study also indicates that the stratigraphic position and assignment of Middle Palaeolithic artefacts at Budha Puskhar is erroneous.

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Fluorescence microscopy in estimation of organic matter maturation

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In fluorescence microscopy spectral wavelength (λ_{max}) of light emitted by excited palynomorph is considered for maturation level estimation. Case study of subsurface samples studied from well E–A of Bengal Basin has been illustrated. λ_{max} recorded from palynomorphs is correlated with the other two parameters: mean vitrinite reflectance and thermal alteration index recorded from the same samples.

QUANTITATIVE spectral wavelengths are measured on MPV-3 fluorescence microscope. Pollen, spores and other organic matter are excited with ultraviolet light of spectral wavelength range 200–400 nm and examined under the microscope to observe fluorescence colours in

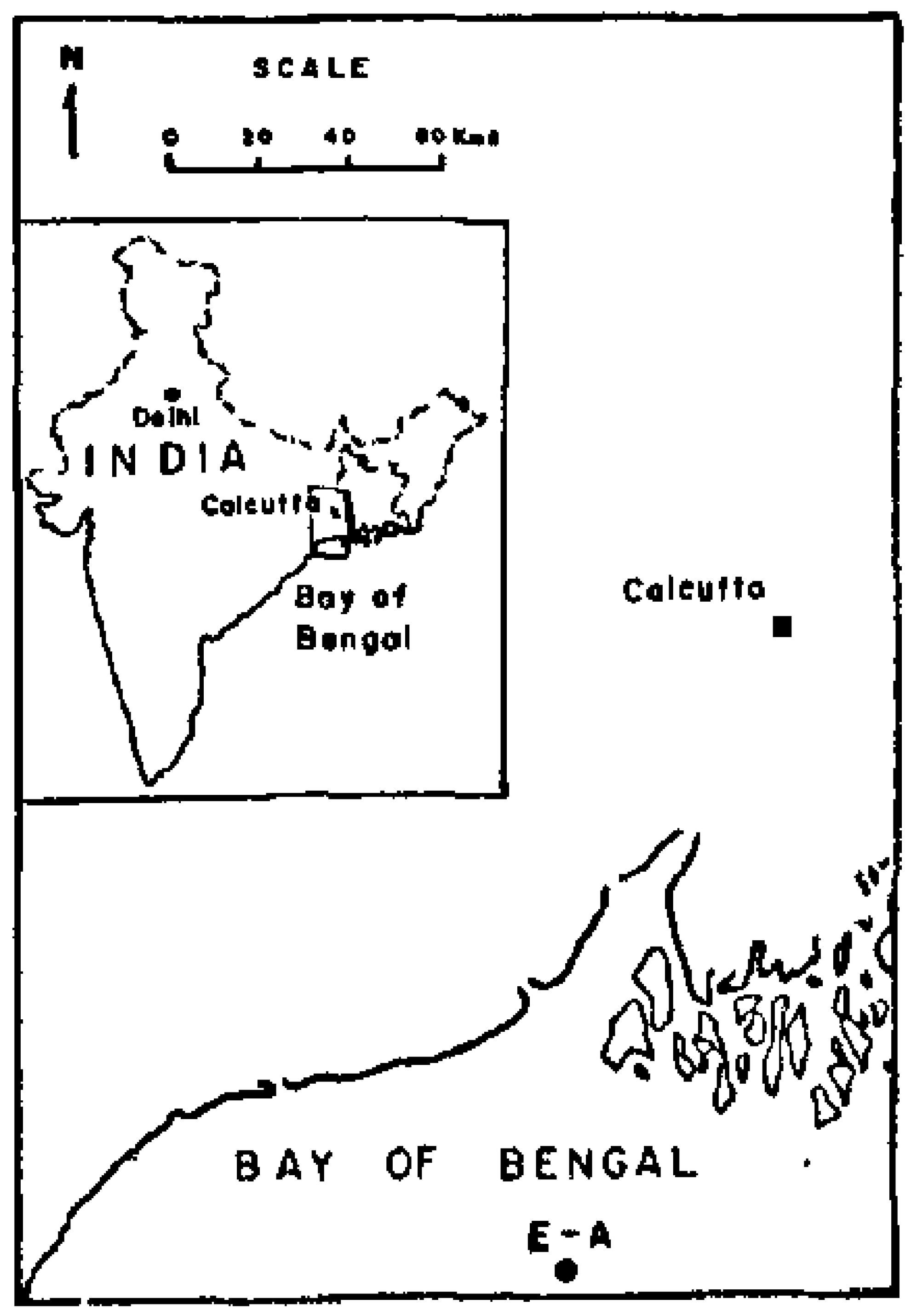

Figure 1. Location map of studied well in Bengal Basin

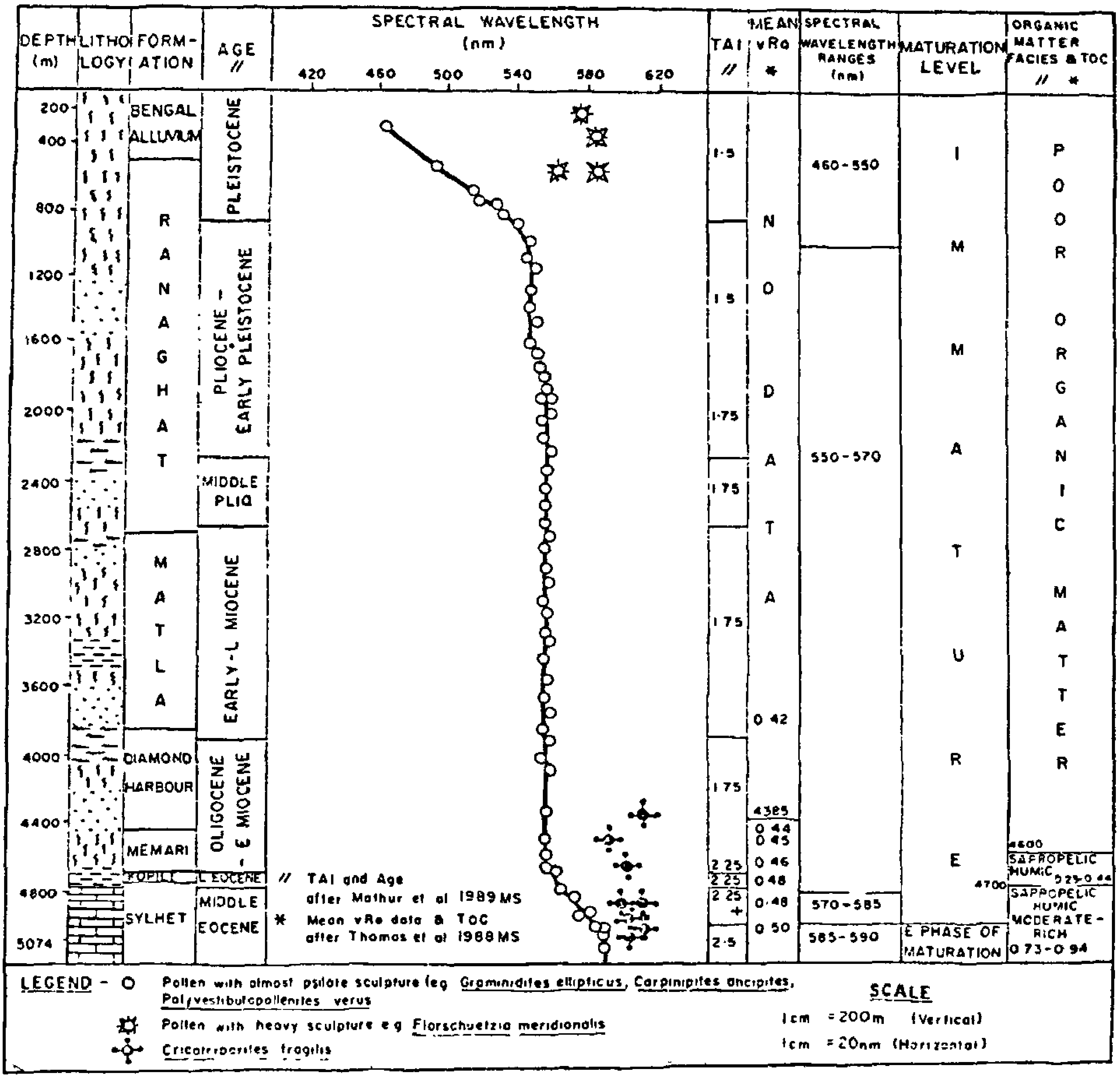

Figure 2. Spectral wavelength curve and maturation levels in well E–A.

