INVESTIGATION AND EXPLORATION OF DIVERSIFIED FOSSIL FLORA FROM CENTRAL INDIA

Final Report

(2017-2019)

Sanction Letter No. F. 47-1255/14 (General/ 31/ WRO)

XII Plan

Submitted To

University Grants Commission

Ministry of Human Resource Development, Govt. of India

Western Regional Office

Ganeshkhind, Pune-411007

Submitted By

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Principal Investigator

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J. M. Patel Arts, Commerce & Science College,

Bhandara- 441904 (M. S.)

Re-Accredited 'B' Grade by NAAC

College with Potential for Excellence (Phase II) by UGC

Recognized as Centre for Higher Learning & Research by R.T. M. Nagpur University, Nagpur.

"INVESTIGATION AND EXPLORATION OF DIVERSIFIED FOSSIL FLORA FROM CENTRAL INDIA"

FINAL REPORT
OF
MINOR RESEARCH PROJECT
IN
BOTANY
(2017-2019)

SUBMITTED BY
DR. (MRS.) APARNA M. YADAV
PRINCIPAL INVESTIGATOR

UGC FILE NO.: 47-1255/14 (GENERAL/ 31/ WRO) XII PLAN DATED 16^{tH} MARCH 2017
FUNDING AGENCY: UGC
SANCTIONED AMOUNT: 3,30,000/-
SANCTION LETTER RECEIVED ON: 05 APRIL 2017
DATE OF IMPLEMENTATION: 6th APRIL 2017
DURATION OF PROJECT: 02 YEARS (6th APRIL 2017 TO 6^{tH} APRIL 2019)

J. M. PATEL ARTS, COMMERCE & SCIENCE COLLEGE,
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BY R.T. M. NAGPUR UNIVERSITY, NAGPUR.

Gondia Education Society's
J. M. PATEL ARTS, COMMERCE & SCIENCE COLLEGE
BHANDARA - 441 904 (M.S.)
★ Re-accredited 'B' Grade by NAAC ★ Awarded the Status of 'College with Potential for Excellence' (Phase II) by UGC
★ Recognized as 'Centre for Higher Learning & Research' by R.T.M. Nagpur University, Nagpur

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Ref. No.: JMPC/0055/2019-20 Date : 27/04/2019

To,

Dr. N. Gopukumar
The Joint Secretary,
University Grants Commission,
MHRD, Gov. India
Western Regional Office,
Ganeshkhind, Pune- 411007

Sub: Submission of Final Project Report for Financial Assistance to Teacher in College for undertaking Minor Research Project.

Ref: UGC Sanction letter No. F. **47-1255/14 (General/ 31/ WRO) XII Plan dated 16th March 2017.**

Through: The Principal J. M. Patel Arts, Commerce & Science College, Bhandara.

Sir,

Kindly find herewith the Final Project Report, Statement of Expenditure and Audited Utilization Certificate for Minor Research Project in Botany entitled **'Investigation And Exploration Of Diversified Fossil Flora From Central India'.** Sanctioned to Dr. (Mrs.) A. M. Yadav in the prescribed format of UGC.

Thanking You

Enclosures:

1) Statement of Expenditure, Audited Utilization Certificate, Project Completion Report (PCR), Assets Certificate, Accession Certificate & Statement of Expenditure Incurred on Field Work.

Principal Investigator
Dr. (Mrs) A. M. Yadav
J.M. Patel College, Bhandara

J. M. Patel College of Arts, Comm. & Sci.

Principal
J. M. Patel College, Bhandara

Principal
J. M. Patel Arts, Commerce
& Science College, Bhandara

Forwarded Through:
Cc:

1) Director Board of Innovation, Incubation & Linkages, Mahatma Jyotiba Fule Education Campus, Nagpur.
2) Deputy Registrar, College Section, RTM Nagpur University, Nagpur.

Gondia Education Society's
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Ref. No.: JMPC/0058/2019-20

Date : 27/04/2019

To,

Dr. N. Gopukumar
The Joint Secretary,
University Grant's Commission,
MHRD, Gov. of India
Western Regional Office,
Ganeshkhind, Pune- 411007

Sub: Release of second installment amount of Rs. 75000/- towards the expenditure incurred under Minor Research Project.

Ref: UGC Sanction letter No. F. **47-1255/14 (General/ 31/ WRO) XII Plan dated 16th March 2017.**

Through: The Principal J. M. Patel Arts, Commerce & Science College, Bhandara.

Sir,

You are requested to release the amount of Rs. 75000/- towards the expenditure incurred under MRP. The financial assistance of the UGC for this project was Rs. 330000/- out of which the amount of first installment release to Rs. 255000/- was only received. Till the completion of work the total expenditure incurred was Rs. 334056/-. You are therefore requested to release the balance of Rs. 75000/- against the sanctioned amount and oblige.

Thanking You

Principal Investigator
Dr. (Mrs) A. M. Yadav
J.M. Patel College, Bhandara

J. M. Patel College of Arts, Comm. & Sc.

Principal
J. M. Patel College, Bhandara

Principal
J. M. Patel Arts, Commerce
& Science College, Bhandara

Forwarded Through:

Cc:

1) Director Board of Innovation, Incubation & Linkages, Mahatma Jyotiba Fule Education Campus, Nagpur.
2) Deputy Registrar, College Section, RTM Nagpur University, Nagpur.
3) The Drawing & Disbursing Officer, University Grant's Commission, Ganeshkhind, Pune.

PROJECT COMPLETION REPORT (PCR)

Certified that the Minor research Project entitled '**Investigation And Exploration Of Diversified Fossil Flora From Central India**' awarded to **Dr. (Mrs.) A. M. Yadav** of this college, in the subject of **Botany** has been successfully completed and all completion documents have been submitted to UGC-WRO, Pune.

Signature of Principal Investigator
Dr. (Mrs.) A. M. Yadav
J.M. Patel College, Bhandara

Signature of the Principal with Seal
Principal
J. M. Patel Arts, Commerce & Science College, Bhandara

J. M. Patel College of Arts, Comm. & Sci.

ACKNOWLEDGEMENT

It gives me immense pleasure to express my deep sense of gratitude to United Grant Commission (UGC) for granting and giving financial support to carry out my research work.

I express my sincere thanks to Dr. Vikas Dhomne, Principle, J. M. Patel, College, Bhandara for providing basic facilities to carry out research project.

I am extremely grateful to Dr. Steven R. Manchester, Curator of Palaeobotany, Florida Museum of Natural Hisory for his contribution in the conformation and identification of various fossil forms.

I am thankful to Dr. D. K. Kapgate Ex-H.O.D, Deprtment of Botany, J. M. Patel, College, Bhandaraand sincere thanks to Dr. M. T. Sheikh, Ex-Reader, Department of Botany, Institute of Science, Nagpur, for identifying Deccan and Gondwana fossil forms.

I wish to express my sense of appreciation and indebtedness to Dr. (Mrs.) S. D. Narkhede, Associate Prof., Department of Botany, H. O. D., Environmental Science, Institute of Science, Nagpur, for valuable suggestion and fossil identification.

I express my sincere thanks to Dr. A. K. Pedhekar, H.O.D., Department of Botany, Dr. V. J. Tiwari, Assos. Prof., Department of Botany, Dr. P.S. Rao and Dr. S.P. Qureshi., Asst. Prof., in Department of Botany, J. M. Patel, College, Bhandara for their encouragement and support.

My sincere thanks to departmental non-teaching staff members for supporting me in my time of necessity.

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SUMMARY OF THE PROJECT CONSIST OF SIX CHAPTERS

CHAPTER 1: INTRODUCTION

CHAPTER 2: METHODOLOGY

CHAPTER 3: MAP OF LOCALITIES

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CHAPTER 1

INTRODUCTION

Palaeobotany is the branch of Botany which deals with the study of plants life of the geological past or deals with the study of plant fossils. Fossils are pre-historic remnants which are preserved in geological past. Thus, a fossil needs to be dug out from the sedimentary exposures.

Index fossils give us information about the flora restricted to time period of occurrence and indicate the age of rock strata formation accurately. Fossils also help in reconstructing geography and climate of a region during past geologic period. Some fossils indicate more details information about the particular environment and climatic condition. It also helps to correlate the past flora with the present day flora and interpret the evolution. Fossil assemblage of same age are not necessarily identical for the species in them will depend on the condition of environment and development in each area of sedimentation. Every rock layer ha s characteristic geophysical signature.

Study of Deccan Intertrappean Beds of India

Stratigraphy of Deccan traps

In order to study the various aspects of Palaeobotany, such as the origin of plant life, origin of different groups of plants, evolution of plant groups and their application, it is absolutely necessary to have a very basic knowledge of the branches of geology. Stratigraphy deals with the study of the correct sequence of rock strata in the earth's crust and is also considered a part of historical geology. It aims at unveiling the past history of the earth through the records available in the rock layers.

The Deccan trap can be divided into three zones viz 1) Upper Traps 2) Middle Traps and 3) Lower Traps. Of these, the middle traps are thickest and include trap of Madhya Pradesh, which are completely barren of Intertrappean beds and hence in fossils. The lower traps are represented in Narmada, Berar, beside Madhya Pradesh and are frequently housed by fossiliferous Intertrappean beds. The upper trap includes basalt i.e flora of Mumbai and Kathiawar again with a number of Intertrappean beds, which are fossiliferous. (Wadia 1961).

Geology of Deccan traps

Of all the branches of geology, it is historical geology which deals the geologic history of the earth and hence is more closely associated with palaeobotany. Towards the close of the Cretaceous period, a series of volcanic eruptions occurred in India, which it is believed continued until the Eocene. These volcanic eruptions resulted in hundreds of bedded horizontal lava flows which, after erosion, gave rise to the flat – topped terraced hills that now mark the topography of the Deccan Plateau. These have a characteristic step – like appearance and are therefore called the Deccan traps.The volcanic eruption which gave rise to the Deccan traps was of the quiet fissure type. The free-flowing lavas are believed to have emanated from long fractures along the coast of Maharashtra. They traveled for long distances before solidifying into rock and enroute covered all the previously existing topography. The various lava flows differed in their resistance to erosion, resulting in the present step-like appearance of the Deccan traps. Deccan trap was formed due to the greatest volcanic eruption in Indian geology that consist of lava flows which started towards the end of Cretaceous period, subsequent to Bagh beds and lameta then led to the formation of immense volcanic plateau.

The term **"Deccan"** is derived from the vernacular **"Dakshin" or "Dakhan"** meaning southern part of India. So that, this trap is called as **"Deccan traps"** and it was first used by (W. H. Sykes 1833).

Medlicot (1873) applied a short term for basaltic sedimentary rock as **"Trap"** now more or less obsolete in geological terminology, has been sustained partly in conformity with old custom and partly because it is peculiarly suitable for rock responsible for the step or terrace like appearance which is a characteristic feature of these beds.

Distribution of the Traps

The Deccan traps cover a large area of India. Tertiary rock deposits in India can be grouped into major groups on the basis of their geographic distribution-peninsular and extra-peninsular. In the peninsular region a very large area about 520,000 sq. km is occupied by the Deccan Traps in which the intertrappean sedimentary beds bearing Tertiary flora are sandwiched. These beds occur mostly around Rajahmundry in Andhra Pradesh, Nagpur and Wardha districts in Maharashtra and Mandla and Chhindwara districts in Madhya Pradesh (Krishnan 1960, Wadia

1961). It extend from Belgaum (Lat 15°, 30'N) to Goona (Lat 24°, 34'N) and from Mumbai (Long 72°, 50' E) to Amarkantak (Lat 81° 50'E) (Blanford 1867).

In South India it extends up to Dharwar, Rajahmundry. In East, near Amarkantak, it is found up to Sarguja and Jashpur where as upto Kutch in North West. The lava flows from Yeotmal, Nagpur and Mohgaonkalan are considered as the earliest pouring where as the highest flows is recorded at Malabar and Worli hill of Mumbai. However, Deccan traps have covered a large area and the continuous process of denudation, dissected them to numerous flat topped hills separated from each other. In extreme cases the weathering resulted into an isolation of the basaltic flow in the patches widely separated from the main area by long distance (Krishnan 1960 & Wadia 1961).

Age of Deccan traps

The assignment of age to the Deccan Traps is controversial given the antiquity of the areas involved and the vast geological time scale. However certain authors have expressed their views on this. The Deccan Traps range in age from Upper Cretaceous to Paleocene to even Eocene in different localities. It is hypothised that the eruption of the Deccan Traps first commenced during the Upper Cretaceous period and carried up to the Eocene. A major part of Deccan Traps has been found to lie in different localities and range in age from Upper Cretaceous to Paleocene or even Eocene, and the first impulse of Deccan Traps Volcanocity was in all probability felt some time during the Upper Cretaceous period.

The Deccan Trap formation was a remarkable event of the geological past. Regarding the age of the Deccan Traps, information is somewhat vague and inconclusive and there are indications and certain amount of fossil evidence that disturbance persisted for a long period.

Distribution of Deccan trap in central India

The Intertrappean beds generally found in upper and lower traps, in the middle trap it is totally absent. These beds occur as broken outcrops contouring the hills, not exceeding 4.5 to 6.5km in lateral extend. An exception is seen in the east of Jabalpur where the Intertrappean are traced to 20 miles at a stretch.

Intertrappeans are well exposed in the Deccan trap as small patches in central India particularly in Madhya Pradesh and Maharashtra state.

In Chhindwara district of Madhya Pradesh it is seen in the Mohgaonkalan, Paladoun, Udadaun, Chaorai, Sausar and Singhpur, Bhutera, Ghat Parasia and nearby areas and in Maharashtra, in Nagpur Dist. it is exposed in Nagpur, Phutala tank, Takli and Mahurzari. In Wardha District is exposed at Navargaon. In Yeotmal Dist, it is exposed in Shibla, Jhargad, Mangurda, Pandharkwada, Soit and Vadner etc.In these localities we get beautifully preserved plant fossil including Algae, Fungi, Bryophytes, Gymnosperms and Angiosperms.

Chemical composition of cherts

In Intertrappean beds, generally two types of cherts are found, they are brown or buff colored and black colored cherts. In black color cherts the plant parts shows beautiful cellular preservations as compared to brown colored cherts. In brown color cherts there is more oxidation of iron compound and in this ferrous oxide is partly converted into ferric oxide, due to these reasons, Plant part gets poorly preserved in brown chert (Nambudiri 1967 and Patil 1971).

The chemical composition of black chert is as according to Nambudiri 1967 and Patil 1971.

Table

Compounds quantity of rock analyzed	Percentage in black cherts 100 gm.
Silica (SiO)	93.51%
Aluminum (Al)	1.26%
Ferric Oxide (FeO)	0.37%
Ferrous Oxide (FeO_3)	0.30%
Iron (Fe)	0.50%
Magnesium Oxide (MnO_4)	Trace
Potassium Oxide (K_2O_5)	Nil
Sodium Oxide (NaO)	0.94%
Phosphorous (P)	0.06%
Sulphur trioxide (SO_3)	0.027%
Sulphur dioxide (SO_2)	0.03%
Sulphur (S)	2.99%

Better preservation in the black chert may be also due to the mode of fossilization. According to (Chitaley 1975), quick reaching of plant part to the lake bottom reduced the attack of micro-organization and it has followed by quicker precipitation of insoluble compound within plant tissue.

Study of Gondwana flora of India

Introduction and nomenclature of the Gondwana system

Gondwanaland, is the name given to a southern precursor supercontinent. Its final geological suturing occurred between ca. 570 and 510 million years ago (Ma), joining East Gondwana to West Gondwana. It later separated from Laurasia 180-200 million years ago during the breakup of the Pangae supercontinent that existed about 500 to 200 Ma into two large segment, nearly equal in area. While the corresponding northern-hemisphere continent Laurasia moved further north, Gondwana drifted south. It included most of the landmasses in today's Africa, Madagascar, Australia-New Guinea, and Newzealand, as well as Arabia and the Indian subcontinent, which have now moved entirely into the Northern Hemisphere.

Gondwanaland is named after the Upper Palaeozoic and Mesozoic formation of the Gondwana district of central India. In the late nineteenth century on the basis of comparative geological evidences. The continent of Gondwana was named by Austrian geologist, Edward Suess, after the Gondwana region of central northern India (from Sanskrit **Gondvana** "forest of Gond"). He also suggested that the continents of Africa, South America, Australia and India were once part of a single supercontinent, which he called "Gondwanaland".

