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Chapter 1 : Vinod Chandra Tewari - calendrierdelascience.com

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Method of reconstructing columnar stromatolites from serial slabs left and tracing on to a block diagram framework on tracing paper right. For example, a series of slabs 5 mm thick and 2 mm apart will appear along the reference face 3. The outlines of columns are traced on to the framework in such a way that only the portions of columns not hidden by the outlines on preceding slabs appear. This basic sketch is then redrafted using shading or stippling to show in three dimensions the features of the columns. Thin-section studies Thin sections are cut generally thicker than standard petrological thickness 0. Large thin sections up to 15cm square are ideal for the study of columnar stromatolites. It is important to choose the least altered, representative samples for thin sections, so that the following features of taxonomic interest can be studied in detail. Laminae may also be characterized as domed, hemispherical, conical, sub-conical, rectangular or rhombic i. On a finer scale, laminae may be smooth, wavy or wrinkled. The behaviour of laminae at column margins is considered to be taxonomically important. If they thin and turn downwards sharply so as t o envelop the edges of the column, a structure termed a wall is formed, in which the internal lamination is sub-parallel to the margin. The margins of unwalled stromatolites may be smooth, bumpy, ribbed, ragged, or with pronounced overhangs. Pointed projections and projections set into niches are significant features if present. This term refers to the thickness, continuity and mutual relationships of laminae, the nature of their boundaries, and any microscopic internal structure. These features are best observed at low magnification under a binocular microscope. Observation under high magnification is usually necessary to determine the textures of the fine-grained carbonate comprising the laminae, but this is probably of less taxonomic significance, being a reflection of the diagenetic history of the rock. The petrographic study of stromatolites is also aided by staining thin sections with alizarin red to distinguish calcite from dolomite. Davies and Till described a variety of stains useful for distinguishing various carbonates. Silicified areas should be scanned at medium magnification and the presence noted of any unicells, colonial unicells, filaments with or without cross-walls, with or without branching, with or without differentiated cells or any other organic structures. The orientation of filaments relative t o the lamination may be important. Peels Acetate peels are a useful adjunct and are easy to prepare rapidly. A smooth-cut rock face is used; it may be necessary t o grind it flat if it is rough with saw marks. The surface may be stained with alizarin red and is then washed, dried, wetted with acetone, and 12 W. After drying for about half an hour, the acetate sheet is peeled off bearing an imprint of the structures and textures of the rock. Davies and Till describe an alternative method of making peels from carbonate rocks, and list additional stains. Statistical studies Certain quantitative parameters can be measured, which when treated statistically, give additional criteria for the comparison and discrimination of stromatolite taxa. The following have been successfully applied. The results are divided into intervals of 0. A graduated eyepiece is used with moderate magnification, since stromatolite lamina thicknesses generally fall within the range 0. The results may be divided into thickness intervals chosen according t o the predominant range of thicknesses e. These can also be represented as contoured frequency plots thickness of dark lamina plotted against thickness of adjacent light lamina, and contoured for frequency of points per unit area. The vertical structure that results from the superposition of these apices is termed the crestal zone. The coefficient of thickening is the ratio of the thickness of a lamina in the crestal zone to its thickness outside the crestal zone. These parameters can all be plotted as histograms or frequency diagrams, enabling rapid comparisons with other forms. If more than a visual comparison is required, it may be necessary to calculate means and standard deviations for the data. SUMMARY Field observations are an essential part of all stromatolite studies, not only for geological mapping, environmental interpretation and determination of stratigraphic facings, but also for detailed taxonomic study. The nature of its constituent units and their vertical and lateral relationships must be