Table 1. Spectral wavelength ranges and maturity levels in well E–A

Depth (m)	Formation	Age (after Mathur *et al.*[3])	Spectral wavelength range (nm)	Mean vR_0 (after Thomas *et al.*[2])	TAI (after Mathur *et al.*[3])	Maturity levels
0–850	Ranaghat	Pleistocene	460–540	No data	1 5	Immature
850–2725	Ranaghat	Late Miocene to Early Pleistocene	540–560	No data	1 5–1.75	Immature
2725–3900	Matla	Middle to Late Miocene	560	0.42	1.75	Immature
3900–4450	Diamond Harbour	Oligocene to Early Miocene	560–570	0.44–0 45	1.75–2.25	Immature
4450–4700	Memari	Oligocene	570	0.45–0 46	2.25	Immature
4700–4770	Kopili/Sylhet	Late Eocene	570–585	0 47–0.48	2.25 (+)	Immature
4770–5074	Sylhet	Middle Eocene	585–590	0.48–0.50	2.25 (+)–2 5	Early phase of maturation

visible parts of spectrum by using narrow and broad band filters[1]. Light emitted by pollen/spores and organic matter after excitation is measured by computer and a graph plotted for intensity vs spectral wavelength (λ_{max}). The latter with maximum intensity is considered for calculation of maturity of the palynomorph.

The normal palynological maceration procedure and slide preparation method has been used for the present investigation. Quantitative spectral analysis of palynomorphs in well E–A (Figure 1) has been carried out as a case study to determine organic matter maturation levels.

Under the present studies only thin-walled, almost psilate pollen, are considered for recording λ_{max}, which is measured from pollen recorded between depth interval 200 to 5074 m and the succession covered ranges in age from Pleistocene to Middle Eocene. Mean vitrinite reflectance values (vR_0) and thermal alteration index values (TAI) recorded are taken from unpublished ONGC reports[2,3].

λ_{max} recorded from the excited pollen has been tabulated against mean vR_0 and TAI and interpreted maturation levels based on the recorded spectral wavelength (λ_{max}) data are shown in Table 1 and Figure 2. λ_{max} recorded from palynomorphs has been standardized against mean vR_0 recorded from the same samples[2].

These studies indicate the organic matter to be immature in well E–A between depth interval 200 and 4770 m from Pleistocene to Late Eocene with spectral wavelength range of 460–585 nm, vR_0 0.42 to 0.48 and TAI 1.5 to 2.25 (+) (Table 1). Poor organic matter is recorded between depth interval 200 and 4600 m. Moderate to rich organic matter with sapropelic humic facies and TOC range of 0.23 to 0.44 is recorded between 4600 and 4700 m. Spectral wavelength range of 585–590 nm recorded in Middle Eocene sediments between depth 4770 and 5074 m is suggestive of organic matter in the early phase of maturation corresponding to vR_0 value range 0.48 to 0.50 and TAI range 2.25 (+) to 2.5 (Table 1). The sequence is indicative of sapropelic humic facies with moderate to rich organic matter with TOC range of 0.73 to 0.94.

This study holds great promise in elucidating maturation levels from samples lacking *in situ* vitrinite.

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Evidence for the role of wavelengths of light on the reproduction of wild male bird, black-headed munia *Munia malacca*

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Effects of different wavelengths of light (red and blue) and continuous incandescent light (LL) were studied in the seasonal reproduction of black-headed munia. While almost normal gonadal cycle was observed both in red and blue light treated groups, it was abolished under continuous incandescent light. Although red light failed to mimic the effects of continuous light, it could delay the gonadal regression for two months, indicating a better photoperiodic effect than blue light.

REPRODUCTION in most wild birds is known to be regulated by one or more environmental factors. Photoperiod is one such factor which has drawn maximum attention of the avian biologists[1–5]. However, only one aspect of avian photoperiodism, i.e. daylength has been studied in detail. Importance of wavelength has been studied only in very few species and the reports available on this aspect to date are restricted to domesticated species[6–9]. Particularly on wild birds, not a single experimental study has been made. It was therefore considered useful to study the importance of wavelength, if any, in black-headed munia, *Munia malacca* in which reproduction is known to be regulated by daylength[3,10].

During the first week of December 1989, adult black-headed munia were procured from a local bird supplier and were acclimatized to laboratory conditions for 14 days. The birds were then sexed by laparotomy and only males were used in the experiment. Four groups of 9 each were established in separate wirenet cages (20 × 16 × 14 inches). Birds of group 1 were exposed to continuous illumination (LL) of white incandescent light. Group 2 birds were exposed to red light (RL) through a monochromator filter (wavelength, 760 nm) every day for 6 hours (from 10.30 to 16.30 hour of the day). Group 3 birds were exposed to blue light (BL) through another monochromator filter (W. L. 420 nm) every day for the same duration. These two groups received white incandescent light for the remaining 18 hours of the day as LL group. Group 4, receiving normal day length (NDL) served as a control group. The study was continued for more than one year covering a complete reproductive phase and was terminated in February 1991. Every month the left testis of each bird was measured *in situ* and the gonadal volume was