Nomenclature

The East India Company in the coal measures of the Damodar Valley started the study of the coal bearing rock formation by (J. Colder 1829) as their first employer. (J. Mc. Clelland1837) was appointed by the east India company as a junior member and secretary of the committee set up for the investigation of coal and mineral resources of India. By the recommendation of the secretary, D.H. Williams of the British geological survey was specially sent to India for initiating the study of the coal measures of India. But, only after two sessions of fieldwork in the area laying between the Raniganj coalfield and Kaimur Plateau. On 25th November Mc. Clelland (1848) assumed his self styled office as 'In charge of the geological survey of India" very soon

he discovered the Giridh coalfields which contained the best coal in the country. He was relived of his duties as "officiating superintendent" of the geological survey in 1850. Thomas Oldham (1851) was transferred from the geological survey of Ireland to organize Geological survey of India. Thus, the study of the coal bearing rock formation was started even before the existence of Geological Survey of India.

Gondwana stratigraphy of India

Super Seq.	Age	Eastern Himalaya		Peninsular Gondwana				
		Bhutan And Darjeeling	Arunachal Pradesh	Damodar Koel East Son Valley Basin	Rajmahal Purnea Galsi Basin	Rewa Basin	Satpura Basin	Godavari Valley Basin
Iv	Early Cretaceous Mid Jurassic (Callovian)				Rajmahal	Bansa	Jabalpur	Chikiala Gangapur
Mid Late Jurassic Gap								
Iii	Early Jurassic To Late Triassic (Norian)			Supra Panchet	Durbrajpur	Bandogarh / Haralla/ Parsora	(?) Bagra	Kota
Infra Upper Norian Unconformity								
Ii	Late Triassic (Carnian)			Panchet	Panchet	Tiki Upper Pali	Denwa Pachmarhi	Dharmaram Maleri Yerrapalli
				Ranjiganj		Middle Pali	Bijori	Kamthi
	Late Permian			Barren Measures		Lower Pali	Motur	Barren Measures
I	Early Permian	Damuda Diuri Boulder Bed	Bhareli Lichi Volcanic Bichom Miri	Barakar Karharbari Talchir	Barakar Talchir	Barakar Talchir	Barakar Karharbari Talchir	Barakar Talchir
	Pre - Cambrian			Basement				

(After Ravishankar *et al.*, 1994)

Division of Gondwana system

The classification of Indian Gondwana is controversial since the time of Feistmantal. According to the bipartite division, the Indian Gondwana deposits were divided into two, with the line of separation at the top of the Panchet series where there is believed to be a break in stratigraphy and plant life. The two Divisions Are:

1) Lower Portion – *Glossopteris* flora

2) Upper Portion –*Ptilopyllum* or Rajmahal flora

C.S. Fox in his memoir on 'The Gondwana System and Related Formations' discuss the various possible formations, which comprise the Gondwana system as it was officially recongnized in 1931. In this memoir he supported original two fold divisons of Gondwana and give reasons and details about its classifications.

Feistmantel (1876) however introduced a new division:– The middle Gondwanas, in which he placed all the localities containing lower Gondwana fossils but bearing the lithological aspects of the upper Gondwanas. Thus, the system is classified into three principal divisions the lower, middle and upper. The two folds and three-fold classification of the Gondwana system proposed by C.S. Fox (1935), Feistmantel (1876), D. N Wadia (1952) and Dey (1968).

<table>
<tr><td rowspan="5">Upper Gondwana</td><td>Umia Series</td><td rowspan="4">Upper Gondwana</td></tr>
<tr><td>Jabalpur Series</td></tr>
<tr><td>Rajmahal Series</td></tr>
<tr><td>Maleri Series</td></tr>
<tr><td>Mahadeva Series</td><td>Middle Gondwana</td></tr>
<tr><td>Lower Gondwana</td><td>Panchet Series</td><td>Lower Gondwana</td></tr>
</table>

Palaeopalynology

Palaeopalynology is one of the branch of palynology and it deals with the study of fossil pollen grains and spores. Pollens and spores survive better and longer than other biological material due to the presence of tough exine. The exine is mainly composed of sporopollenin that renders the pollen grains and spores resistant to decay. Pollen survive well where microbial activity is depressed due to drought, low availability of oxygen and presence of toxic salts in soli. The pollen analysis in comparison to mega fossil studies is more advantageous by virtue of the fact that a little quantity of sample unfolds the vegetation of that area from where the sample are collected.

Pollens and spores are always produced in very large number. This is due to unreliability of particular grain finding its target. To be effective pollen and spores are produced in a far number than would be needed. This forms the basis upon which palaeopalynology depends. Pollen grains from atmosphere settle to soil from where they are washed out by rain water into lakes, streams, seashores etc. Pollen grains lie there for very long periods of time. Humus collects and thus pollen grains etc fossilized. But the characteristic of surface pattern and aperture are still retained, and are of great diagnostic value. These deposits become a storehouse of information from where ancient vegetation can be reconstructed.

In such deposit's types of pollen and their abundance become means of statistical analysis that leads to reconstruct palaeoenvironment. Change of type of pollen and spores in the different strata reveal the change of vegetation and accordingly the changing pattern of the climate can be interpreted.

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CHAPTER 2

METHODOLOGY

1. **The film of peel technique:**
   Anatomical details were studied after breaking the chert, the plant specimen get exposed. The preserved plant specimen etched with hydrofluoric acid and peels were made. Peels are mount in DPX or Canada balsam and left it to dry whole night.
   The peel method is dependent upon the presence of nonmineralized substance in the cell walls. The hydrofluoric acid that is applied to the prepared surface dissolves the mineral matter from the cell cavities and leaves the cell walls. Then when a thin solution of cellulose nitrate is spread over the etched surface and allowed to dry, a thin layer of embedded plant tissue can be removed with it.

2. **Ground section technique:**
   In this technique thin ground section of the plant specimen is made to study the anatomical details.

3. **Maceration technique:**
   - The coal or soil samples are prepared by fine crushing.
   - Dip 10-20 gm of sample in 40% Hydroflouric acid.
   - Keep the sample for 2-5 days till the sample dissolves in HF.
   - Decant and remove the HF
   - Wash the sample 2-3 times with water
   - Add Nitric acid, keep for 30 min.
   - Thoroughly wash the sample.
   - Add 5% Potassium Hydroxide (KOH) solution keep for 1 min.
   - Wash the sample and sieve with 10 micron sieve.

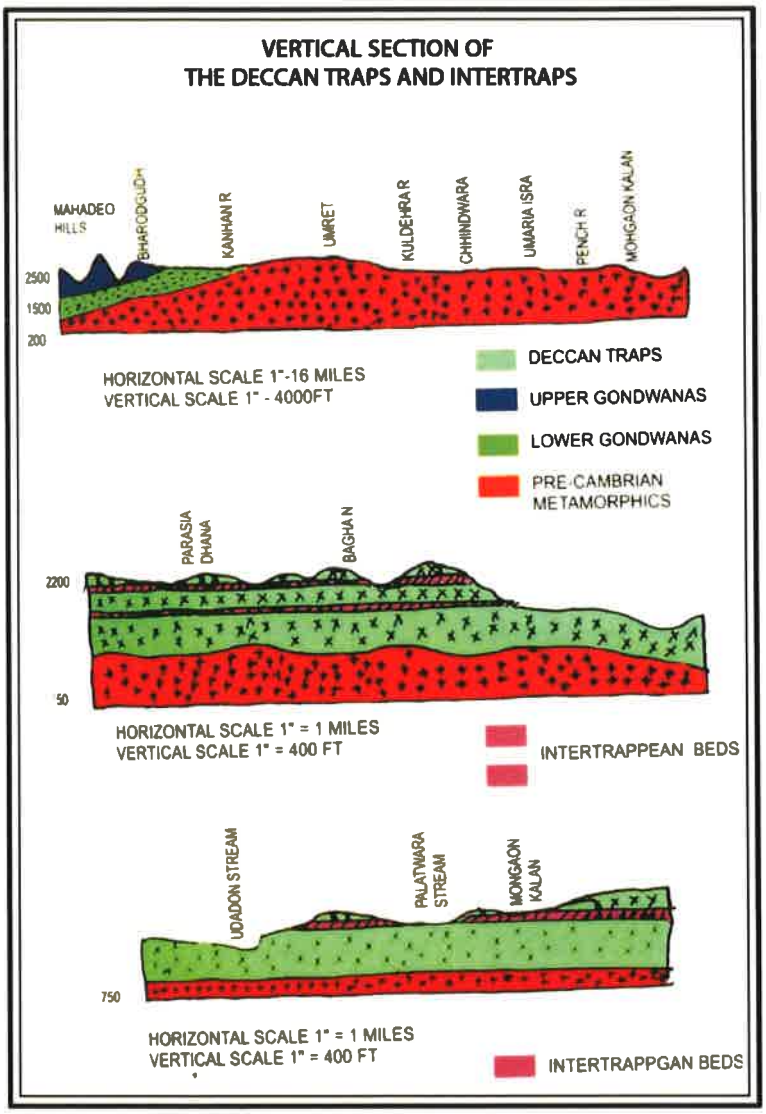
   Sample containing pollens and spores mount in glycerine jelly and observed under the microscope.

4. **Gondwana specimen study technique:**

   The specimen preserved in the form of impression and compression on black coloured coal shale and whitish ash coloured shale. The specimens are studied with the help of different magnifying lenses and binocular research microscope.

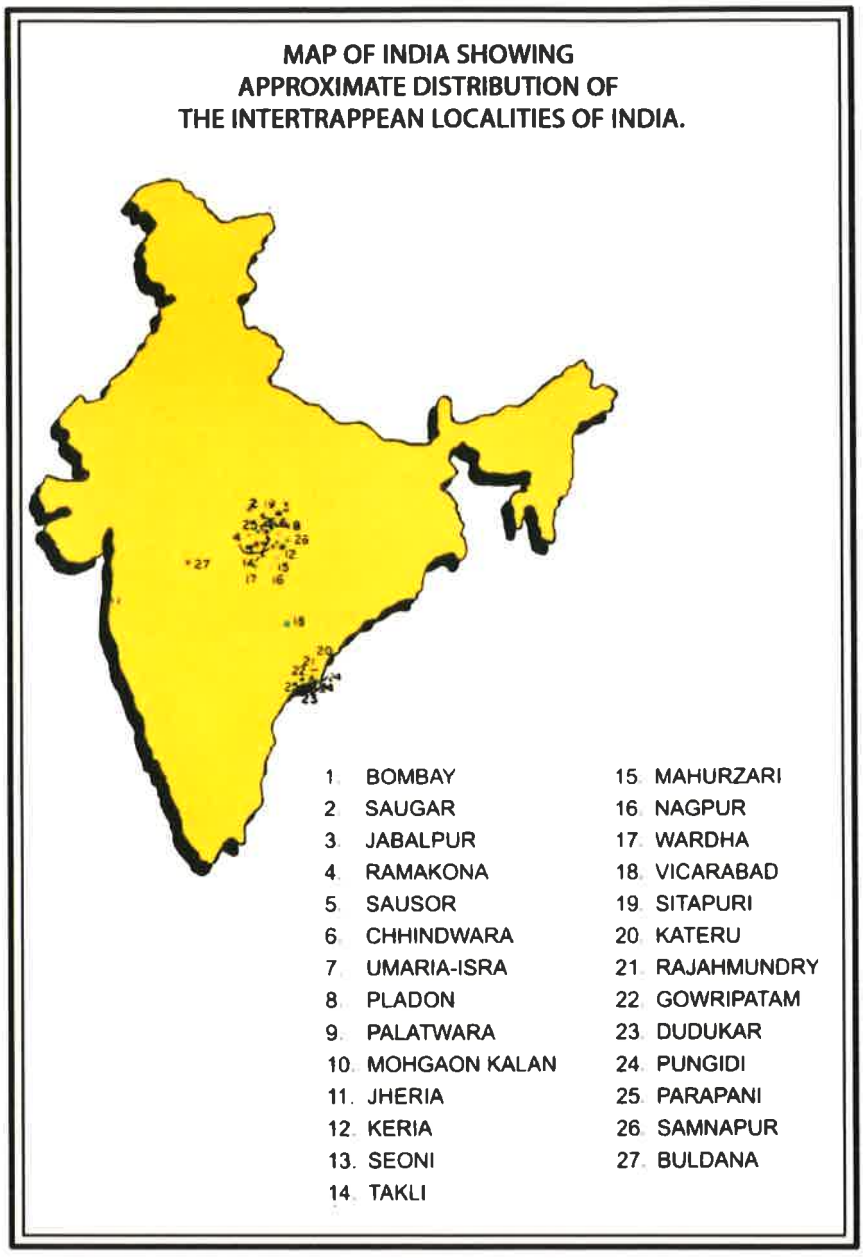
CHAPTER 3

MAPS OF LOCALITIES

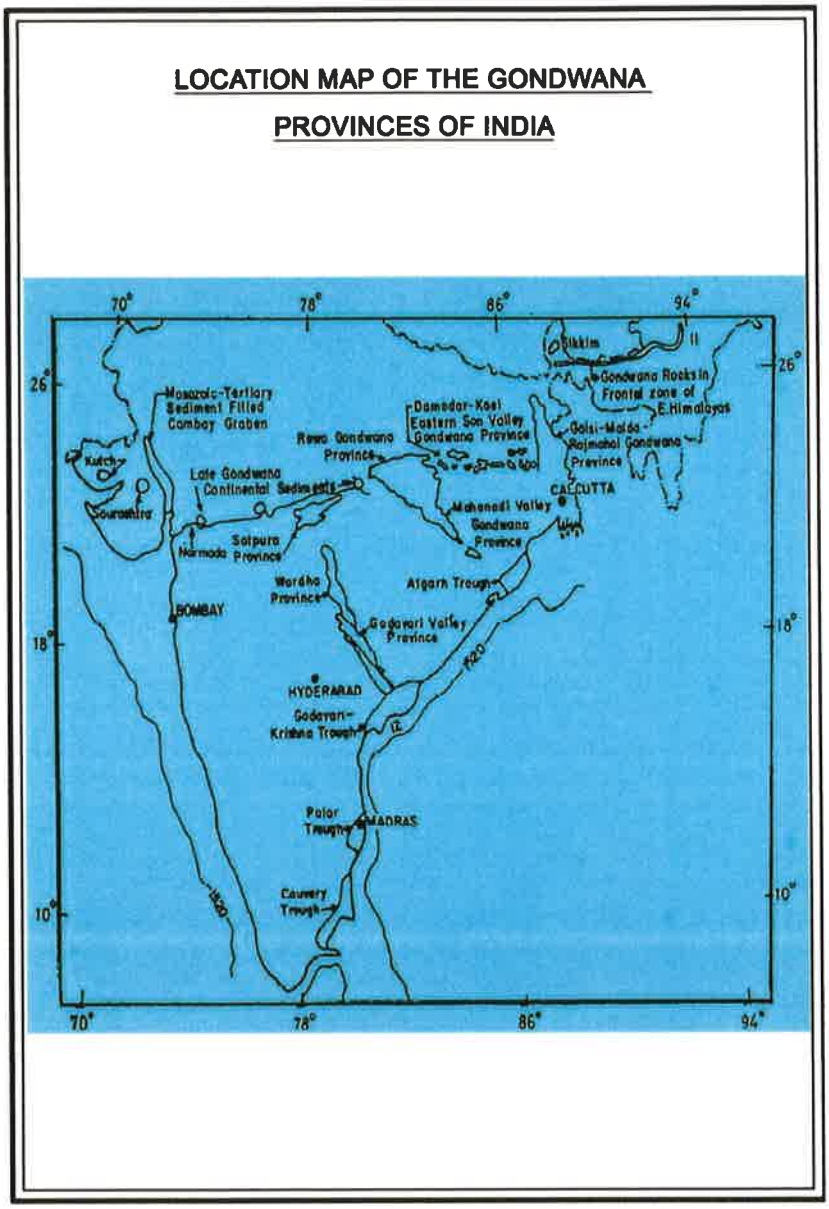


Vertical section of the Deccan Traps and Intertraps.

