# CHAPTER THREE

# MATERIAL AND METHODS

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The Upper Gondwanas, flora of the east coast are exposed along the east-coast of India; by a series of small exposures. They are in the form of detached outcrops representing outlires, on the gneiss or alluvial deposits. They are found in the Prakasam districts called as Vemavaram beds; in West Godavari district as Raghavpuram shales and Collapalli sandstones. These beds are found in the Andhra Pradesh. In Orissa they are represented by Athgarh sandstones. In Tamil Nadu they are found in Chingleput district known as Sriperumudur beds and Sattavedu beds. In Trichinopoly region they are called as Utatur beds. The above formations are major formations and shows plant fossil assemblage belonging to Ptilophyllum flora. Among all these beds Vemavaram beds of Ongole area are richest in their fossil contents. Earlier work on Vemavaram beds represent the study of the plant fossils from Vemavaram village only. The recent contribution by our school has brought to the notice of a new locality Uppugunduru which has yielded the richest plant fossil assemblage belonging to Vemavaram shales. In addition to Uppugunduru the plant fossils were also located at new places like Nagaluppalpadu, Rachapudi, Prasangalpadu, Madiralpadu by the workers of Palaeobotanists school of our University. In the search of plant fossils passing references of locality, 'KANDKURU' was found in the Manual of the Geology of India and Burma by Edwin H. Pascoe (1959). It is mentioned that South of Ongole town as many as 24 small outcrops of Upper Gondwana beds are found.

However, in the literature of plant fossil studies except Vemavaram and Uppugunduru none of them have been reported so far. Further it is pointed out that out of these exposures the principle exposure is found near town Kandkuru, Which is 32 Kms. South-South West of Ongole town. Kandkuru is a small town located on the Ongole-Madras road. It is present near the border of Ongole and Nellore district of Andhra Pradesh.

The fossiliferous exposures are located on the Western side of the town. One such exposure is present near a Regional Tobacco Research Centre. Here some newly dug wells in the February 1995 showed that the sandstone layers shows presence of plant fossils. They were in the form of impressions, preserved on yellowish white or yellowish brown, fine grain sandstones. The sandstones were softer in nature and occassionally show presence of Mica. From 3 to 4 well diggings the plant fossils were collected in the form of impressions. The subsequent visit of March 1995 brought to the notice petrified coniferous woods exposed along the small Nallah and Stream banks found at the distance of ½ Kms. from Kandkuru town and towards the Ongole road. The plant impressions were also collected from near by places of Kandkuru.

They mostly yielded plant impressions only. These two visits produced about 40 specimens of plant impressions and few woods indicating the abundance of impressions and rarity of woods. The specimens were studied morphologically as well as anatomically and the results form the contents of the present investigation.

## Methods of Plant Impressions Studies

The plant impressions were collected from the places mentioned above. On the spot they were examined for their morphological features. The fragmentary specimens as well as poorly presented specimens are rejected and only those showing promissing features were selected in the field work. They were properly packed in the news paper wrappers and finally carefully packed in the wooden boxes. This was done due to longer distance between the site of collection and the laboratory. In the laboratory the specimens were throughly cleaned by soft hair brush and numbered serially. it was done by using white acrylic paint and black India ink. The specimens were observed for the gross morphological features like, type of branching, shape of the leaf, nature of the apex; pattern of the venation etc. Based on these features the text figures were drawn on the ivory sheet using India ink and sometimes with a Rotter pen. The care was taken to draw the figures at natural size. But in some cases figures were drawn in the enlarged proportion. The text figures were numbered properly and then copied using the Gulminard film. By this method

negatives of text figures were prepared. From the negatives the prints were made on the Sterling Photographic printing paper using normal aand hard grades. This is done to obtain the proper contrast of characters in the figures.

## Methods used for studying the Petrified Woods

The woods were collected and cleaned at the site of collection under running water. They were packed in small gunny bag and transported to the laboratory. In the laboratory the specimens were cleaned under tap water. Sometimes they were emersed in dilute HCl solution to remove the dirt from the surface. The woods were examined for their megascopic features and those found promissing were selected for the investigation. At the time of selection the quality of preservation, number of growth rings, the appearance of tracheids in T.S. and other characters were considered. The woods were studied by using thin ground section method. Before that peel method was also tried. Due to presence of higher proportion of Silica the peels did not produce better results. Hence a thin ground section method was the only method used here. The section were cut by using the cutting machine of an American make, "Highland Park".