described. Columnar stromatolites should be categorized according t o shape and orientation of columns, style of branching, and margin structure. Stromatolitic outcrops should be photographed prior t o sampling. The size and number of samples to be taken depends on the size and variability of the stromatolites. In the laboratory, serial sectioning and reconstruction are needed to show column morphology in three dimensions. Lamina shape, margin structure and microstructure are studied in thin section and acetate peels. Quantitative measurements of features of the lamination aid in the identification and comparison of stromatolites. Hofmann are gratefully acknowledged. The paper is published with the permission of the Director of Mines, South Australia. This Page Intentionally Left Blank 2. The earliest methods included verbal description and drawings of structures in outcrop, reproduced by wood cuts and lithographs e. Later, the petrographic microscope facilitated the study of microstructure, and the invention of photography and new printing methods opened up new ways for rapid improvement in disseminating information pictorially. The first Precambrian stromatolite to be described, Archaeozoon acadiense Matthew, a, p. A subsequent variant of the graphic reconstruction method is that of Raaben b , using systematically spaced, serial transverse sections. These shaded-in surface features are used to differentiate some groups and forms from others. It has now become evident that the process of shading can be very subjective, varying from one person to the next Hofmann, , and that consequently the distinction between certain taxa based on this method may be artificial. For these reasons a more objective and precise method of reconstruction is proposed, one which also may eventually lead t o automatic representation by computers. This is described below. However, instead of subjectively shading the reconstructed stromatoid surfaces, the columnar outlines are actually depicted by two sets of lines: In this manner, the surface of each column becomes outlined by a grid, whose lines and points of intersection are not only accurately placed in space, but which also automatically provides a shading effect that is mechanically produced, and therefore more objective and precise than conventional shading Hofmann, , p. Further superimposed stippling or shading is optional. However, there is often a limit to the size of the specimen that can be taken, handled, transported, and processed in the saw, and for many columnar stromatoids it is impossible to apply the method because the columns are too large. If several morphologic types are present in a bioherm, a range of variants is sampled. Relevant field observations on the positional, lithologic, sedimentologic, or other aspects relating the structures to enclosing lithosomes are essential for later interpretation of the reconstructed stromatoids. This plane also gives the plan outlines of the concentric laminae, which are desirable for completion of the top surface of the reconstruction. A set of two converging, intersecting, or diagonal straight lines are drawn on the surface, with indelible ink markers t o permit the exact relative positions of the slabs to be established later on, after sawing. Likewise, it is desirable, but not essential, to have a second, longitudinal section perpendicular to the first one before proceeding with the serial sectioning. The thickness of slabs chosen depends on the diameters of the columns, and should be selected so that the finished thicknesses of the slices are equal to, or multiples 2,3,4 of the widths sawed and ground away. This will allow later addition of intermediate profile lines by interpolation. For example, if the slab is twice the width of the cut, the two faces of the slab are traced on the final drawing, but later a supplemental line may be drawn intermediate in position between the two actually traced. In this way the uniform spacing between successive profiles is maintained. The caption of the final figure should specify whether the reconstruction is based on actual tracings only, or has supplementary profile lines. Hints Carbonate slabs as large as 10 by 30 cm can be cut mm thick without breaking if a piece of foam plastic or rubber is placed in the receptacle underneath the slices being sawed off. For large and heavy samples serial sectioning frequently requires remounting of the specimen. The block can be reinserted in the vice with nearly the same orientation if the last-cut face of the remaining portion of the specimen is aligned against the side of the saw blade. The outlines, and prominent laminar profiles of the columns to be reconstructed, as well as all reference lines or points, are transferred from the rock slice onto the drawing surface. The preparation of this tracing will often be facilitated if contrast is enhanced by introducing a film of water between the plastic drafting film and the surface to be traced. If the columns are still not readily visible they should be brought out by special treatment

such as etching or staining. Eventually, it may be possible to obtain such outlines automatically with computers with capability for imagedensity evaluation and suitable output peripherals. The tracings are labelled in sequence. This is the reticle or control grid, which provides the coordinate system for the reconstruction; it should be large enough to fumish orientation for all points represented within the sample. This is the working sheet. Method of graphic representation, illustrating reconstruction during stage of transferring fourth profile from tracing 4 onto working sheet. Contour lines have not yet been drawn through lowermost three sets of hypsometric control points. These pieces of tape act as hinges and allow the working sheet to be lifted for insertion and removal of successive tracings between it and the control grid. This point should be so located that all columns to be represented can be accommodated on the working sheet. This line is the y-reference line that gives, in isometric projection, the y-reference points of each of the serial tracings, displaced towards the rear up and to one side by a factor of 0. Mark off and label these reference points. Move it until the reference point of the tracing exactly coincides with the origin on the working sheet, and the straight horizontal reference line coincides with the underlying grid line passing through the origin. The first tracing is now properly oriented for copying. If the first face to be depicted is substantially within the column, then the laminae of this surface may also be traced so as to illustrate the laminar profile in longitudinal section. Mark or note all points of intersection of the profile lines with uniformly spaced contours, the contour interval equalling the actual uniform spacing between successive vertical profiles. Superpose the reference points for this section on the tracing and working sheets and orient the tracing until the horizontal reference line is parallel to the corresponding x-coordinate of the underlying grid. The procedure is considerably simplified if the serial sections are cut and ground so as to be an even number of miIlimetres apart 4 , 6 mm, etc. Trace the profile s of the same column s as in the first tracing onto the working sheet as well as any newly appearing ones of interest, taking care to show only those parts of the profile lines that are visible in the oblique view chosen, and not "behind" the profile s drawn for the previous section. Again, mark or note all points where the equally spaced horizontal grid lines intersect the profile lines. After the third profile has been drawn, the set of lines joining points of equal elevation can be added. Alternatively, this surface can be reconstructed from the serial vertical profiles by joining correlative points previously positioned on each tracing along the upper horizontal reference lines. A projection of a second, vertical lateral section can be drawn in similar fashion if desired. These may become necessary where the thickness of the slabs is large. The thickness should preferably be a multiple of the width of the sawed and ground portion of the specimen. In the case where the spacing is double, one supplemental profile line is added by interpolation halfway between those representing the front and back of the slabs; where it is triple, two supplemental lines are inserted. HOFMANN SUMMARY The result obtained by the method is an isometric diagram of vertical profiles and obliquely viewed horizontal contour lines, whose points of intersection lie on a systematic, three-dimensional coordinate system, on two sets of unifornily spaced and mutually perpendicular planes.