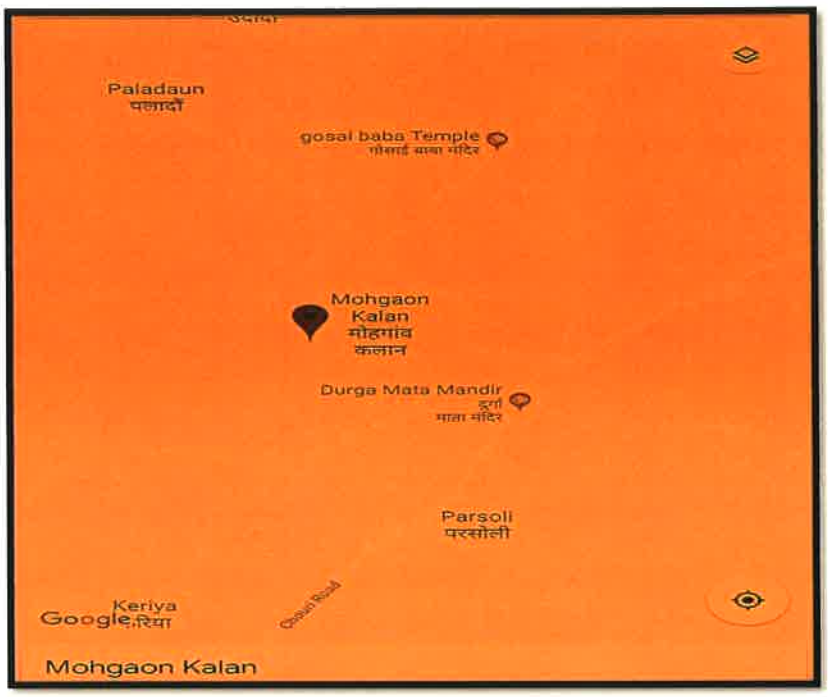
(After Sahni and Rode, 1937)



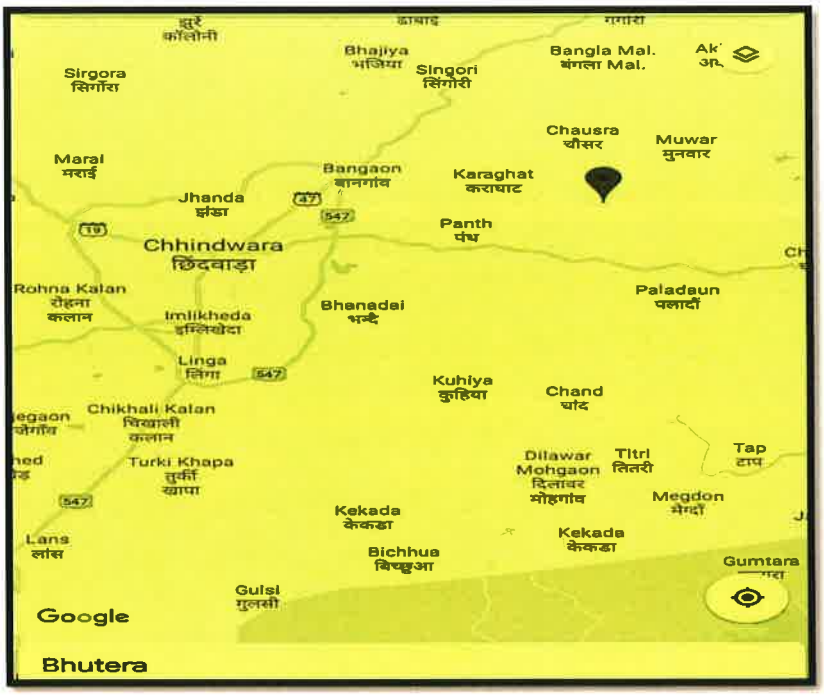
Map of India showing approximate distribution of the Deccan Intertrappean localities of India.



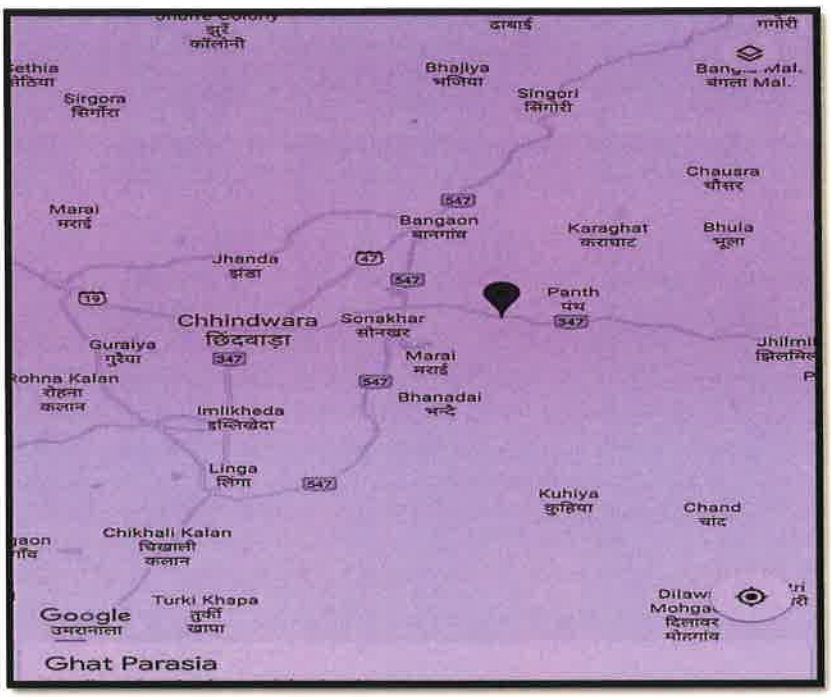
Map showing Gondwana provinces of India.



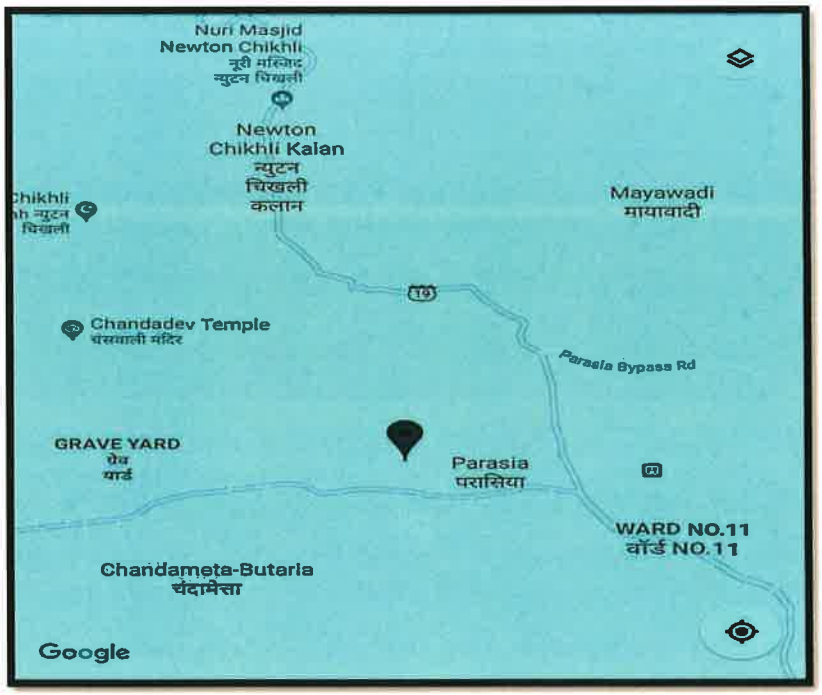
Map of Mohgaokalan



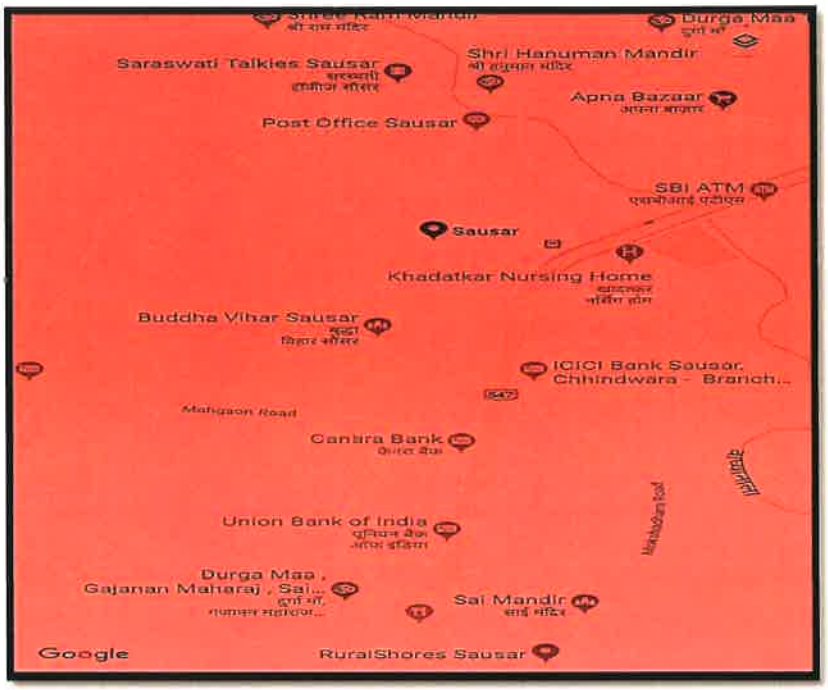
Map of Bhutera



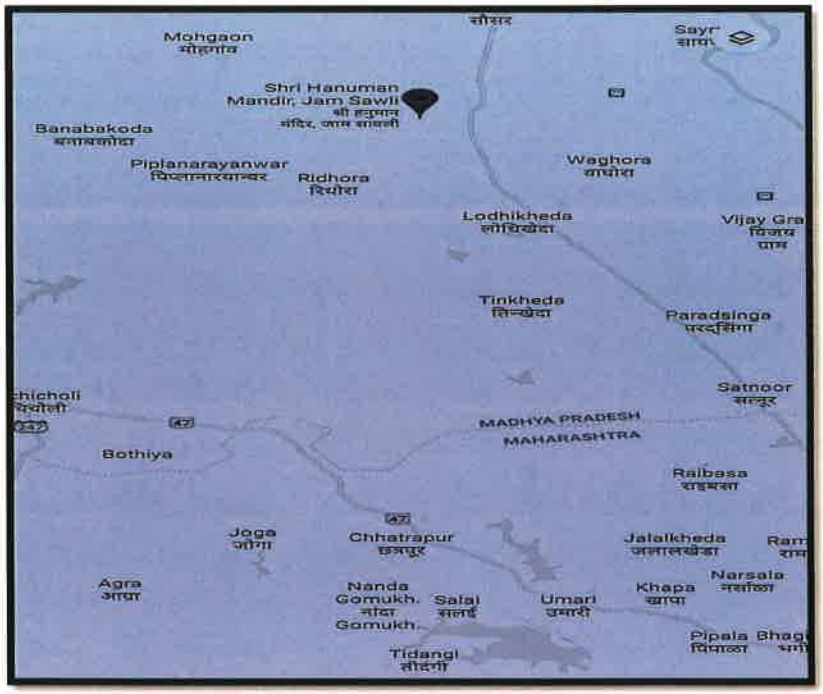
Map of Ghat Parasia



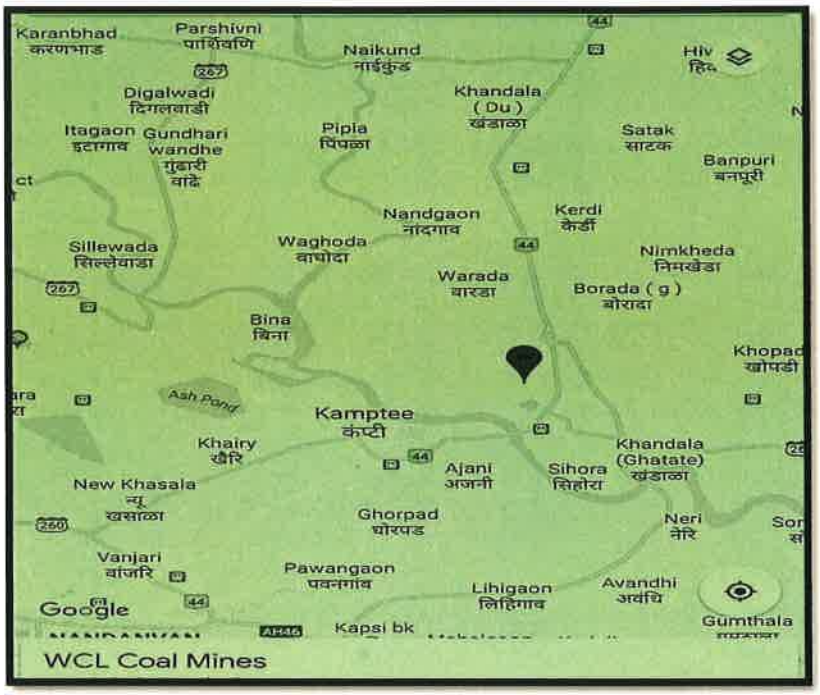
Map of Chhinda open cast mine



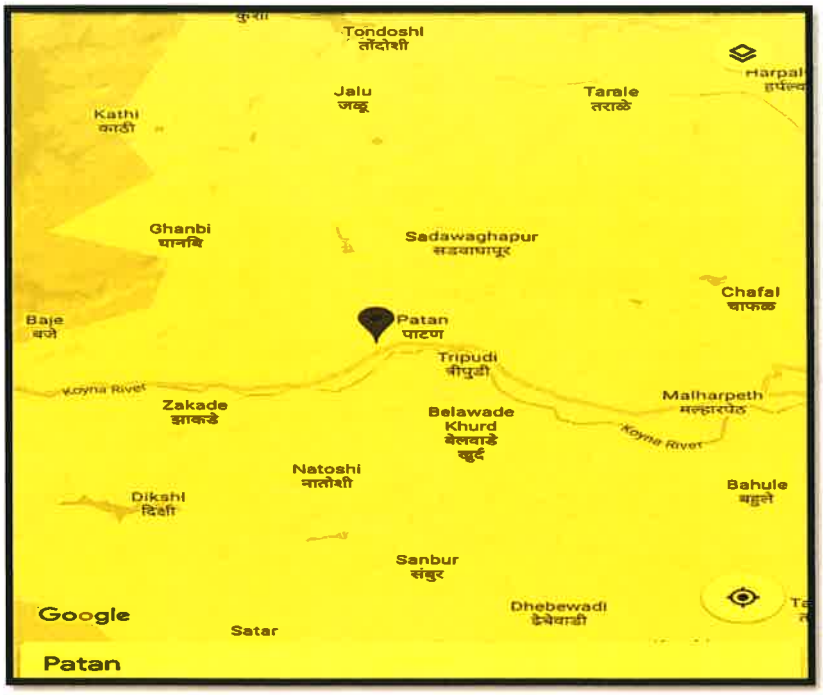
Map of Singhpur



Map of Jamsavli



Map of Kanhan Kamthi coal mines



Map of Patan

CHAPTER 4

FOSSILIFEROUS LOCALITIES

Visited fossiliferous localities of the Deccan Intertrappean beds of Central India

1. Mohgaonkalan

The most important and famous locality of Chhindwara District (Lat 21°, 30' to 22°, 55'N and long 78°, 15 to 79°, 20 E) of M. P. is Mohgaonkalan (Lat 22°, 1'N: long 79°, 1'E). It was first discovered by Prof. K. P. Rode in 1930. Intertrappean exposures are in 3 to 4 discontinuous area of 1 to 3 km. the sedimentary exposures of this area are full of Shales (Rode, 1937), black, silicified cherts.

2. Bhutera

Bhutera is a Village in Chhindwara Tehsil in Chhindwara District of Madhya Pradesh State, India. It is located 23 KM towards East from District head quarters Chhindwara. 19 KM from Chhindwara. The geographical coordinates i.e. latitude and longitude of Bhutera is 22.0956° N, 79.1379° Erespectively.

3. Ghat Parasia

Ghat Parasia village is located in Chhindwara Tehsil of Chhindwara district in Madhya Pradesh, India. It is situated 15km away from Chhindwara.

4. Chhinda open cast mine

The Chhinda open cast mine is 6 to 7km away from Perasia, Dist., Chhindwara, Madhya Pradesh., India. It is a new locality from where various fossils samples collected for the first time.

5. Singhpur

The locality is in M. P., and was located by Fermor (1935) & Sahni (1931). And after long gap Dr. Sheikh visited this locality in 1989, it is 3 km south from village Mohgaon of Chhindwara District.

6.Jamsavali

This locality is in M. P., and was located by Dr. P. K. Mukherjee (2008). It lies at Lat 21°, 30' to 22°, 55' N and Long 78°,15 to 79, 20° E. It is 2 to 3 km away from Sausar.

7. Satnavari

Satnavari lies on the Nagpur Bombay national highway No-6, about 30 km towards west on the right hand side of the village the various hilly tracks of deciduous forest is present on and in the foothill areas the deposition of Gondwana beds lies. In this patch no overbedding of Deccan trap is seen from this hilly track, from this locality so many previous workers reported number of notable fossil specimens. In present collection also some of the fossil specimens are recorded from this area.

8. Kanhan Kamthi coal mines

It is situated 22 km north east of Nagpur near military cantonment, Kamthi on the bank of Kanhan river. Its height from seashore is 306.52 m. It is a railway station on the Bombay-Hawrah main railway route and connected by Nagpur-Ramtek meter gauge. The Nagpur-Jabalpur National Highway also passes from Kanhan. It is laying between latitude 210 10' -210 14' and Longitude 790 15' – 790 18'. It in one of the major open cast coalfields in central India known as Kamthi coalfield.