The machine is driven by an electrical motor and equipped with circular diamond blade. A diamond blade runs through a water bath mixed with cutting oil and soap powder. The pieces are fixed in the vice of the machine and adjusted for the cutting of thinner sections. This was done manually.

The machine works automatically when it is operated by the electric current.

The sections were cut along different planes like T.S., T.L.S. and R.L.S. The sections were taken out from the machines and then again cleaned under tap water. Each section was ground on the glass plate by using '0' grade emery powder. It was done to polish the surface of the section. After the surface becomes smooth it was fixed on the glass slide by heating the natural Canada Balsam. The heating was done using spirit lamp. After proper heating the smoothened surface of the section was pressed against the layer of heated Canada Balsam. While fixing, the care was taken to remove the air bubbles. This was done by heating the fixed slide 2 or 3 times and applying proper pressure. After fixing the section on the slide it was allowed to cool for 1/2 hours. Then it was tested for the perfect fixing.

The fixed section is next ground on the grinding machine, which is equipped with a rotating disc and a continuous water flow system. The section is ground by using 60, 90 and 120 grades of emery powder, till it becomes sufficienly thin. The section is observed under microscope to examine the characters of the wood. The final grinding is made on a glass plate using 400 grade emery powder. The grinding is stopped when the characters are clearly visible. Next the section is separated from the slide by gently heating on spirit lamp. It was further cleaned by dipping in the xylene solution.

This was done to remove the particles of emery powder and traicesof Canada Balsam. Finally the section is mounted in a laboratory grade Canada Balsam of STAFFORD and ALLEN make. The section was covered with coverglass and it was observed under microscope for the desirable characters. The Camera lucida sketches were prepared by using Cemera lucida make of ERMA make. The sketches were drawn on a Ivory sheet and inked by using Camel water proof drying ink. The sketches were drawn by using by both low and high power magnification. The inked sketches were used for preparing text figures plates. They were numbered and labelled for important characters like Spring wood, autumn wood, xylem parenchyma, inflated cells, cross field pits etc. The explaination of text figures were prepared and magnifications were introduced. This was done by using the callibration of microscope. The characters introduced in Camera lucida sketches were photographed by using JENAVAL microphotographic camera. For microphotography 35 mm Black and White film having 125 ASA speed of NOVA make was used. The exposed film was developed in contrast developer and prints were prepared on hard normal and special grades photographic papers. The prints were used to prepare photographic plates. They were numbered and their magnification were calculated and introduced in the explanations of plate figures. For impressions photographs were prepared by using 35 mm colour film of Kodak make. The colour prints were obtained from commercial firms and the photoplates of impressions were prepared by using them. The impressions of photographs were

also calculated for their size and proper magnification was introduced in their explainations.

The methods used are standard Palaeobotanical methods with some modifications. Some of the methods like cellulose acetate peel or nail police transfers were also used but proper results were not obtained from them. The type of material allows only certain techniques which can be used for better results and those methods are described in details in this Chapter.


KANDUKURU MANDALAM
PRAKASAM DISTRICT
Scale – 1" = 1 Mile
G.MECAPADU
JARUGUMILLI
KAMMAVARI PALEM
PANDALA
JILLELA MUDI
VIKKIRALA PETA
M.K.KANDRIKA
PONNALURU
KOVURU
KONDI KANDUKURU
PALUKURU
MAHADEVAPURAM
SINGARAYA KONDA
ANANTHA SAGARAM
OGURU
KANDUKURU
KANCHARAGUNTA
KONDAMUDUSU PALEM
ANANDRPURAM
MOPADU TANK
MOPADU
DONDAPADU
MACHA VARAM TANK
PALURU
MANDANA GOPALAPURAM
ULAVAPADU
VALETIVARI PALEM
MACHAVARAM
GUDLURU
Δ – Fossiliferous localities