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Chapter 2 : Revisiting the stratigraphy of the Mesoproterozoic Chhattisgarh - calendrierdelascience.com

*Biostratigraphic study of stromatolites and microbiota of Chattisgarh Basin, M.P., India (Pailiontolojiya Indika / Bharatiya Bhuvaijnanika Sarvekshana) [A. K Moitra] on calendrierdelascience.com *FREE* shipping on qualifying offers.*

An assemblage of structurally preserved organic-walled microfossils OWMs from the macerated residue of black carbonaceous shale belonging to Saradih Formation, the youngest carbonate horizon of the Raipur Group, Chhattisgarh Supergroup exposed at on the right bank of Mahanadi River, NE of Sarangarh township in Raigarh district, Chhattisgarh is being reported for the first time. The assemblage is comprised of 19 taxa of 13 genera belong to eukaryotes and prokaryotes viz. Leiosphaeridia, Stictosphaeridium, Dictyotidium, Synsphaeridium, Symplassosphaeridium, Satka, Trachysphaeridium, Goniosphaeridium, Trachyhystrichosphaera, Vandalosphaeridium, Siphonophycus, Oscillatoriopsis and Polythrichoides. The comprehensive account of recovered microbiotic assemblage can be correlated with globally known Neoproterozoic early Cryogenian assemblages, deposited in tidal complexes of shallow sea. Organic walled microfossils, Acritarchs, Cyanobacteria, Neoproterozoic, Chhattisgarh. The entire succession in the limestone, known as the Chhattisgarh Supergroup Das et western and south-central parts and little part in south-eastern al. This is similar to other Proterozoic basins viz. Several workers mainly for lithostratigraphy, lithofacies and palaeogeography have suggested late mid-Proterozoic to Neoproterozoic age Murti, ; ; Das et al. Kâ€”Ar dating of authigenic Chakraborty et al. Majority of palaeobiological glauconite mineral from the Chandarpur and Raipur groups evidences viz. A few contributions have earlier been zircons Patranabis-Deb et al. In made in tracing the biological evidences from the Raipur particular, zircon ages from the Khariar tuff show a Group Moitra, of Hirri sub-basin and Saraipali concentration of ages around Ma for the basal part of Formation of Singhora Group Babu and Singh, in Chhattisgarh succession Das et al. This is also Baradwar sub-basin. The age of the Chhattisgarh Supergroup supported by recent geochronological studies from the lower in Baradwar sub-basin is still a debatable matter due to part of the Chhattisgarh basin Basu et al. The inadequate palaeobiological information. Tectonic distribution of Proterozoic platform basins in Indian shield after Naqvi and Rogers, Basins: Chhattisgarh Basin modified after Das et al. Sapos area after Basu et al. The present finding of the bonafide Fig. Here the succession is characterized by prolific organic-walled microfossils is significant in fulfilling the development of algal stromatolites and mature sandstones, demands for inferring the age and environment of deposition a characteristic stable platformal association Dutt, ; of Saradih Formation of Raipur Group. This is considered as youngest succession of Chhattisgarh overlies the Gunderdehi Shale Formation and is underlain Supergroup deposited in Baradwar sub-basin, having litho- by Churtela Shale Formation of the Raipur Group. The stromatolites are columnar in longitudinal minor sandstone Fig. Group in the study area has five successive formations The limestone is cherty in its upper part. The grey to dark viz. Bijepur shale, Sarangarh limestone, Gunderdehi grey shale sequence 2. The shale sequence is further ascending order Patranabis-Deb and Chaudhuri, overlain by thick bedded limestone 4. Generalized Chronostratigraphic chart of the Chhattisgarh Supergroup based on available data. The chert is black in colour, thinly acritarchs and cyanobacteria. In the latter remains, the bedded 0. The identified taxa of cyanobacterial affinity include 15 cm long and cm wide , show vitreous lustre. The Schopf, Siphonophycus thulenema Butterfield, Siphono- cherty limestone is further overlain by a thick dolomite phycus typicum Hermann Butterfield et al. The acritarchs taxa include: Mahanadi river at Dhota village Lat. Palynological slides of Timofeev Mikhailova and Yankauskas, Leiosphaeridia macerated residue were prepared through standard and tenuissima Eisenack, Symplassosphaeridium tumidulum modified techniques Grey, The observations were Timofeev Timofeev, Synsphaeridium sorediforme made with Olympus BH2 microscope under 40x and x Timofeev Eisenack, Satka colonialica Yankauskas, oil immersion objectives. The microphotographs were Stictosphaeridium hunjiangensis Yin, Trachysphaeridium taken with attached digital Camera CS using Olympus laminaritum Timofeev Vidal, Trachyhystrichosphaera software. All the slides and