9. Gokul open cast mineUmred

It is situated 44 km south east of Nagpur and covers an area of 4 sq km. It is a railway station on the Nagpur Nagbhir Chanda fort and is now connected by broad gauge to Calcutta- Bombay main railway route near Butibori railway station and also connected by a good road laying between latitude 20- 15' and 200 53' and 790 16' – 790-19'.The hilly tracks around Umrer shows the deposition of Deccan traps, which are overbedded, on the coal measures.

10. Patan

This fossil locality is in Chandrapur District of Jiwti Taluka. The fossiliferous cherts are found scattered in the field. The fruits and seeds are collected from this site (Ramteke D. D 2017).

11. Pandharkawda

This locality is in Yeotmal district lies between 19, 26 N and, 42 N Lat and 77, 18 E and 79 E Long. This locality is famous for petrified wood and monocot stems.

12. Nawargaon

It is small village (Lat 21°, 1'N, long, 78°, 35°E) situated in the forest area of Wardha district. It is about 60 kms away from Nagpur and 19 kms from Bor dam, on Nagpur Wardha road, some dicot and monocot woods are reported.

13. Mahurzari

The Deccan intertrappean beds are exposed 3kms east from a small village Phetri, Nagpur-Katol road, (Late 21°, 13'N and long 79°, 1E). Some dicot and monocot woods are reported from this locality.

PLATE 1

MOHGAONKALAN

The fossils are found scattered in the field and even institute on the flat topped hillocks and river beds. Sedimentary beds are traced from Mohgaonkalan to Keria, Jheria, Paladon, Udadon and Chaorai. Though they are discontinuous. During my visit I reported intact Daberocarpon and *Triccocites. Enigmocarpon* fruit, leaf, petrified wood, bilocular fruit and shells.

Mohgaonkalan locality

Paladon Udadon locality

PLATE 2

Daberocarpon intertrappea

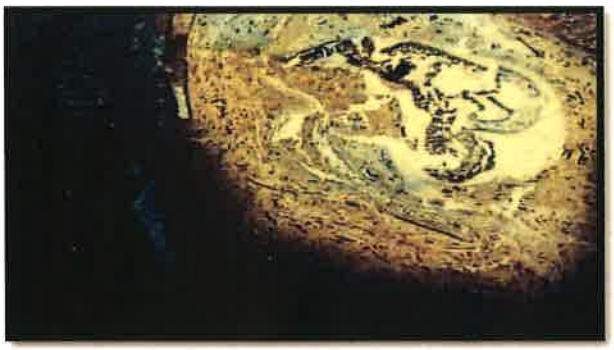
Enigmocarpon fruit

The present intact dicotyledonous capsular fruit which is preserved in the creamishcolored petrified chert,therefore only morphological characters were studied. The fruit is dicotyledonous,capsular, schizocarpic, octalocular measures about 1cm 9 inch in length and breath. It is round in shape with central axis, eight locular, eight seeded (single seed in each locule), it is eight ridged and furrowed, axile placentation and septicidal dehiscence. Comparison are made with the fossil and living capsular fruit of the dicotyledonous families like *Malvaceae, Melastomaceae, Teleaceae* and *Lythraceae* but it has close relation with the present family *Malvaceae* and more or less similar to the fossil capsular fruit of *Daberocarpon gerhardi*. Hence it is named as *Daberocarpon intertrappea.* The species name is given after Deccan Intertrappean beds of India from where it was collected.

PLATE 3

`Triccocites Fruit

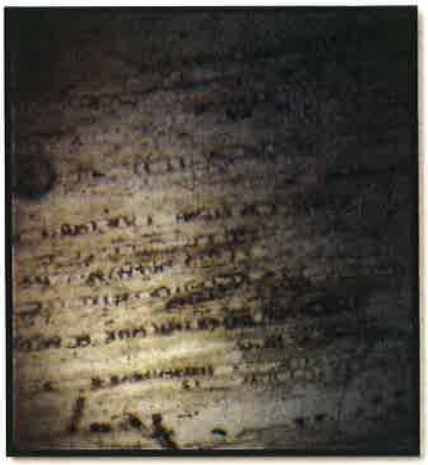
Petrified chert showing preserved bilocular fruit specimen



Petrified chert showing preserved leaf specimen

PLATE 4

T. S. of wood

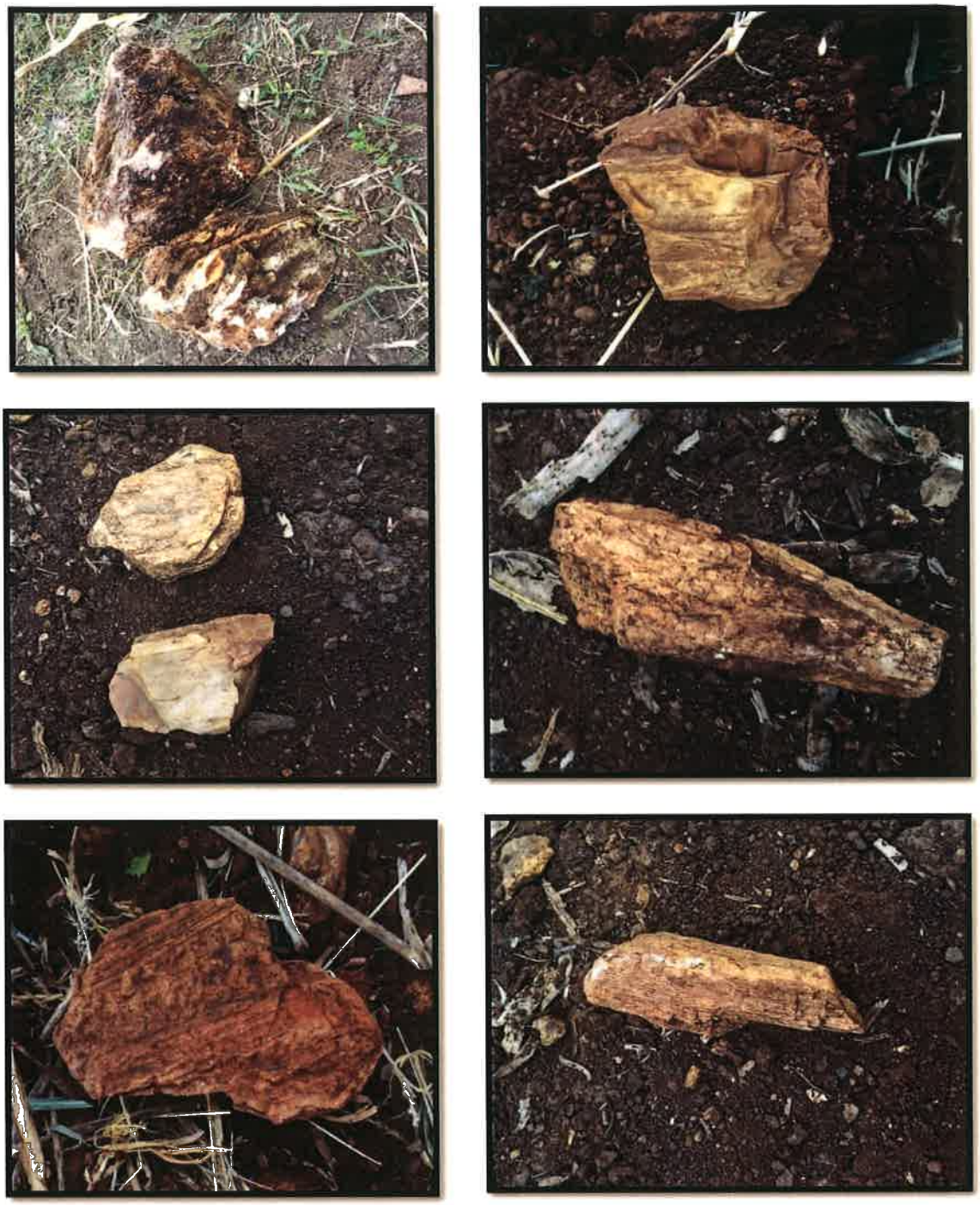


R. L. S. of wood

T. L. S. of wood

T. S. of wood shows scattered vessels, rays & fibers. Vessels are in multiples.T. L. S. of wood shows perforation simple, alternate vascular pitting, parenchyma predominately present, ray homogenous in nature. Fibers septate and non-storied.

PLATE 5



Petrified wood

PLATE 6

Petrified wood

Shell Cast

Preserved shells in the chert

Shell

PLATE 7

SINGHPUR

Singhpur locality

Broken cherts

Impression

Shells

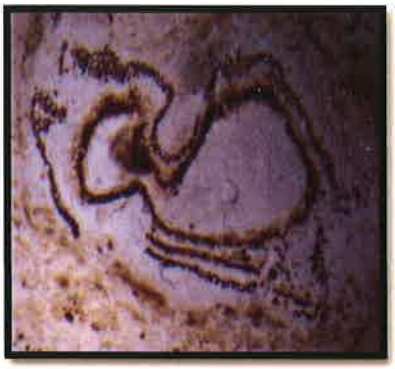
5 to 7 locular fruit

PLATE 8

Uni locular fruit

Tri locular fruit

Flower like structure



Unilocular fruit

L. S. of flower

Trilocular fruit

PLATE 9

JAMSAVLI

Jamsavli locality showing intertraps

Bilocular fruit

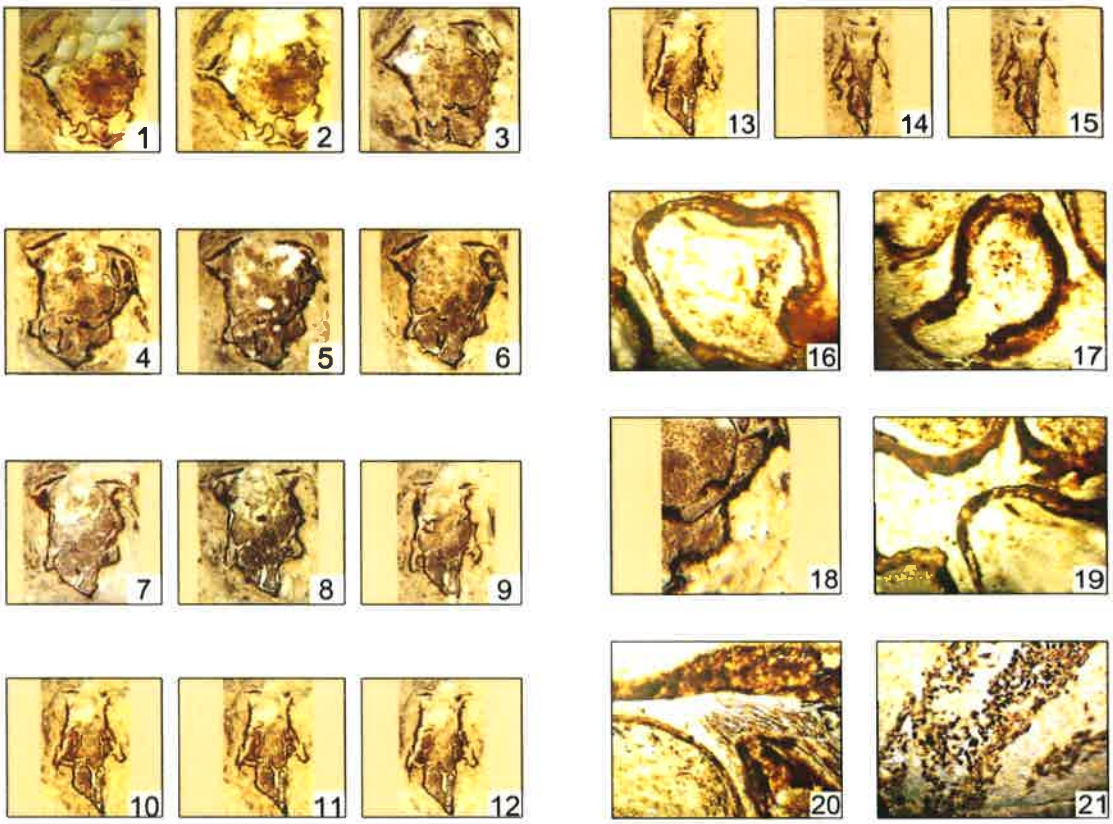
Bilocular fruit

Flower like structure

Trilocular fruit

T. S. axis

PLATE 10



T. S. of Flower

Flower measures about 1mm in length and 0.5mm in breadth. The petrified flower is monochlamydous, sessile, ebracteate, actinomorphic and unisexual with presence of hairs on perianth. Ovarysuperior, Five locular, ovules numerous in the axile placentation and funicles are seen. Bract is absent. Perianth tubular, actinomorphic and is not irregular or gibbous. Gynoecium, the ovary is sessile, globular structure with style and peculiar tetrafid stigma, broad at the base and tapers to a short style.

PLATE 11

SATNAVARI

Impression of leaf

Impression

Petrified wood

Petrified wood

Petrified root

PLATE 12

GHAT-PARASIA

Ghat-parasia locality

Petrified chert

BHUTERA

Bhutera locality submerged in water

PLATE 13

Petrified wood

Petrified wood **Shell**

PLATE 14

PATAN

Patan locality

Cherts showing various number of petrified stems.

PLATE 15

Petrified wood

PLATE 16
MAHURZARI

Formation of intertraps

Petrified roots

Petrified wood

PLATE 17
NAVARGAON

Navargaon locality

Petrified wood

PANDHARKAWDA

Pandharkawda locality

Petrified wood

PLATE 18

Petrified palm root

Petrified wood

PLATE 19

I visited various coal mines of Kamthi Stage such as Chhinda and Damua open cast mine Parasia, Kamthi and Kanhan mines and Gokul open cast mine of Umrer. During my visit I collected fossil in coal shell. After breaking the coal shell, I recovered impression and compression of Glossopteris leaf, Equisetum axis and fruit like structure.

Gokul open cast mine Umrer

Kanhan Kamthi mines

Equisetious axis with fruit or seed like structure from Kanhan Kamthi mines

PLATE 20

Buradia heterophylla

Glossopteris leaf from Gokul mines

Equisetious stem showing node & internode

Glossopteris leaf from Chhinda open cast mines.

PLATE 21

Shale coal was collected from Kanhan Kamthi mines, Gokul open cast mine Umrer and cherts from Mohgaonkalan are used for the study of pollen and spores. During the study I found Angiospermic and Pteridophytic pollens.

