CHAPTER - III

MATERIAL AND METHODS

The material for the present work was collected from Nawargaon locality which is located at about 28 - 30 miles north west of Wardha (La. 21° 1' and Long. 78° 35'). This locality belongs to Wardha district and is situated in Arvi Tehsil. From Wardha to Bordam via Pawnar and Sello there is a tar road, further there is no P.W.D. road and hence only small bullock cart or jeep can approach this locality proper only during the summer. Recently state transport bus has been started once in a day service upto Nawargaon village. As shown in the Map - II the distance between Wardha and Nawargaon is 28 miles (N.W.). Fossils were collected from Nawargaon after making several trips from time to time. This locality is dominating in petrified fossils, impressions being rare. The main exposures are scattered between Nawargaon and forest village Maragsur. Most of the petrified samples collected belongs to Dicotyledonous and Monocotyledonous woods. From the later group large palm stumps are predominating all along the hillocks surrounding Nawargaon. Some of these are still standing erect with their rooting mantle embeded in the matrix. Cherts and impression fossils are comparatively less.

Most of the fossils are reddish brown in external appearance as well as in internal structure. Some are jet black internally and reddish externally. About 100 woods belonging to Dicotyledons and Monocotyledons were collected.

Collection includes small to large pieces of petrified woods, a few leaf impressions and cherts. Some of these picked up from the ground while others lay buried partially in the earth and had to be dug out. Where the logs were very big and difficult to bring small pieces were taken out after making observations of the size and other features of the logs. The main exposures of Nawargaon locality are along the slope of Nala and Hill tops occupied by teak forest located at about two miles west of Nawargaon.

Only the largest well preserved and anatomically distinct specimens were selected by making gross observations with the help of hand lense. The completeness of the specimen was also considered. Temporary labelling was made in the field only and then the material was packed into boxes. After bringing to the laboratory the entire collection was cleaned and the individual specimen was numbered as FN-1, FN-2, ...

etc.

For detailed anatomical study the selected fossil woods were cut into thin slices and usual sections viz. cross , tangential, and radial longitudinal were prepared by using thin ground section technique. In few cases the peel technique was also tried but without much success probably due to the highly silicified nature of the samples.

So as to study the minute details of the different elements of the wood, maceration with hydrofloric acid was tried but it yielded no satisfactory results. Since majority of the fossils are brownish to reddish brown in colour the staining was not necessary.

Photographs of the fossils showing the various anatomical features were taken with Asai Pentax Camera using 35 mm ORWO microfilm. Contact prints were also taken wherever necessary. Camera lucida sketches were made with "ERMA" camera lucida at different magnifications. The actual magnification of each figure is given below the respective text figure plate along with the explanations.

For the identification of Dicotyledonous woods, in addition to Metcalfe and Chalk's work (1950),

publications of following workers were also found to be quite useful. Brazier and Franklin (1961) , Chowdhury and Ghosh(1958), Desh (1957), Gamble (1902), Howard (1942), Jane (1956), Janssonius (1930), Kanehira (1924), Moll and Janssonius (1906,1908,1914,1914 a, 1918) and Pearson and Brown (1932).

"Anatomy of Dicotyledons" by Metcalfe and Chalk (1950) was used as the basic book for identification of Dicotyledonous woods. Wherever possible the basic identifications were also varified by using the various keys given by Record (1943, 1943 a) in Tropical woods. Sections of the woods of modern species comparable to the fossil woods included in this work were then studied by using the handcut sections wherever possible.

For the identification of Monocotyledonous fossil the "Anatomy of the Monocotyledons" by Solereder and Mayer (1928) and "Anatomy of Monocotyledons - V Cyperaceae" by Metcalfe C.R. (1973) were also used.

The anatomical terms used here in describing the Dicotyledonous woods are those adopted by the International Association of Wood Anatomists - 1957.

While describing the fossil Dicotyledonous woods the following anatomical features have been considered as important (Record and Chattaway , 1939 ; Tippo, 1941).

Groth rings - Their presence or absence and distribution frequency (No. per sq. mm.)size, wall thickness, presence or absence and nature of tylosis, type of perforation plates, length of the vessel members, nature of the intervessel , vessel ray and vessel parenchyma pits.

Parenchyma - Its abundance and distribution, pits between xylem parenchyma cells, their size, shape, and parenchyma cell strands.

Xylem rays - Their nature, frequency (no.per sq.mm) , width,and height (in number of cells and in micra), pitting between the ray cells, sheath cells and aggregate rays.

Fibres - Septate or nonseptate, their length, wall thickness, type of inter fibre pits.

Other features - Storied structures pith flecks, intercellular canals (vertical, horizontal or both) included phloem , vestured pits, tracheids, crystals , etc.

Primary anatomical characters like the nature of pith, primary vascular structure, and pericycle were also made use of wherever available.

Each selected fossil specimen has been presented in the text as shown below -

1. Description of the fossil
2. Comparison with the modern woods
3. Comparison with the fossil species followed by
4. Generic and specific diagnosis wherever needed

All the specimens and slides on which the present work is based are deposited in the Botany Department, Smt. Kasturbai Walchand College, Sangli.

MAP - II

MAP OF WARDHA DISTRICT SHOWING APPROACHABLE ROUTE TO THE LOCALITY INVESTIGATED