samples bearing the label with truncate Hermann and Yankauskas, Vandalosphaeridium full details are deposited in the museum of Birbal Sahni reticulatum Vidal, and Goniosphaeridium implicatum Institute of Palaeobotany, Lucknow BSIP statement no. These are among the oldest It was low in Palaeoproterozoic and The various species of simple sphaeromorphs â€" moderate in Mesoproterozoic time Knoll, The Leiosphaeridia, are dominant over the ornamented various species of Leiosphaeridia belonging to simple sphaeromorphs, followed by acanthomorphs. This is sphaeromorphs have commonly been reported from the indicative of moderate deep water and tidal depositional Meso-Neoproterozoic sediments of Canada, Australia, east environment. The ornamented sphaero- of cyanobacteria owing to alteration in gene pool either in morphic acritarchs in association with various species of numbers or in size. This assemblage is also recorded from the Trachyhystrichosphaera, Goniosphaeridium, and equivalent sediments of other parts of world Fensome et Vandalosphaeridium in present assemblage are the key fossil al. The sediments were deposited Similar data are also known from the equivalent sediments in two types of environmental settings viz. This is also supported by the presence viz. Canada, Greenland, India, Russia, Spitsbergen and of stromatolites and associated chert microbiota above Sweden Hofmann and Jackson, ; Butterfield et al. Therefore, the ; Huntley et al. Organic-walled microfossils from the Saradih Formation: This is a preliminary report and detailed work and Gunderdehi shale formations Mukherjee and is in progress. Two volcanic units named Sapos and Sukhda rhyolitic tuffs in this sub-basin need more data to confirm Acknowledgement: The authors are grateful to Birbal stratigraphic position and variable age Patranabis-Deb Sahni Institute of Palaeobotany for providing laboratory et al. We are also Are these volcanic sequences of Raipur Group analogous indebted to Mr. We are extremely thankful to provided by U-Pb method Torsvik et al. The anonymous reviewers for their suggestions. Chhattisgarh Supergroup, India and their significance. Implications east Gondwanaland Neoproterozoic In: Chhattisgarh Supergroup, India and the Ma question. Fossils and Strata, v. Lithostratigraphy and sedimentation of Chhattisgarh basin. Principles Indian Minerals, v. Middle to late Proterozoic basins of Peninsular India. Fall of the Ediacaran Biota. Precambrian of central India. Seminar Precambrian Crust in eastern and central India. India microbiota of the Chhattisgarh Basin, M. Symposium on Purana Formations of Peninsular India. Protobasin, Chhattisgarh basin, central India: Capital Publ House, New Delhi, p. The Palaeobotanist, leiosphaeric and acanthomorphic acritarchs from the Ediacaran v.