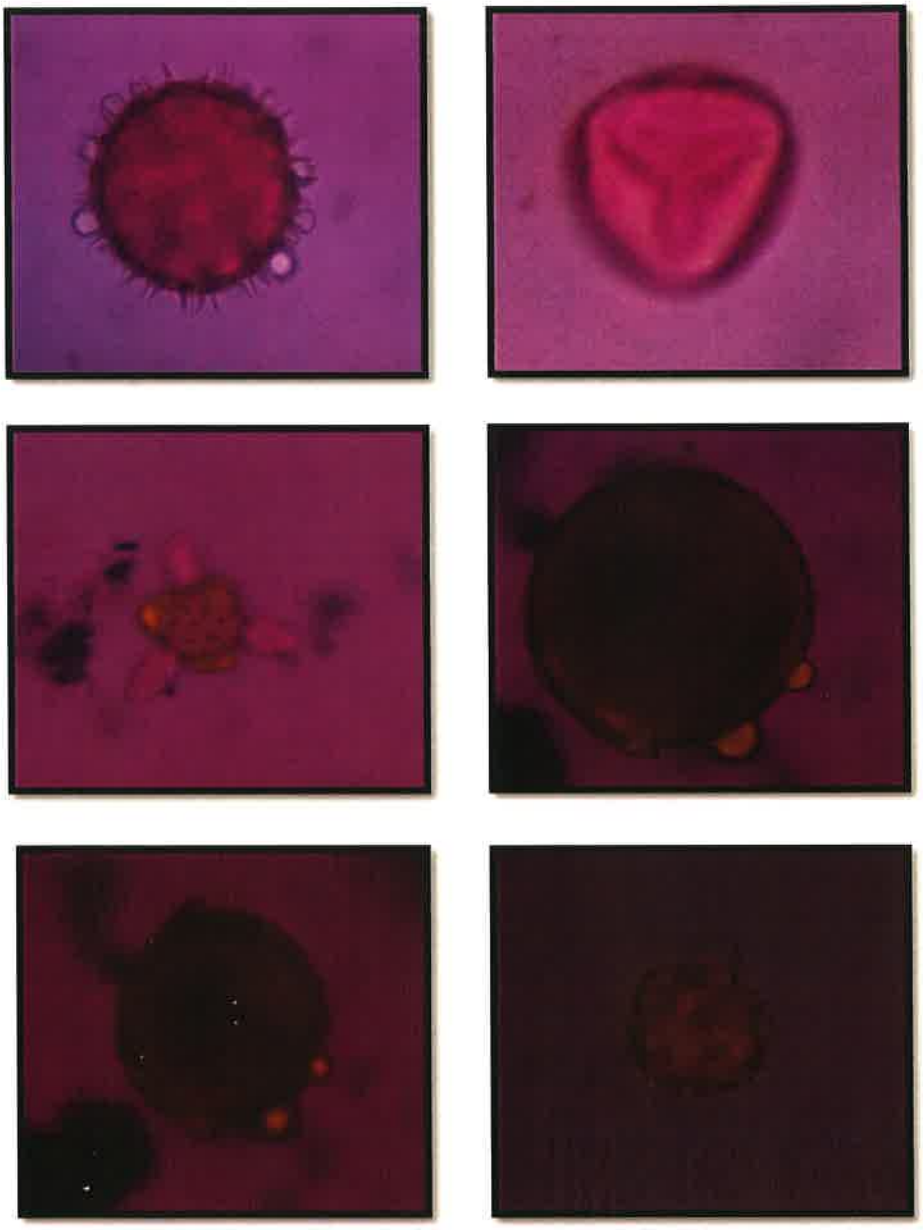
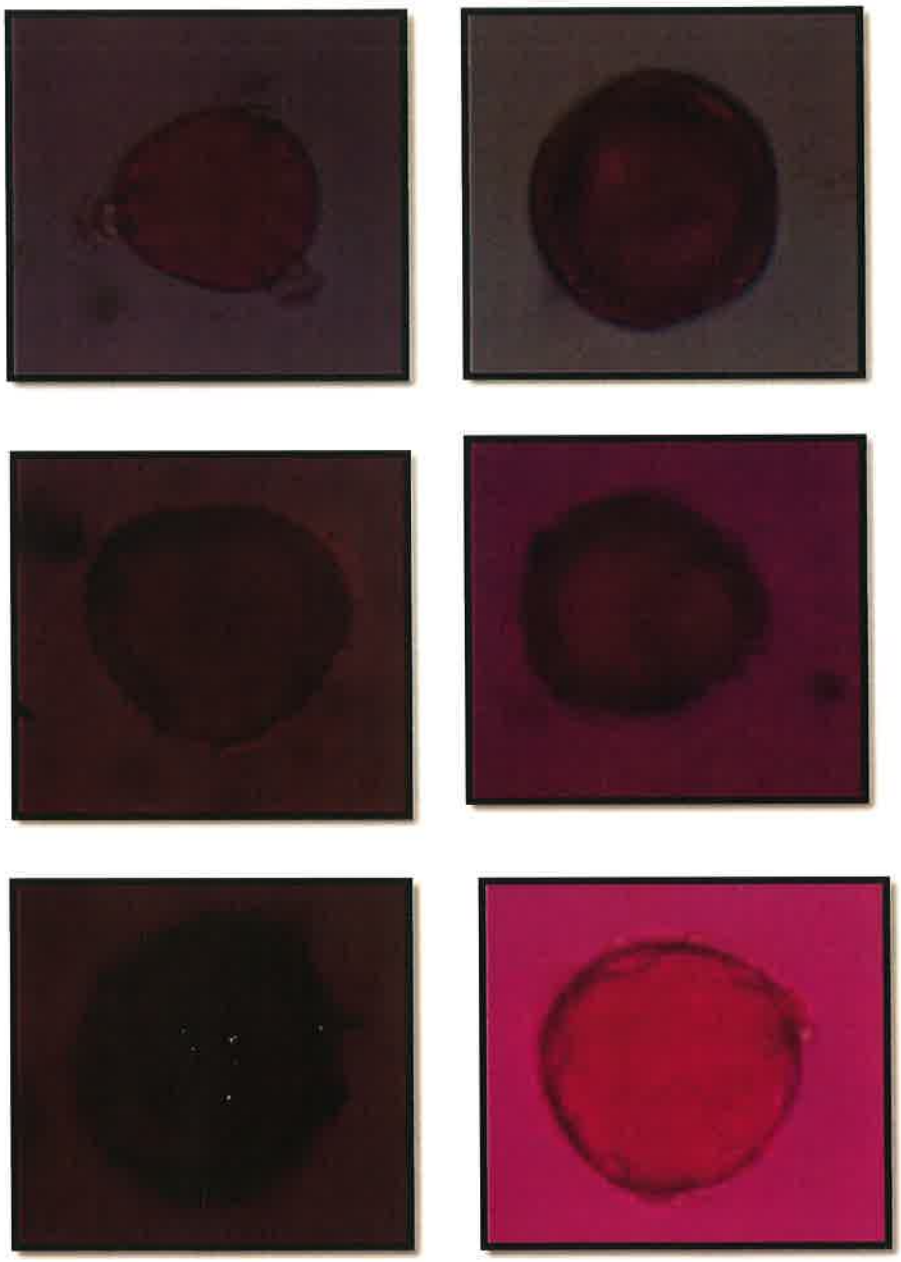


PLATE 22



CHAPTER 5

CONCLUDING REMARKS

The project report includes investigation of micro, mega fossil and study of fossil pollen grains. After visiting, investigating and studying the Intertrappean and Gondwana flora I am able to draw the following conclusion.

In Madhya Pradesh I had visited many fossiliferous localities, but the most remarkable of them is Mohgaonkalan.This locality is rich and unique. Here the Deccan Intertrappean exposures are not continuous. They are seen in patches. Fossil locality is surrounded by fields and so many fossil woods were scattered in the field. I had collected *Daberocarpon, Triccocites, Enigmocarpon* fruit, flower and leaves. At the side of the canal road shells and gastropods were collected. Both brown and black cherts show preservation but plant preserved in black cherts shows good preservation as compared to the brown cherts.

In Markahadi fossils are exposed in petrified form.The fossiliferous Intertrappean exposures are discontinuous towards Keria, Jheria and Paladon side.

Singhpur is in M. P. this locality is very rich in fossil flora and have good preservation. Fossils are collected and cherts were broken, after etching the cherts with Hydrofluoric Acid it shows beautiful preservation of various plant specimens like flower, Unilocular, trilocular, 5-7 locular fruit, impression and shells.

From Jamsavli bilocular, trilocular fruit and axis were collected.This suggest that forest is in fruiting stage at Mohgaonkalan, Singhpur and Jamsavli.

From Bhutera Petrified wood is collected which is good in preservation, we can study external as well as internal structure of the wood in detail. New locality is explored Ghat-Parasia, which is exposed at the road side in the petrified form. Fossil cherts are collected from this locality.

Mahurzari is full of big woody trunk which is in-situ and some wood pieces are scattered. Patan is in Maharashtra and it is observed that fossil woods are big and in-situ here too. Some

cherts show good preservation of petrified stem. From Navargaon petrified wood wad collected. Pandharkawda locality shows good preservation of palm root and petrifiedwood.

There is no direct positive evidence for deciding the age of Deccan Intertrappean flora. Still it can be inferred that the age at least of greater part of the Deccan trap must be assigned to the early Tertiary. It is quite apparent that Deccan Traps cannot be older than Upper Cretaceous whereas from external evidences of fossil fishes, palms etc. they could not be much younger than Eocene.The Deccan Intertrappean exposures are not continuous. They are seen in patches.

All the fossil plant parts are difficult to identify to their modern families. Affinities to a family level is only possible, but affinities with genera and species are almost uncertain.

Gondwana flora is knows as *Glossopteris* flora due to abundance of *Glossopteris* leaves in that period and it is an index fossil of Permo-Carboniferous period. Equisetious axis with fruit or seed like structure and *Buradia heterophylla* is collected from Kanhan Kamthi mines. Glossopteris leaf is collected from both Chhinda and Gokul Open cast mine. Bryophytic, Pteridophytic and Angiospernic pollen grain is observed but its family, genera and species level was unidentified.

Signature of Principal Investigator
Dr. (Mrs.) A. M. Yadav
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Signature of the Principal with Seal

Principal
J. M. Patel Arts, Commerce & Science College, Bhandara

Dr. Steven Manchester, Curator of Palaeobotany, Florida Museum of Natural Hisoryand Dr. D. K. Kapgate, Ex- H. O.D, Dept. of Botany, J. M. Patel, College, Bhandara, identifying fossil specimen.

Dr. Steven Manchester, Curator of Palaeobotany, Florida Museum of Natural Hisory and Dr. D. K. Kapgate, Ex- H. O.D, Dept. of Botany, J. M. Patel, College, Bhandara, visited our college research lab.

Dr. M. T. Sheikh (Palaeobotanist), Ex- Reader, Dept of Botany, Gov. Institute of Science, Nagpur, Identifying fossil specimen.

Dr. Sushma Narkhede, Associate Prof., Dept of Botany, Gov. Institute of Science, Nagpur, Identifying fossil specimen.

UNIVERSITY GRANTS COMMISSION
WESTERN REGIONAL OFFICE
GANESHKHIND, PUNE-411007

First Year Report of the work done on the Minor Research Project
(Report to be submitted within 6 weeks after completion of each year)

1. Project report No. First Year: **No. F. 47-1255/14 (General/ 31/ WRO) XII Plan dated 16th March 2017**
2. UGC Reference No.: **F. 47-1255/14 (General/ 31/ WRO) XII Plan dated 16th March 2017**
3. Period of report: **from 6th April 2017 to 6th April 2018**
4. Title of research project: **Investigation And Exploration Of Diversified Fossil Flora From Central India.**
   (a) Name of the Principal Investigator: **DR. (Mrs.) A. M. Yadav**
   (b) Department & University/ College where work has progressed: **J. M. Patel Arts, Commerce & Science College, Bhandara.**
   (c) Effective date of starting of the project: **6tht April 2017**
5. Grant approved and expenditure incurred during the period of the report:
   a. Total amount approved **Rs. 330000**
   b. i. Total Sanctioned for First Year **Rs. 255000**
      ii. Total actual expenditure incurred in this project **Rs. 258228**
   c. Report of the work done: (Please attach a separate sheet): **Separate sheet attached**
   i. Brief objective of the project: The aim of the project is to explore new fossiliferous localities of Central India. Though many localities have been reported from these regions several are yet to be explored. Such localities will be explored and fossil flora preserved in the form of petrification, compression, impression and in other forms will be collected and identified. Botanical and geological aspects of these fossil flora will be studied. The botanical concern will be the morphology of fossil plants, there distribution, evidence of early plant life, past climate and environment coupled with the problem of phylogeny and evolution.
   ii. Work done so far and results achieved and publications, if any, resulting from the work (Give details of the papers and names of the journals in which it has been published or accepted for publication: **Yes**

Yadav A.M. (2018). *Glossopteris chhindai*, A new species of *Glossopteris* from Permotriassic beds of Kamthi stage, Perasia, district-Chhindwara India. Int. J. of Life Sciences, 2018; Volume 6 (1):153-155 ISSN:2320-7817(p) | 2320-964X(o) UGC Approved Journal No 48951

iii. Has the progress been according to original plan of work and towards achieving the objective? If not, state reasons: **Yes**

iv. Please indicate the difficulties, if any, experience in implementing the project: **No**

v. If project has not been completed, please indicate the approximate time by which it is likely to be completed. A summary of the work done for the period (Annual basis) may please be sent to the Commission on a separate sheet: **Approximate time of completion 6th April 2017.**

vi. If the project has been completed, please enclose a summary of the finding of the study. Two bound copies of the final report of work done may also be sent to the Commission: **Not Applicable**

vii Any other information which would help in evaluation of work done on the project. At the completion of the project, the first report should indicate the output, such as (a) Manpower trained (b) Ph.D. awarded (c) Publication of results (d) other impact, if any: **One research paper published**

Signature of Principal Investigator
Dr. (Mrs.) A. M. Yadav
J.M. Patel College, Bhandara

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Signature of the Principal with Seal
Principal
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UNIVERSITY GRANTS COMMISSION
WESTERN REGIONAL OFFICE
GANESHKHIND, PUNE-411007

PROFORMA FOR SUBMISSION OF INFORMATION AT THE TIME OF SENDING THE FINAL REPORT OF THE WORK DONE ON THE PROJECT

1. NAME AND ADDRESS OF THE PRINCIPAL INVESTIGATOR:
   DR. (MRS.) A. M. YADAV

2. NAME AND ADDRESS OF THE INSTITUTION: **J. M. PATEL ARTS, COMMERCE & SCIENCE COLLEGE, BHANDARA.**

3. UGC APPROVAL NO. AND DATE: **F. 47-1255/14 (GENERAL/ 31/ WRO) XII PLAN DATED 16TH MARCH 2017**

4. DATE OF IMPLEMENTATION: **6th April 2017**

5. TENURE OF THE PROJECT: **TWO YEAR**

6. TOTAL GRANT ALLOCATED: **3,30,000/-**

7. TOTAL GRANT RECEIVED: **2,55,000/-**

8. FINAL EXPENDITURE: **3,34,056/-**

9. TITLE OF THE PROJECT: **INVESTIGATION AND EXPLORATION OF DIVERSIFIED FOSSIL FLORA FROM CENTRAL INDIA.**

10. OBJECTIVES OF THE PROJECT: The aim of the project is to explore new fossiliferous localities of Central India. Though many localities have been reported from these regions several are yet to be explored. Such localities will be explored and fossil flora preserved in the form of petrification, compression, impression and in other forms will be collected and identified. Botanical and geological aspects of these fossil flora will be studied. The botanical concern will be the morphology of fossil plants, there distribution, evidence of early plant life, past climate and environment coupled with the problem of phylogeny and evolution.

11. WHETHER OBJECTIVES WERE ACHIEVED: **YES**

12. ACHIEVEMENTS FROM THE PROJECT: **EXPLORED NEW LOCALITIES**

13. SUMMARY OF THE FINDINGS (500 WORDS): **AS ENCLOSED**

14. CONTRIBUTION TO THE SOCIETY (GIVE DETAILS): Fossil is a good indicator of fossil fuels. The organic matter takes long time to form and deposits of living organism. There are three types of fossil fuels such as coal, oil and natural gas.

Coal is a solid fossil fuel formed over millions of years by decay of land vegetation. When layers are compacted and heated over time, deposits are turned into coal. Coal is quite abundant compared to the other two fossil fuels.

Oil is a liquid fossil fuel that is formed from the remains of marine microorganisms deposited on the sea floor. After millions of years the deposits end up in rock and sediment where oil is trapped in small spaces. It can be extracted by large drilling platforms. Oil is the most widely used fossil fuel. Crude oil consists of many different organic compounds which are transformed to products in a refining process.

Natural gas is a gaseous fossil fuel that is versatile, abundant and relatively clean compared to coal and oil. Like oil, it is formed from the remains of marine microorganisms.

The Deccan basalt's are largely used in construction of building and roads. Some are preferred because of colours as semi-precious stones. Aluminous rock is a source of aluminium. The aluminous laterite is used as high grade bauxite in petroleum filtration. They are also sources of good agricultural soil formed by the decomposition of basalt containing calcium and magnesium carbonates, potash, phosphates, etc. This soil is known as 'Regur' and is used for the cultivation of cotton and wheat.

Fossils also help in reconstructing geography and climate of a region during past geologic period. Some fossils indicate more details about the environment and also helps to interprete the evolution of organic world. Fossil assemblage of same age are not necessarily identical for the species in them will depend on the condition of environment and development in each area of sedimentation. Every rock layer has characteristic geophysical signature.

Palaeoenvironment deals with the environmental, climatic and ecological conditions of the geological past. Environment is the surrounding condition by which contemporaneous plants and animals are influenced and subjected to modifications in their growth and development. Environment of a particular region is thus controlled by climate. There are several factors to be considered to reconstruct the palaeoenvironment of particular region. The possibility of reconstructing past environment depends on the accurate identification of diverse fossil assemblage.

The fossil woods are often used for decorative purpose or show piece in garden or museum. In short Deccan traps are of great economical important.

15. WHETHER ANY PH.D ENROLLED/PRODUCED OUT OF THE PROJECT: **NO**

16. NO. OF PUBLICATIONS OUT OF THE PROJECT (PLEASE ATTACH RE-PRINTS):

PAPER PUBLISHED = 02
PAPER PRESENTED = 01

A) **Yadav A.M. (2018).** *Glossopteris chhindai*, A new species of *Glossopteris* from Permotriassic beds of Kamthi stage, Perasia, district-Chhindwara India. Int. J. of Life Sciences, 2018; Volume 6 (1):153-155 ISSN:2320-7817(p) | 2320-964X(o) UGC Approved Journal No 48951

B) **Aparna M. Yadav (2018).** A New Petrified Bilocular Capsular Fruit *Acanthaceocarpon jamsavlii* gen. Et sp. Nov. From the Deccan Intertrappean Beds of Jamsavli M.P., India. IJRAR- International Journal of Research and Analytical Reviews 2018,VOLUME 5, ISSUE 4, OCT.– DEC. 2018: 708-711(p), E ISSN 2348 –1269, PRINT ISSN 2349-5138

C) **A. M. YADAV.** Presented paper on 'Diversified Correlation of a Fossil Dicotyledonous Capsular Fruit With Modern Angiospermic Flora' At National Conference On Climate Change And Human Health: Issues, Concerns And Opportunities, Department Of Zoology & Environmemtal Sciences Govt. Degree College Bijbehara- Anantnag on 8th-9th Oct. 2018.

