



*Material &
Methods*

MATERIAL AND METHODS

The present work deals with the fossil flora of Nagpur district. The area includes both Palaeozoic and Coenozoic deposits. The Palaeozoic rocks show fossiliferous beds representing Barakar and Raniganj. The Coenozoic deposits represent the famous Deccan Intertrappean series having Eocene age. In the present work only Palaeozoic rocks are studied and particularly the fossil plants found in Kamthi formation are dealt with. Nagpur District includes several coal mines, having Barakar deposits, those deposits are not considered for this work.

The Kamthi deposits are peculiarly rich in their fossil contents and show several elements. They are mostly devoid of coal and indicate a typical types of rocks. The Kamthi beds are exposed around Nagpur at several places like Bazargaon and Satnaori since meager work is done on them they deserve more attention. Therefore, for the present study following two localities are selected (1) Satna^aori, (2) Bazargaon. The material found is preserved as impressions as well as petrifications. Therefore, they are studied morphologically as well as anatomically.

The first locality Satna^aori lies on Nagpur, Amaravati road. It is at the distance of 22 Km. from Nagpur. From the main road a kuccha road given out towards the small hillocks situated in the interior part. The entire area covers about 5 to

6 Kms. On the road to hillocks number of small streams are met with due to erosion the stream beds are exposed and several petrified woods are found in them, number of shales are also found on the surface of the streams which show a characteristic reddish-brown colour representing Kamthi rock. Few years back a stone quarry was opened due to that a large section of Kamthi rocks was exposed. The quarry is called as Yawalkar's (quarry). From the material exposed in the quarry the fossiliferous shales were selected and opened for the impression they yielded beautiful impression of Glossopteridales and other groups.

The next locality selected for the work is Bazargaon. It also lies on the Nagpur-Amravati road, but here the quarries are not opened. The material is collected from the stream beds and they yielded yellowish brown colour shales containing impressions of Glossopteridales. The sandstones are some what different than those found at Satnari^a but they agree in general features of Kamthi rocks. This locality yielded only impressions.

The petrified wood which are some what rare in Nagpur district when compared to Kamthi deposits of Chandrapur district. Very little work was done on them and they deserve more attention. First systematic studies on Satnari^a woods were made by Varadpande (1977, 1979). Since then no work is available. In the present investigation the petrified woods were collected from Satnari^a in the month of December and February 1993 and 1994. The woods are difficult to locate because they are embedded in the walls of the streams in the dry season they comes out

from the walls and then can be separated from the adjoining region. Some of them were also found in separated condition due to erosion. More than 24 petrified coniferous woods were collected. From these 4 pieces are selected for final investigation.

The woods were properly packed in the field and brought to laboratory. They are thoroughly washed under tap water and cleaned. Some time dilute HCl was used for removing the dirt. After cleaning the woods were serially numbered by using white enamel paint and India ink. For numbering the name of locality, year of collection and serial number were introduced. The woods were examined megascopically for their morphological features, textures etc. Later on the promising pieces were selected for further studies. The woods are studied by using thin ground section technique. For this purpose the woods were cut by using cutting machine. The cutting machine is equipped with a circular diamond saw driven by an electrical motor. The woods were fixed in the voice along different planes such as T.S., T.L.S. and R.L.S. The diamond saw runs through a solution made up of water, cutting oil and soap powder. After the sections were cut they were first ground on glass plate using "0" grade carborandum powder. This is done to remove the vibrations marks of the cutting machines on the sections. After the surface becomes smooth it was fixed on glass slide by using natural Canada balsam. For this purpose sufficient amount of Canada balsam was heated on a slide using spirit lamp. After

sufficient heating smoothed surface of the section is gently pressed against the layer of Canada balsom. Proper care is taken to remove the air bubbles. Section is firmly fixed on the glass slide after cooling the Canada balsam. The fixed specimen was further ground on grinding machine which is equipped with grinding wheel driven by electric motor. The machine is provided with a continuous water trickling mechanism, which helps the emery powder to fall on grinding plate at regular intervals. Different grades of carborandom powder such as 60, 90 & 120 were used. The grinding was continued till the section becomes sufficiently thin and transparent. Finally the section was ground on glass plate, using '0' grade carborandom powder. This is the final stage where section becomes quite thin and can be used for primary observation. After the primary observation the section was selected for the final mounting for this purpose it was again heated on spirit lamp and detached from glass slide. The section is washed in xylene solution to remove the particles of Canada balsom or carborandom powder if any. After thoroughly cleaning, the final mounting was done by using a fresh slide and laboratory grade Canada balsam. The slide is properly mounted in Canada balsam and covered with the cover glass.

Finally the slide was just warmed on spirit lamp to remove the air bubble if any. The prepared slide is observed under microscope and promising features were noted for final description.

Camera lucida sketches of the important anatomical feature of specimens were prepared by using camera lucida instrument of 'Erma' make. Camera lucida attachment is used in combination with Olympus microscope. The sketches were prepared on Ivory paper and inked by using water proof camel balck ink. The drawings were fixed on a card board sheet and the set of text figures was prepared for each wood.

The measurements of tracheids, xylem rays and radial pits were made by using a special formula. For this purpose readings were taken by using a circular micrometer called as 'OKNOR'. The readings were introduced in description, the suitable magnification of text figures were given in the explanation of text figures. (was)

The important anatomical characters of the wood specimens were photographed by using microphotographic technique. For this purpose the 'Jenaval' microphotographic camera was utilised. The equipment is incorporated with computerised light source arrangement and therefore, the correct amount of light source required for the photograph of character was automatically calculated and utilised. Use of suitable objectives and correct illumination were made to get the better photographs. For photography black and white film of 'Nova' make having speed of 125 A.S.A. was used some times film of 100 A.S.A. was also used for better contrast. The film was developed in the fine grain developer and prints were prepared on steirling make papers. For printing papers of hard, normal

and special grades were used. The photographs were fixed on a card sheet and photoplates were prepared, magnification of each photograph was calculated and introduced in explanation of plate figures.

For the investigation of impressions following procedure was followed. The impressions were exposed by breaking the shales at the bedding plane, in the field impressions were properly packed and care was taken to avoid the friction of surface with others objects. In the laboratory the impressions were first cleaned by using camel hair brush. Some times wet cotton plug of xylen solution was used to clear the area. The observation of shape, venation, midrib were made in case of leaves. For other specimens the habit sketches were prepared to show type of branching, arrangement of nodes and internodes and important features of reproductive organs, Sketches of impressions were made on Ivory sheets and inked by using camel water proof drawing ink. These sketches were introduced as text figures of impressions. For plate figures the impressions were photographed by using black and white as well as colour films, depending upon the merit of material, choice of prints were made. The prints were utilised for the formation of plate figures of impressions. Magnification of text figures and plate figures were calculated and introduced in respective explanations.