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Chapter 3 : Stromatolites - PDF Free Download

M OITRA, A.K. () Biostratigraphic study of stromatolites and microbiota of the Chhattisgarh Basin, M P, India, Palaeontologica Indica, v. 51, pp. 1- MICROBIOTA FROM THE CARBONA TE FACIES.

The timing of oceanic anoxic events in the Cretaceous succession of Cauvery Basin: Mixing processes in modern estuarine sediments from the Gulf of Khambhat, western India. Marine and Petroleum Geology 91, Origin and geochemical characterization of the glauconites in the Upper Cretaceous Lameta Formation, central India. Journal of Palaeogeography 7, Application of visible and infrared spectroscopy for the evaluation of evolved glauconite. Roasting-leaching experiments on glauconitic rocks of Bakchar ironstone deposit Western Siberia for evaluation their fertilizer potential. Applied Clay Science , Implications on provenance and basin evolution. Journal of Palaeogeography, https: Facies and depositional settings of the Middle Eocene-Oligocene carbonates in Kutch. Paleogene stratigraphy of Kutch, India: An update about progress in foraminiferal biostratigraphy. The distinctive compositional evolution of glauconite in the Cretaceous Ukra Hill Member Kutch basin, India and its implications. Marine and Petroleum Geology 82, Compositional variation of glauconites in Uupper Cretaceous-Palaeogene sedimentary iron-ore deposits in south-eastern western Siberia. Sedimentary Geology , Economic potential of glauconitic rocks in Bakchar deposit S-E western Siberia for alternate potash fertilizer. Applied Clay Science, , The effects of igneous dike intrusion on organic geochemistry of black shale and its implications: Late Jurassic Jhuran Formation, India. International Journal of Coal Geoloy , Estimation of palaeo-slope and sediment volume of a lacustrine rift basin: Journal of Asian Earth Sciences , Implications for depositional model in southern part of the Andaman basin. Journal of the Indian Association of Sedimentologists 34, The morphology and evolution of tidal bar sand bodies in the macrotidal Gulf of Khambhat, western India. Marine and Petroleum Geology 77, Pande, K, Meena, S. Sedimentary Geology , 12â€" A review on palaeogeographic implications and temporal variation in glaucony composition. Journal of Palaeogeography 5, Origin, depositional setting and stratigraphic implications of Palaeogene glauconite of Kutch. Special Publication of the Geological Society of India 6, Eocene depositional sequence and cycles in Kutch. Sequence stratigraphic analysis of a shallow marine, mixed carbonate-siliciclastic system, early Miocene, Kutch. An updated Eocene stratigraphy of Kutch. Berita Sedimentologi 35, Distinctive compositional characteristics and evolutionary trend of Precambrian glaucony: Precambrian Research , 33â€" Possible indicator of Oceanic Anoxic Event? Journal of the Geological Society of India 85, â€" Geological Society of London Memoir 43, 85â€" Palaeoenvironmental and biostratigraphic implications of microbial mat-related structures: Journal of Palaeogeography 3, â€" Tom , Bose, P. Seismic and non-seismic soft-sediment deformation structures in the Proterozoic Bhander Limestone, central India. Spectral variation of Microbial mat records in siliciclastic rocks: Journal of Asian Earth Sciences 91, â€" Siliciclastic-carbonate mixing modes in the river mouth palaeogeography of the Upper Cretaceous Garudamangalam Sandstopne Ariyalur, India. A review of the inferred geodynamic evolution of the Dharwar craton over the ca. Canadian Journal of Earth Sciences 51, â€" Age of Lignite and Fossil Vertebrates. Journal of Palaeogeography 3, 90â€" Secular changes in sedimentation systems and sequence stratigraphy. Gondwana Research 24, â€" Microbial mat-related peculiar tunnels and cracks from modern supratidal environment, Gulf of Cambay, India. International Journal of Earth Sciences , Palynology, palaeoecology and palaeodepositional environment of Eocene lignites and associated sediments from Matanomadh mine, Kutch basin, western India. Journal of the Geological Society of India 82, â€" Mineralogy and geochemistry of lagoonal glauconites and their implications on origin and maturation: Geological Journal 47, â€" Substrate control on formation and maturation of glauconites in the Middle Eocene Harudi Formation, western Kutch India. Marine and Petroleum Geology 30, â€" Nummulites solitarius â€" Nummulites burdigalensis lineage in Kutch with remarks on the age of Naredi Formation. Journal of the Geological Society of India 79, â€" Integrated borehole and outcrop study for documentation of sea level cycles within the Early Eocene Naredi Formation,

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