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Original Article | Open Access

Glossopteris chhindai, a new species of *Glossopteris* from Permotriassic beds of Kamthi stage, Perasia, district-Chhindwara India

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ABSTRACT

The Permian glacial deposits of S. Africa, Australia, S. America and Antarctica are succeeded by beds containing a flora very different from that of N. America and Europe. The flora of the south grew in a cold, wet climate, while that of the north existed under warm conditions. Plants with elongate, tongue-shaped leaves dominated the southern flora, with the genera Glossopteris and Gangamopteris being among the best known. Of these two, the genus Glossopteris gives its name to the flora. Glossopteris is characterized by a leaf with a fairly well defined midrib and a reticulate venation. The present specimen is from Chhinda open cast mine, Perasia of Permotriassic beds of Kamthi stage. It shows its close affinities with the Glossopteris leaf but differs from its species. Hence it is described under a new specific name *Glossopteris chhindai*. The specific name is given after the locality Chhinda open cast mine, Perasia.

Key words: Permia, *Glossopteris*, Permotriassic, Perasia, Reticulate.

INTRODUCTION

Glossopteris, the genus from which the group gets its name, is also the largest and best-known member of the Glossopteridales. More than 70 species of this genus have been recognized in India alone, with additional species from South America, Australia, Africa and Antarctica. Only a few fossils from the northern hemisphere have been considered as member of this group, but these are not identified with great certainty. The name *Glossopteris* was proposed by Brogniart in 1822 but Sternberg gave it a generic status. In 1828, Brogniart describe *G. browniana Var. indica and G. browniana Var. Australsia* from India and Australia respectively. The first Indian species of *Glossopteris* which Schimper (1869) changed into separate species *G. indica.* From India, several workers have described different *Glossopteris* species on the basis of morphological as well as cuticular characters from various localities.

A New Petrified Bilocular Capsular Fruit *Acanthaceocarpon jamsavlii* gen.Et sp.Nov. From the Deccan Intertrappean Beds of Jamsavli M.P., India.

Aparna M. Yadav
P. G. Department Of Botany, J. M. Patel College, Bhandara, 441904 (Ms), India.

Received: July 22, 2018 Accepted: October 09, 2018

ABSTRACT *A present petrified fruit is bilocular capsular collected from the Deccan Intertrappean beds of Jamsavali (Lat 21°, 30 to 22°, 55 N and Long 78°, 15 to 79°, 20 E) Madhya Pradesh, India. The present fruit is triangular in shaped, dicotyledonous, bilocular capsule. It is sessile and showing loculicidal dehiscence. Out of two locules, one fertile and one sterile. Pericarp differentiated into epicarp, mesocarp and endocarp. Seed coat unitegmic. Embryo ill preserved. On comparison it shows close affinities with the characters of living family Acanthaceae.*

Keywords: *Bilocular, Triangle, Loculicidal, Pericarp and Seed.*

INTRODUCTION

The dicotyledonous fruits described from the Deccan Intertrappean beds are generally capsules, berries and drupes. The present investigation deals with the bilocular capsular fruit collected from the locality of Jamsavli exposures. The capsular fruits that have been reported from Deccan Intertrappean beds of India are as under,*Enigmocarpon parijai* (Sahni B. 1943), *Daberocarpon gerhardii* (Chitaley and Sheikh 1973), *Chitaleocarpon intertrappea* (Kapgate V.D. 2000), *Schizocarpon aliformii* (Bhowal and Sheikh 2002), *Bicarpelarocarpon singhpurii* (Bhowal and Sheikh 2008),*Tiliaceocarpon jamsavlii* (Meshram S. et.al 2013), *Rodeocarpon mohgaonse* (Konde L. 2015), *Pentaloculocarpon Intertrappean* (Khursel and Narkhede 2016), *Portulacaceocarpon bhuterensis* (Borkar S. et. al 2016) and *Tamaricaceocarpon mohgaonse* (Yadav A. M. 2017)

The present fruit specimen gives additional information to the knowledge of bilocular fruit from the Deccan Intertrappean flora of India.

MATERIAL AND METHOD

A petrified triangular shaped fruit was obtained on breaking a fossil chert from Jamsavali, M.P.,India. The peels were obtained in transverse section, after etching with Hydrofluoric acid. Anatomical details of both part and counterpart were studied. Camera lucida sketches in series were drawn and photographed.

DESCRIPTION

Fruit Morphology

The fruit is almost triangular in shape, bilocular, sessile and measuring 288µm in length and 108µm in breadth. The bilocular fruit is separated by single transverse septa. The upper locule is broad and lower locule is narrow with single transverse septa in between giving the triangular structure to the fruit (Text Fig. 1; Plate Fig. 1).

Fruit Anatomy

On the basis of anatomical characters the present petrified bilocular capsular fruit is described in details under following heads:-

Pericarp: The pericarp thickness varies between 172.23µm and 266.64µm. It is multilayered and differentiated into three major zones. Epicarp is the outermost layer of the fruit wall. It is 66.66µm across its width. It is one to two layered, made up of thin walled parenchymatous cells. Mesocarp is thewell-defined broad middle layer of the pericarp. The width of this region varies a lot between 98.12µm and 133.33µm cells, it is sclerenchymatous three to four layered at some places and single layered at other. The cells is pentagonal to hexagonal. Endocarp is the inner most layer of the pericarp. The width of this region is 99µm.The cells are one to two layered made up of soft tissues may be parenchymatous in nature (Text Fig. 3; Plate Fig.2).

Locules: It is bilocular fruit with two well developed locules, that is upper and lower, upper locule is sterile or empty and lower locule is fertile and includes an embryo. The upper locule measures about 66µm in height and 174µm in breath. Lower locule 228µm in height and 138µm in breadth. (Text Fig. 1; Plate Fig. 1).

NATIONAL CONFERENCE
ON
CLIMATE CHANGE AND HUMAN HEALTH: ISSUES, CONCERNS AND OPPORTUNITIES

(8th - 9th October, 2018)

Organized by

DEPARTMENT OF ZOOLOGY & ENVIRONMENTAL SCIENCES

Certificate

This is to certify that Prof./Dr./Mr./Ms. A. M. YADAV *of* J.M. Patel College, Bhandara *participated / presented paper / poster / delivered invited lecture / chaired a technical session in the National Conference on "Climate Change & Human Health : Issues, Concerns & Opportunities" held during 8th - 9th October, 2018. His/Her title of the paper / poster is* "Diversified Correlation of a fossil..... flora."

Organizing Secretary | Joint Secretary | Principal

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PVRS & ASSOCIATES
CHARTERED ACCOUNTANTS

Minor Research Project of Dr. (Mrs) A. M. Yadav
J. M. Patel Arts, Commerce & Science College, Bhandara

UTILIZATION CERTIFICATE FOR TOTAL/UTILIZED GRANT

(FIRST & SECOND YEAR UTILIZATION OF FUNDS)

(2017-18,2018-19)

It is certified that the grant of **Rs. 330000/- (Rupees Three Lac Thirty Thousand only)** sanctioned to J. M. Patel Arts, Commerce & Science College, Bhandara by University Grants Commission vide their letter No. 47-1255/14 (General/ 31/ WRO) XII Plan dated 16th March 2017 towards the Minor Research Project awarded to DR. (Mrs.) A. M. Yadav entitled 'Investigation And Exploration Of Diversified Fossil Flora From Central India' Rs. 255000/- (Two Lakhs Fifty Five Thousand only) has been received and fully utilized for the purpose for which it has been sanctioned and in accordance with the prescribed terms and condition laid down by the commission.

If as a result of check or audit objection, some irregularity is noticed at a later stage action will be taken to refund or regularize the objected amount.

Total actual expenditure incurred for this project is of **Rs. 334056/- (Three Lac Thirty Four Thousand and Fifty Six only).**

For PVRS & ASSOCIATES
Chartered Accountants
Vaibhav Toshniwal
Partner
M. No. 152652
UDIN: 19152652AAAAAC1853

PVRS & ASSOCIATES CHARTERED ACCOUNTANTS NAGPUR

Signature of the Principal with Seal

Principal
J. M. Patel Arts, Commerce & Science College, Bhandara

Signature of Principal Investigator
Dr. (Mrs.) A. M. Yadav
J.M. Patel College, Bhandara

J. M. Patel College of Arts, Comm. & Sci.

Signature of the Chartered Accountant with Seal & Regd. No. of C.A

Date : 26/04/19
Place : Nagpur

201, Shiv Gaurav Estate Apartment, Near Traffic Park,
Bhagwaghar Layout, Dharampeth, Nagpur - 440 010 (M.S.)
Mobile No. # 9766616607/9766616608/7776839829
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PVRS & ASSOCIATES
CHARTERED ACCOUNTANTS

STATEMENT OF EXPENDITURE
(FIRST & SECOND YEAR EXPENDITURE)
(2017-18, 2018-19)

File No.: 47-1255/14 (General/ 31/ WRO) XII Plan dated 16th March 2017
Name of Principal Investigator: DR. (Mrs.) A. M. Yadav
Name of the College: J. M. Patel Arts, Commerce & Science College, Bhandara.
UGC approval letter No. and Date: 47-1255/14 (General/ 31/ WRO) XII Plan dated 16th March 2017
Title of the Research Project: Investigation and Exploration of Diversified Fossil Flora From Central India.
Date of Starting of Project: 6th April 2017
Date of Completion of Project: 6th April 2019 (For Two years)

Heads	Total Sanctioned Amount	Received Amount (Amount in Rupees)	Actual Expenditure (2017-18)	Actual Expenditure (2018-19)	TOTAL EXPENDITURE
Books & Journals	20000	20000	20000	-	20000
Equipment	160000	160000	162505	-	162505
Contingencies	40000	20000	20409	20021	40430
Special Needs	-	-	-	-	-
Travels/Field work	50000	25000	25314	25291	50605
Chemical & Glassware	60000	30000	30000	30516	60516
Other	-	-	-	-	-
Total	**330000**	**255000**	**258228**	**75828**	**334056**

If as a result of check or audit objection, some irregularity is noticed at a later stage action will be taken to refund or regularize the objected amount.

For PVRS & ASSOCIATES
Chartered Accountants
Vaibhav Toshniwal
Partner
M. No. 152652
UDIN: 19152652AAAAAE1853

PVRS & ASSOCIATES CHARTERED ACCOUNTANTS NAGPUR

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Principal
J. M. Patel Arts, Commerce & Science College, Bhandara

Signature of Principal Investigator
Dr. (Mrs.) A. M. Yadav
J.M. Patel College, Bhandara

J. M. Patel College of Arts, Comm. & Sci.

Signature of the Chartered Accountant with Seal & Regd. No. of C.A
Date: 26/04/19
Place: Nagpur

First Year Project Report (2017-2018)
Minor Research Project of Dr. (Mrs) A. M. Yadav
Expenditure on Books and Journal

Sr. No	Voucher No.	Purchased from whom	Bill No & Date	Particulars/Description	Amount in Rs
1	02	Central Book Stall Nagpur	470 13-01-2018	1) Paleobotany	350
				2) Embryology of Angiosperm	375
				3) Paleobotany evolution of plant	995
				4) Economic Botany	175
				5) Mycology	399
				6) Biotechnology	895
				7) Biotechniques	325
				8) Nanoscience & Nanotechnology	375
				9) Biochemistry & Molecular Biology	595
				10) Pharmacognasy & Phytochemistry I	525
				11) Pharmacognasy & Phytochemistry II	470
				12) Genetics I	545
				13) Genetics II	625
				14) Plant Anatomy	350
				15) Natural product Vol II	430
				16) Anatomy & Embryology of Angiosperm	325
				17) Natural product Vol I	450
				18) Fungi	525
				19) Gymnosperm	425
				20) Pteridophyta	550
				21) Bryophyta	510
				22) Algae	525
				23) Mycology	819
				Total	11558
				Discount 10%	1158
				Total	**10400**

PVRS & ASSOCIATES CHARTERED ACCOUNTANTS NAGPUR

2	03-3-2018	The Palaeobotanical Society	A2017180007 29-01-2018	Life Membership of Palaeobotanical Journal	**4100**
				Total	**4100**
3	03-3-2018	Central Book Stall Nagpur	230 05-03-2018	1) Flora of Jabalpur	1400
				2) Flora of Nagpur District	450
				3) Flora of the presidency of Bombay Vol I & II	2500
				4) Indian Medicinal plants Vol I	300
				5) Indian Medicinal plants Vol II	550
				6) Indian Medicinal plants Vol III	600
				7) Indian Medicinal plants Vol VI	315
				Total	6115
				Discount 10%	615
				Total	**5500**
				Total	**20000**

For PVRS & ASSOCIATES
Chartered Accountants
Vaibhav Toshniwal
Partner
M. No. 152652

PVRS & ASSOCIATES CHARTERED ACCOUNTANTS NAGPUR

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Signature of the Chartered Accountant with Seal & Regd. No. of C.A

First Year Project Report (2017-2018)
Minor Research Project of Dr. (Mrs) A. M. Yadav
Expenditure on Equipments

Sr. No	Voucher No.	Purchased from whom	Bill No & Date	Particulars /Description	Amount in Rs	Rate Inclusive of GST in Rs.	Ps.
1	01	Monarch Enterprises Nagpur	ME/MEN-31/17-18/N-47 29-11-2017	1) Labomed LX-300 Trinocular Microscope with IVU 3100 Camera Module	104435 GST=28%	133676	80
				2) Nikon Digital Camera	7900 GST=28%	10112	00
				3) Turner Cutter Machine	2200 GST=28%	2816	00
				Total		**146605**	
2	04	Abhinav Computers Bhandara	2683 16-01-2018	Printer Laser Canon MF-244DW	13474.58 GST=18%	15900	
				Total		**15900**	
				Total		**162505**	

For PVRS & ASSOCIATES
Chartered Accountants
Vaibhav Toshniwal
Partner
M. No. 152652

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First Year Project Report (2017-2018)
Minor Research Project of Dr. (Mrs) A. M. Yadav
Expenditure on Contingency

Sr. No	Voucher No.	Purchased from whom	Bill No & Date	Particulars/Description	Amount in Rs
1	05	Rupali Xerox center, Bhandara	1617 07-09-2017	Photo copy	200
2		Anju Xerox & computer, Bhandara	255 03-10-2017	Photo copy	200
3		Mayur stationers, Nagpur	36286 04-10-2017	Stationery	1593
4		Silver system, Nagpur	CH/8516 04-10-2017	Cable Accessories (HDMI to VGA Adapter)	350
5		R. N. Enterprises, Nagpur	3591 10-11-2017	Photo copy of book (Woody plants)	500
6		R. N. Enterprises, Nagpur	3791 02-12-2017	Photo copy of book (Flowering plants)	630
7		Kiran stationers, Nagpur	525 22-12-2017	J.K. Easy 70G/A3/4.37KG	1600
8		Alfa books & Xerox, Bhandara	790 27-12-2017	Photo copy	106
9		Sai Enterprises, Bhandara	81 05-01-2018	D.T.P work	100
10		Kiran stationers, Nagpur	572 08-01-2018	Stationery	8120
11		R. N. Enterprises, Nagpur	3891 16-01-2018	Photo copy of three books (Palaeobotany, Glossopteris Manual Vol I & II)	1500
12		Mayur magazine & Xerox corner, Nagpur	1616 29-01-2018	D.T.P work	240
13		Mayur magazine & Xerox corner, Nagpur	1614 29-01-2018	Flex designing & printing	400
14		Kiran stationers, Nagpur	911 19-02-2018	SAN. Pendrive 16GB & Stationery	4500
15		Anant stationers	32 02-03-2018	Stamp & Ream	370
				Total	**20409**

Signature of the Principal with Seal

Principal
J. M. Patel Arts, Commerce & Science College, Bhandara

Signature of Principal Investigator
Dr. (Mrs.) A. M. Yadav
J.M. Patel College, Bhandara

J. M. Patel College of Arts, Comm. & Sci.

Signature of the Chartered Accountant with Seal & Regd. No. of C.A

For PVRS & ASSOCIATES
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Vaibhav Toshniwal
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PVRS & ASSOCIATES CHARTERED ACCOUNTANTS NAGPUR

First Year Project Report (2017-2018)
Minor Research Project of Dr. (Mrs) A. M. Yadav
Expenditure on Travelling & Field Work

Sr. No	Voucher No.	Name of the Place visited	Bill No & Date	Duration of the Visit From-To	Hired &Mode of Journey	Expenditure Incurred (Rs.)
1	03-3-2018	Field work at Mohgaonkalan, Bhutera, Ghat Parasia in Madhya Pradesh	038 20-05-2017	13-05-2017 To 18-05-2017	Taxi hired from Mahakali Tours & Travels, Nagpur	9320
2		Field work at Parasia Coal fields, Chhinda open cast mine, Damua Mine in Madhya Pradesh	072 14-11-2017	10-11-2017 To 13-11-2017	Taxi hired from Mahakali Tours & Travels, Nagpur	6450
3		Field work at Singhpur in M.P.	080 04-12-2017	03-12-2017	Taxi hired from Mahakali Tours & Travels, Nagpur	3300
4		Field work at Satnavari in M.S.	089 11-12-2017	10-12-2017	Taxi hired from Mahakali Tours & Travels, Nagpur	2244
5		Field work at Kanhan Kamthi Coal mine in M.S.	094 08-01-2018	07-01-2018	Taxi hired from Mahakali Tours & Travels, Nagpur	2000
6		Field work at Gokul Coal mines in Umred M.S.	097 31-01-2018	30-01-2018	Taxi hired from Mahakali Tours & Travels, Nagpur	2000
					Total	**25314**

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J. M. Patel College of Arts, Comm. & Sci.

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For PVRS & ASSOCIATES
Chartered Accountants
Vaibhav Toshniwal
Partner
M. No. 152652

PVRS & ASSOCIATES ★ NAGPUR ★ CHARTERED ACCOUNTANTS

First Year Project Report (2017-2018)
Minor Research Project of Dr. (Mrs) A. M. Yadav
Expenditure on Chemicals & Glassware

Sr. No	Voucher No.	Purchased from whom	Bill No & Date	Particulars/ Description	Quantity	Rate		Amount	
						Rs.	Ps	Rs.	Ps
1	03-3-2018	Monarch Enterprises , Nagpur	ME/MEN-30/17-18/P-06 27-02-2018	Celloidine Loba 500ML	01	630		630	
2				N-Butyl acetate 500ML	02	515		1030	
3				Xylene rectified 500 ML	02	475		950	
4				HF 40% 500 ML	02	675		1350	
5				DPX 250 ML	02	571		1142	
6				Nitric Acid 500 ML	01	497		497	
7				Ethanol 500 Ml	01	490		490	
8				Slide box blue star	05	101		505	
9				Coverslip 18 MM blue star	05	133		665	
10				Coverslip 22* 60 MM	01	154		154	
11				Slide box wooden 100 slides	01	630		630	
12				Dropping bottle Polylab 300 ML	01	868		868	
13				Dropping bottle Polylab 60 ML	02	28		56	
				Reagent	02	54		108	

PVRS & ASSOCIATES ★ CHARTERED ACCOUNTANTS ★ NAGPUR

14				bottle Polylab N/M 500 ML					
15				Reagent bottle Polylab W/M 500 ML	02	70		140	
16				Glass rod 8^ll	01	28		28	
17				Stage micrometer Erma 1MM/100 division (0.01 MM)	01	1400		1400	
18				Occular micrometer disc Erma, Japan made	01	630		630	
19				Trays	01	490		490	
20				Glycerine jelly (Prepared)	02	210		420	
21				Hammer iron with handle-Big	01	490		490	
22				Hammer iron with handle-Small	01	350		350	
23				Multifunctional 3-in-1hand-folding lighted power magnifier glass with 3X Zoom & 2 led lights	01	505		505	
24				Weswox India camera	01	2115		2115	

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				lucida prism type					
25				KOH solution	01	1200		1200	
26				NAOH	01	220		220	
27				Celloidine flax	02	4200		8400	
						Total GST=18 %		**25463 4583**	**34**
						Total		**30000**	

For PVRS & ASSOCIATES
Chartered Accountants
Vaibhav Toshniwal
Partner
M. No. 152652

PVRS & ASSOCIATES ★ CHARTERED ACCOUNTANTS ★ NAGPUR

Signature of the Principal with Seal

Principal
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Signature of Principal Investigator
Dr. (Mrs.) A. M. Yadav
J.M. Patel College, Bhandara

J. M. Patel College of Arts, Comm. & Sci.

Signature of the Chartered Accountant with Seal & Regd. No. of C.A

Second Year Project Report (2018-2019)
Minor Research Project of Dr. (Mrs) A. M. Yadav
Expenditure on Contingency

Sr. No	Voucher No.	Purchased from whom	Bill No & Date	Particulars/Description	Amount in Rs
1	01	Mayur Stationers, Nagpur	19068 09-07-2018	Folder	130
2	01	Mayur Stationers, Nagpur	22725 24-07-2018	Sticker	165
3	02	Anant Stationers, Nagpiur	27 22-08-2018	A4 Ream	240
4	03	R. N. Enterprises, Nagpur	495 03-10-2018	Photocopy	182
5	04	Shubham Stationers, Nagpur	CA1662 30-11-2018	Stationery	4100
6	04	Shubham Stationers, Nagpur	CA950 30-11-2018	JK Easy Green FS-230	2200
7	05	Mayur Stationers, Nagpur	52561 17-12-2018	Stationery	130
8	06	Shubham Stationers, Nagpur	CA1309 07-01-2019	Internal Hard Disk & Ink Cartrage	5104
9	06	Shubham Stationers, Nagpur	CA1341 05-02-2019	Photo Paper (Desmat 180 G)	1000
10	06	Shubham Stationers, Nagpur	CA2072 05-02-2019	Stationery JK Easy Copier A/4 230 & JK Green FS-270	6150
11	07	R. N. Enterprises, Nagpur	659 12-02-2019	DTP Work	200
12	07	R. N. Enterprises, Nagpur	5562 05-03-2019	Photo Paper Printout	420
				Total	**20021**

Signature of the Principal with Seal

Principal
J. M. Patel Arts, Commerce & Science College, Bhandara

Signature of Principal Investigator
Dr. (Mrs.) A. M. Yadav
J.M. Patel College, Bhandara

Signature of the Chartered Accountant with Seal & Regd. No. of C.A

For PVRS & ASSOCIATES
Chartered Accountants
Vaibhav Toshniwal
Partner
M. No. 152652

PVRS & ASSOCIATES CHARTERED ACCOUNTANTS NAGPUR

Second Year Project Report (2018-2019)
Minor Research Project of Dr. (Mrs) A. M. Yadav
Expenditure on Travelling & Field Work

Sr. No	Voucher No.	Name of the Place visited	Bill No & Date	Duration of the Visit From-To	Hired &Mode of Journey	Expenditure Incurred (Rs.)
1	10	Field work at Patan in Maharashtra	133 15-06-2018	09-06-2018 To 11-06-2018	Taxi hired from Mahakali Tours & Travels, Nagpur	11395
2	10	Field work at Mahurzari in Maharashtra	135 17-06-2018	17-06-2018	Taxi hired from Mahakali Tours & Travels, Nagpur	2000
3	09	Field work at Nawargaon	143 26-08-2018	26-08-2018	Taxi hired from Mahakali Tours & Travels, Nagpur	2794
4	11	Field work at Pandharkawda M. S	150 28-10-2018	28-10-2018	Taxi hired from Mahakali Tours & Travels, Nagpur	3300
5	08	Field work at Ghugua M. P.	156 13-11-2018	10-11-2018 To 11-11-2018	Taxi hired from Mahakali Tours & Travels, Nagpur	5802
					Total	**25291**

For PVRS & ASSOCIATES
Chartered Accountants
Vaibhav Toshniwal
Partner
M. No. 152652

PVRS & ASSOCIATES ★ NAGPUR ★ CHARTERED ACCOUNTANTS

Signature of the Principal with Seal

Principal
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Dr. (Mrs.) A. M. Yadav
J.M. Patel College, Bhandara

J. M. Patel College of Arts, Comm. & Sci.

Signature of the Chartered Accountant with Seal & Regd. No. of C.A

Second Year Project Report (2018-2019)
Minor Research Project of Dr. (Mrs) A. M. Yadav
Expenditure on Chemicals & Glassware

Sr. No	Voucher No.	Purchased from whom	Bill No & Date	Particulars/ Description	Quantity	Rate		Amount	
						Rs.	Ps	Rs.	Ps
1	12	Central Scientific Company, Nagpur	CSC/3526 29-01-2019	Celloidine Otto 500GM	03	9,603		23047	20
2				N-Butyl acetate 500ML	04	384		1228	80
3				HF 40% 500 ML	02	533		852	80
4				Micro Slide 75 X 25 MM	12	61		732	
						Total		**25860**	**80**
						GST=18%		**4655**	**2**
						Total		**30516**	

For PVRS & ASSOCIATES
Chartered Accountants
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PVRS & ASSOCIATES NAGPUR CHARTERED ACCOUNTANTS

Signature of the Principal with Seal

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J. M. Patel Arts, Commerce & Science College, Bhandara

Signature of Principal Investigator
Dr. (Mrs.) A. M. Yadav
J.M. Patel College, Bhandara

J. M. Patel College of Arts, Comm. & Sci. Bhandara

Signature of the Chartered Accountant with Seal & Regd. No. of C.A

ASSETS CERTIFICATE

It is certified that the following Equipment purchased from MRP grant have been handed over to the college and have been duly entered in the Stock Register maintained by the college.

1) Labomed
   LX-300 Trinocular Microscope with IVU 3100 Camera Module
2) Nikon Digital Camera
3) Turner Cutter Machine
4) Printer Laser Canon MF-244DW

Signature of Principal Investigator
Dr. (Mrs.) A. M. Yadav
J.M. Patel College, Bhandara

Signature of the Principal with Seal
Principal
J. M. Patel Arts, Commerce & Science College, Bhandara

ACCESSION CERTIFICATE

It is certified that the Books purchased from MRP grant are handed over to the college central/ departmental library. Their Accession number is from **Sci. 16267 to 16289** and **Sci. 16320 to 16327**

Signature of Principal Investigator
Dr. (Mrs.) A. M. Yadav
J.M. Patel College, Bhandara

Signature of the Librarian with Seal

Ms. MONA YEOLE
Librarian
J.M.Patel College,
Bhandara

Signature of the Principal with Seal

Principal
J. M. Patel Arts, Commerce
& Science College, Bhandara

J. M. Patel College of Arts, Comm. & Sci.

ज्ञान-विज्ञान विमुक्तये

विश्वविद्यालय अनुदान आयोग
University Grants Commission
मानव संसाधन विकास मंत्रालय, भारत सरकार
Ministry of Human Resource Development, Govt. of India
पश्चिम विभागीय कार्यालय गणेशखिंड,पुणे- ४११००७
Western Regional Office, Ganeshkhind, Pune – 411007

Ph: 020 – 25696896, 25696897
Tele.Fax:.- (020-25691477
Website- www.ugc.ac.in
Email: mrpugcwro@gmail.com

UGC M.R.P. Pune Yadav Dr. Supe. A.M. 5/4/17

No. F. 47-1255/14 (General/ 31/ WRO) XII Plan

Date: 16 MAR 2017

The Drawing and Disbursing Officer,
University Grants Commission,
Pune – 411007.

05 APR 2017

Subject: RELEASE OF GRANTS TO J M PATEL ARTS COMMERCE & SCIENCE COLLEGE, , RAJGOPALAACHARI WARD, BHANDARA, PIN - 441904 FOR THE YEAR 2016-2017 UNDER PLAN *FINANCIAL ASSISTANCE TO TEACHER IN COLLEGES FOR UNDERTAKING MINOR RESEARCH PROJECTS – RELEASE OF FIRST INSTALLMENT.*

Sir/Madam,

I am directed to convey the sanction of the Commission. The UGC on the recommendations of the Expert Committee has approved the Minor Research Project in the subject of **Botany** entitled "Investigation and Exploration of Diversified Fossil Flora From Central India" to be undertaken by **Dr. Yadav A. M., of J M PATEL ARTS COMMERCE & SCIENCE COLLEGE, , RAJGOPALAACHARI WARD, BHANDARA-441904.** The financial assistance of the UGC would be limited to Rs. 330000/- (Rupees Three Lakh Thirty Thousand only) for a period of two years. An amount of Rs. 255000/- (Rupees Two Lakh Fifty Five Thousand only) is presently being sanctioned as the first installment Plan expenditure to be incurred during 2016-2017.

(In Rupees)

Non-Recurring Grant for Two years	Amount (Rs)	Recurring grant	1st Year Amount	2nd Year Amount	(Comp- General) Grant to be approved as Ist Inst.
Books & Journals	20000	Contingency	20000	20000	NR 100% Rec. 1st Year
Equipment	160000	Special Need	0	0	
		Travel/Field work	25000	25000	
		Chemicals & Glassware	30000	30000	
		Others	0	0	
Total (Rs.)	180000		75000	75000	255000

Total amount for the project: Rs. 330000/-

NOTE:

- **For remittance of refund to UGC (WRO), Bank details may be seen at point – 9.**
- **The grants should be utilized within the time period as specified under the GFR, 2005.**
- **"The University/College/Institution is registered/ mapped with PFMS portal" and settled.**

1. **The sanctioned amount is debitable to the Plan Head 3 (31) and is valid for payment during the financial year 2016-17 only.**

Component	Head of A/c	General –In-aid (31)	Capital Assets (35)	Total
General	3(A)	75000	180000	**255000/-**

2. The amount of the grants shall be drawn by the Drawing & Disbursing Officer, UGC (WRO), Pune on the Grants-in-aid bill and shall be disbursed to and credited to the Principal of the college through Electronic mode as per the following details:

a.	Details (Name & Address) of Accounts Holder:	J M PATEL ARTS COMMERCE & SCIENCE COLLEGE, , RAJGOPALAACHARI WARD, BHANDARA, PIN- 441904
b.	Account No.:	21285432836
c.	Name & address of Bank Branch	ALLAHABAD BANK, BHANDARA
d.	MICR Code:	
e.	IFSC Code:	ALLA0210797
f	Type of Account:	Saving Account

3. The grant is subject to adjustment on the basis of Utilization Certificate in the prescribed Performa submitted by the University/ College/ Institution.
4. The University/ College shall maintain proper accounts of the expenditure out of the grants, which shall be utilized only on approved items of expenditure.
5. The University/ Institution may follow the General Financial Rules, 2005 and take urgent necessary action to amend their manuals of financial procedures to bring them in conformity with GFRs, 2005 and those don't have their own approved manuals on financial procedures may adopt the provision of GFRs, 2005 and instruction/ guideline there under from time to time.
6. The Utilization Certificate to the effect that the grant has been utilized for the purpose for which it has been sanctioned shall be furnished to UGC as early as possible after the close of current financial year.

O/C UGC, WRO ! Pune file

Ref. No: JMPC/0858/2015-16

Dt 06/02/20

Annexure - II

UNIVERSITY GRANTS COMMISSION
WESTERN REGIONAL OFFICE
GANESHKHIND. PUNE- 411007

Regd letter A/D

ACCEPTANCE CERTIFICATE FOR MINOR RESEARCH PROJECT

Name Dr. Aparna Manoharlal Yadav

No. F. 47-1255/14 (WRO) dated 08/05/2015 (Date of Recommendations of the Expert of subject)

Title of the Project Investigation and exploration of diversified fossil flora Ghatom Central India.

(Please tick (√) whichever is applicable & strike out (X) whichever is not applicable)

√ 1. The research project is not being supported by any other funding agency.

√ 2. The terms and conditions related to the grant are acceptable to the Principal Investigator and College/Institute.

√ 3. At present, I have no research project approved by UGC and the accounts for the previous project, if any have been settled.

√ 4. The College/Institute is fit to receive financial assistance from UGC and is included in the list of Section 2(f) & 12(B) prepared by the UGC. **The College is not self-financing**

X 5. The Principal Investigator is a retired teacher and eligible to receive honorarium as he/she is neither getting any honorarium from any agency nor is he/she gainfully employed anywhere.

6. (i) His/her date of birth is 16-06-1983
   (ii) Age 32 yrs

7. The date of implementation of the project is _____

√ 8. The Principal Investigator is a permanent/regular Teacher

X 9. The Principal Investigator is undertaking the above project after a gap of one year from the last UGC Project completed satisfactorily.

(Signature)
Principal Investigator

This is to certify that the college is self-financing and is charging fee as per the State/University norms.

(Signature)
Principal
College: _____

J. M. Patel College of Arts, Comm. & Sci.

(Seal)

Date: 06/02/2016

Principal
J. M. Patel Arts, Commerce
& Science College, Bhandara

ME/ Q(BHA) /2017
DTD. 26.05.17

JMPC, BHANDARA
29 MAY 2017
Inward No. 0060/17

THE PRINCIPAL,
J.M.PATEL ARTS, COMMERCE & SCIENCE COLLEGE,
BHANDARA – 441 904.

MONARCH
ENTERPRISES
Meera Apartments, Dhantoli, Nagpur - 440 012. (M.S.)
Phone : 0712-2430350 / 1. Fax : 0712-2430352
E-mail : monarchngp@dataone.in / admn.monarch@gmail.com

SUBJECT : **OFFER FOR MICROSCOPE, GRINDER, CAMERA.**
REFERENCE : **YOUR ENQUIRY NO. : JMPC/0100/17** **DTD. 16.05.17**

1. MICROSCOPE

MODEL NO.	MAKE	DESCRIPTION	PRICE / EACH RS.
LX-300 DIGITAL	LABOMED	DIGITAL MICROSCOPE WITH 3 MP CAMERA MICROSCOPE SPECIFICATIONS : STAND: SINGLE MOLD STURDY STAND WITH ANTI-RUST MATERIALS. EXTENDED BASE WITH HAND RESTS FOR ENHANCED STABILITY AND COMFORT. VIEWING BODIES: BINOCULAR, 45° INCLINED, 360° ROTATABLE, INTERPIPULLARY DISTANCE 54-74MM WITH FIXED 3 MEGA PIXEL CAMERA MODULE IVU 3100. EYEPIECES: WIDE FIELD FOCUSABLE PAIRED EYEPIECE WF 10X/18MM, WITH FOLDABLE EYE GUARD, LOCKABLE, ANTI-FUNGUS COATING. NOSEPIECE: QUADRUPLE NOSEPIECE (BALL BEARING TYPE) WITH RUBBER GRIP. OBJECTIVES: LP SERIES DIN PLAN ACHROMATIC OBJECTIVES 4X, 10X, 40X (SPRING LOADED), 100X (SPRING LOADED, OIL), ANTI-FUNGUS COATING. MECHANICAL STAGE: MECHANICAL STAGE WITH CO-AXIAL DRIVE, HIGHLY SMOOTH ON BALL SLIDES, STAINLESS STEEL HOLDERS FOR SLIDE 75 X 50MM MOVEMENT. CONDENSER: SUB-STAGE ABBE CONDENSER NA 1.25 WITH ASPHERIC LENS. IRIS DIAPHRAGM WITH SNAP-IN BLUE FILTER. RACK AND PINION MOVEMENTS ON METAL GUIDES. FOCUSING: CO-AXIAL COARSE AND FINE FOCUSING ON BALL DRIVE SYSTEM FOR SMOOTH MOVEMENT. ILLUMINATION: HALOGEN 6V-20W ILLUMINATION WITH VARIABLE ILLUMINATION CONTROL. UP TO 2000 HOURS OF HALOGEN LAMP LIFE. ELECTRICAL: UNIVERSAL INPUT 100V-240VAC.	104,435/- + 29,242 = 133671

Model No.	Make	Description	Price/Each Rs.
		Camera Specifications : Digital Camera Module 3.0 Megapixel Sensor: ½" 3.0 Megapixel Color CMOS Active area: 4.52mm x 3.40mm Sensor resolution: 2048 x 1536 pixels Scan Mode: Progressive Pixel Size: 2.2mm x 2.2 mm Digitization: 12 Bit RGB Pixel clock: 48 MHz Dynamic range: 56 dB (measured at 10ms exposure) Max. exposure: 2S (Automatic Exp, WB, BL) Frame rate: 30 fps (640 x 480) Image resolution: Standard: 2048 x 1538 Binning 1024 x 768; 640 x 480 Digital interface: USB 2.0 Optical connection: C-Mount Software Specifications : PixelProTM Image Analysis Software for capturing still images and videos. Software provides an easy to navigate user interface designed for routine analysis. Control features include Auto White Balance and Auto Exposure adjustments. Picture quality adjustments, Annotations, Measurement functions & Calibration, Region of Interest selection, Archival of images in an easy to use gallery, and a variety of resolutions to view images at. Software is compatible with Windows XP/Vista/7 Operating Systems. Package: USB cable, software CD Packed in Styrofoam box with operation manual, allen wrench, dust cover, cleaning cloth, power cord.	

2. GRINDER / CUTTER

MODEL NO.	MAKE	DESCRIPTION	PRICE / EACH RS.
	TURNER / EQUIVALENT	GRINDER / CUTTER – FOR FOSSIL GRINDING AND CUTTING	2,200/- ✓

+ 616
= 2816

3. FIELD CAMERA

MODEL NO.	MAKE	DESCRIPTION	PRICE / EACH RS.
	NIKON / CANON / FUJI / VIVITAR	DIGITAL CAMERA. OPTICAL RESOLUTION : 10 MP OR BETTER. OPTICAL ZOOM : 3X OR BETTER. SUPPLIED WITH MEMORY CARD, USB CABLE, BATTERIES.	7,900/- ✓

+ 2212
10112

133677 → microscope
2816 → cutter
+10112 → camera
146605
– 2932 – 2% less
1,43,673/–

Sanctioned amount
160000
– 143673
16,327 – Bal.

Remarg 13395
amount 10112
23507

OK Place the order for VHC MRP Pure

MONARCH ENTERPRISES

TERMS AND CONDITIONS

PRICES :
F.O.R COLLEGE, BHANDARA.

EXCISE DUTY :
NOT APPLICABLE.

VAT :
EXTRA @ 13.5%.

LBT / OCTROI / ENTRY TAX :
EXTRA, AS/IF APPLICABLE, TO YOUR ACCOUNT.

DELIVERY :
WITHIN 2 – 8 WEEKS OF RECEIPT OF YOUR ORDER.

PAYMENT :
FULL PAYMENT AGAINST DELIVERY OF THE GOODS.

WARRANTY :
MANUFACTURER'S STANDARD WARRANTY AGAINST MANUFACTURING DEFECTS ONLY. THE WARRANTY DOES NOT COVER GLASS PARTS, RUBBER PARTS, CABLES, CORDS, WIRES, CARBON BRUSHES, FUSES, SPARES, CONSUMABLES, ACCESSORIES ETC. IT ALSO DOES NOT COVER DAMAGES DUE TO IMPROPER HANDLING, BREAKAGES, FIRE, VOLTAGE PROBLEMS, SHORT CIRCUITS, ETC. THE WARRANTY ALSO DOES NOT COVER CONSEQUENTIAL OR INDIRECT DAMAGES WHETHER IN CONTRACT, TORT OR OTHERWISE, AND IN NO EVENT SHALL BE THE SUPPLIER'S LIABILITY FOR ANY CLAIM OF ANY KIND.

VALIDITY OF OFFER :
30 DAYS. THE VALIDITY MAY BE EXTENDED ON FURTHER CONFIRMATION FROM OUR PRINCIPALS.

NOTE :
1. YOU ARE REQUESTED TO KINDLY CHECK / CONFIRM / CLARIFY ANY DOUBTS WHAT-SO-EVER BEFORE PLACING THE ORDER. PRODUCTS ONCE SUPPLIED WILL NOT BE TAKEN BACK ON ANY TECHNICAL / COMMERCIAL GROUNDS.
2. CUSTOM/EXCISE DUTY, CST/VAT AND LBT/OCTROI/ENTRY TAX ARE CALCULATED AT THE PRESENT RATES. HOWEVER, ANY FURTHER APPLICATION / INCREASE OR INTRODUCTION OF ANY OTHER DUTIES, TAXES AND LEVIES BY THE GOVERNMENT IN FUTURE / DURING THE PROCESS OF EXECUTION OF THE ORDER SHALL BE TO YOUR ACCOUNT AND SHALL BE CHARGED AS PER THE RATES RULING AT THE TIME OF SUPPLY.

ERRORS :
ALL CLERICAL & TYPOGRAPHICAL ERRORS ARE SUBJECT TO CORRECTIONS.

ME/ Q(BHA) /2017
DTD. 25.08.17

To,
Aparna Yadav
Botany

MONARCH
ENTERPRISES
Meera Apartments, Dhantoli, Nagpur - 440 012. (M.S.)
Phone : 0712-2430350 / 1. Fax : 0712-2430352
E-mail : monarchngp@dataone.in / admn.monarch@gmail.com

THE PRINCIPAL,
J.M.PATEL ARTS, COMMERCE & SCIENCE COLLEGE,
BHANDARA – 441 904.

JMPC, BHANDARA
29 AUG 2017
Inward No. 0191/17

SUBJECT : OFFER FOR MICROSCOPE, GRINDER, CAMERA.
REFERENCE : 1. YOUR ENQUIRY NO. : JMPC/0100/17 DTD. 16.05.17
2. OUR QUOTATION NO. : ME/Q(BHA)/2017 DTD. 26.05.17

DEAR SIR,

WE INVITE YOUR KIND ATTENTION TO THE ABOVE.

AS YOU ARE AWARE THE GOVT. OF INDIA HAS IMPLEMENTED GOODS & SERVICES TAX (GST) W.E.F FROM 1.07.17.

THE GST REPLACES EXCISE DUTY, CST, VAT, SERVICE TAX, ENTRY TAX, LBT, OCTROI, ETC.

AS SUCH, WE SHALL CHARGE GST IN LIEU OF VAT.

THE GST ON THE OFFERED PRODUCT IS 28%.

ALL OTHER TERMS AND CONDITIONS REMAIN UNCHANGED.

YOU ARE REQUESTED TO KINDLY RELEASE YOUR PURCHASE ORDER WITH GST.

THANKING YOU.

YOURS FAITHFULLY,
FOR **MONARCH ENTERPRISES**

MITTIN RAATHI

Dr. Aparna Yadav
28/8/17

ME/ Q(BHA) /2017
DTD. 20.08.17

To, Aparna Yadav
Botany

THE PRINCIPAL,
J.M.PATEL ARTS, COMMERCE & SCIENCE COLLEGE,
BHANDARA – 441 904.

SUBJECT : OFFER FOR GLASSWARE, CHEMICALS, ETC..

MONARCH
ENTERPRISES
Meera Apartments, Dhantoli, Nagpur - 440 012. (M.S.)
Phone : 0712-2430350 / 1. Fax : 0712-2430352
E-mail : mme_ngp@sancharnet.in / monarchngp@dataone.in

JMPC, BHANDARA
29 AUG 2017
Inward No. 01924/17

SR NO.	DESCRIPTION	PRICE / EACH RS.	GST EXTRA
1	CELLOIDINE LOBA 500ML	630/-	18%
2	NBUTYL ACETATE Q 500ML SQ	515/-	18%
3	XYLENE RECTIFIED Q 500ML	475/-	18%
4	HF 40% Q 500ML SQ	675/-	18%
5	CANADA BALSAM LOBA 100ML	364/-	18%
6	CANADA BALSAM LOBA 500ML	1540/-	18%
7	DPX Q 250ML	571/-	12%
8	NITRIC ACID Q 500ML ER	497/-	18%
9	POTASSIUM CHLORATE	2765/-	18%
10	CARBORANDUM	2520/-	18%
11	ETHANOL CHINA 500ML	490/-	18%
12	SLIDE BOX BLUE STAR PIC 1	101/-	18%
13	COVERSLIP 18MM BLUE STAR PIC 1	133/-	18%
14	COVERSLIP 22*50MM	154/-	18%
15	COVERSLIP 22*60MM	154/-	18%
16	SLIDE BOX WOODEN 100 SLIDES	630/-	18%
17	SLIDE BOX WOODEN 50 SLIDES	2520/-	18%
18	DROPPING BOTTLE POLYLAB 300ML	868/-	18%
19	DROPPING BOTTLE POLYLAB 60ML	28/-	18%
20	REAGENT BOTTLE POLYLAB N/M 500ML	54/-	18%
21	REAGENT BOTTLE POLYLAB W/M 500ML	70/-	18%
22	GLASS ROD 8^II	28/-	18%
23	SIEVE 25 MICRON 6^II	7700/-	18%
24	STAGE MICROMETER ERMA 1MM/100DIVISION (0.01MM)	1400/-	18%
25	OCCULAR MICROMETER DISC. ERMA,JAPAN MAKE	630/-	18%
26	TRAYS	490/-	18%
27	GLYCERIN JELLY	210/-	18%
28	HAMMER IRON WITH HANDLE-BIG	490/-	18%
29	HAMMER IRON WITH HANDLE-SMALL	350/-	18%
30	MULTIFUNCTIONAL 3-IN-1 HAND-HELD FOLDING LIGHTED HIGH-POWERED MAGNIFIER GLASS WITH 3X ZOOM & 2 LED LIGHTS	505/-	18%
31	WESWOX INDIA CAMERA LUCIDA PRISM TYPE	2115/-	18%

Aparna Yadav
28/8/17

NaOH, KOH

TERMS AND CONDITIONS

Continuation Sheet .....

PRICES :
F.O.R COLLEGE, BHANDARA.

GST :
EXTRA, AS SHOWN.

DELIVERY :
WITHIN 2 – 8 WEEKS OF RECEIPT OF YOUR ORDER.

PAYMENT :
FULL PAYMENT AGAINST DELIVERY OF THE GOODS.

VALIDITY OF OFFER :
30 DAYS. THE VALIDITY MAY BE EXTENDED ON FURTHER CONFIRMATION FROM OUR PRINCIPALS.

NOTE :
1. YOU ARE REQUESTED TO KINDLY CHECK / CONFIRM / CLARIFY ANY DOUBTS WHAT-SO-EVER BEFORE PLACING THE ORDER. PRODUCTS ONCE SUPPLIED WILL NOT BE TAKEN BACK ON ANY TECHNICAL / COMMERCIAL GROUNDS.
2. DUTIES AND TAXES ARE CALCULATED AT THE PRESENT RATES. HOWEVER, ANY FURTHER APPLICATION / INCREASE OR INTRODUCTION OF ANY OTHER DUTIES, TAXES AND LEVIES BY THE GOVERNMENT IN FUTURE / DURING THE PROCESS OF EXECUTION OF THE ORDER SHALL BE TO YOUR ACCOUNT AND SHALL BE CHARGED AS PER THE RATES RULING AT THE TIME OF SUPPLY.

ERRORS :
ALL CLERICAL & TYPOGRAPHICAL ERRORS ARE SUBJECT TO CORRECTIONS.

VAT TIN No. 27340279606V
CST TIN No. 27340279606C

MANGALAM TRADERS

225, Hill Road, Shivaji Nagar, Nagpur - 440 010.
Tel.: (O) 2440856 Fax : 0712-2440856
E-mail : mtbipin_ngp@sancharnet.in

To, Aparna Yadav Botany

JMPC, BHANDARA
29 AUG 2017
Inward No. 0190

MT/BHANDARA/EDU/17

Date : 21.08.2017

The Principal,
J M Patel Arts, Commerce & Science College,
Bhandara : 441904.

Offer for Chemicals, Laboratory ware

Sr no.	Description	Rate / Each Rs.	Add GST
1	Celloidine loba 500ml	707/--	18%
2	Nbutyl acetate q 500ml sq	579/--	18%
3	Xylene rectified q 500ml	531/--	18%
4	Hf 40% q 500ml sq	755/--	18%
5	Canada balsam loba 100ml	408/--	18%
6	Canada balsam loba 500ml	1727/--	18%
7	Dpx q 250ml	641/--	12%
8	Nitric acid q 500ml er	557/--	18%
9	Potassium chlorate	3101/--	
10	Carborandum	2826/--	
11	Ethanol china 500ml	550/--	
12	Slide box blue star pic 1	113/--	18%
13	Coverslip 18mm blue star pic 1	133/--	18%
14	Coverslip 22*50mm	173/-	18%
15	Coverslip 22*60mm	173/--	18%
16	Slide box wooden 100 slides	848/--	
17	Slide box wooden 50 slides	2826/--	
18	Dropping bottle polylab 300ml	973/--	
19	Dropping bottle polylab 60ml	31/--	18%
20	Reagent bottle polylab n/m 500ml	71/-	18%
21	Reagent bottle polylab w/m 500ml	79/-	18%
22	Glass rod 8^ii	31/--	18%
23	Sieve 25 micron 6^ii	8635/--	18%
24	Stage micrometer erma 1mm/100division (0.01mm)	1570/--	18%
25	Occular micrometer disc. Erma,japan make	707/--	18%
26	Trays	550/--	18%
27	Glycerin jelly	236/--	18%
28	Hammer iron with handle-big	550/-	18%

Dr Yadav

MANGALAM TRADERS

225, Hill Road, Shivaji Nagar, Nagpur - 440 010.
Tel. : (O) 2440856 Fax : 0712-2440856
E-mail : mtbipin_ngp@sancharnet.in

Sr no.	Description	Rate / Each Rs.	Add GST
29	Hammer iron with handle-small	393/--	18%
30	Multifunctional 3-in-1 hand-held folding lighted high-powered magnifier glass with 3x zoom & 2 led lights	564/--	18%
31	weswox india camera lucida prism type	2372/--	18%

Terms and Conditions

Prices : Bhandara, College delivery.
Delivery : Within 4-12 weeks.
Payment : 100% against delivery. Proforma will be sent on readiness of the material.
Validity of offer : 30 days.