INTRODUCTION
OVERVIEW OF GONDWANA BASIN

The Gondwana rocks of peninsular India occur as relatively restricted strips/patches in well defined linear basins. These include the well known east-west trending Koel-Damodar basin, southeast-northwest trending Son-Mahanadi basin and Pranhita-Godavari basin, and east-west trending Satpura basin (Fig. 1A).

The Satpura Gondwana basin of central India lies south of Narmada alluvium tract of Hoshangabad district of Madhya Pradesh (M. P.), and includes the undulating terrain of Mahadeva hills of southern Hoshangabad and northern Chhindwara around Pachmarhi. Large portion of this hilly region to the north of coal-bearing Permian "Lower Gondwana" rocks of Pench Valley of Chhindwara district and south of Narmada Plain is underlain by a thick pile of the Mesozoic "Upper Gondwana" rocks.

STUDY AREA

The study area comprising Mesozoic Gondwana rocks of Satpura basin, forming the elevated Mahadeva range, was selected because of its strategic location in terms of geological and topographic setting with underlying Permian Lower Gondwana rocks and granitoid basement occurring mainly to the south and southeast with small isolated patches outcropping also along the northern
Fig.1 A. Map showing distribution of Gondwana basins in Peninsular India.

B. Map showing location and rail, road access to study area in central India; inset shows position of Satpura Gondwana basin.
boundary, post-Gondwana Deccan Traps in the southeast, and Narmada-Son Lineament and recent alluvium in the north. Thus, the Satpura Gondwana basin of peninsular India displays a fascinating geological history of sedimentary record ranging in age from Permian in the south to Triassic through Cretaceous in the north. The Lower Gondwana rocks (Permian) of southern part around Pench Valley have been widely studied (Shukla and Rai, 1971; Qidwai, 1972; Casshyap and Qidwai, 1974). However, our knowledge of the northerly Mesozoic Gondwana rocks of this basin is lacking from sedimentologic, tectonic and paleogeographic point of view.

LOCATION AND ACCESS

The Satpura basin is located between North Lat. 22° 06' and 22° 28' and East Long. 77° 48' and 78° 53'. Its southern boundary runs close to the coalfield belt along Pench river near Parasia, whereas the northern boundary extending east-west from Narsinghpur to Itarsi runs in the proximity of Narmada river. Exceptionally, the small outlier of Permian rocks called Mohpani coalfield occurs along the northern margin of the basin located in the centre of Ranipura reserve forest, some twenty three kilometers south of Gadarwara on the Jabalpur-Itarsi section of Central Railway in Narsinghpur district, Madhya Pradesh. Pachmarhi, a hill station, Matkuli,
Bagra, Tawa, Piparia etc. are other important places which are well connected by road (Fig. 1 B). Much of the terrain to the north and northwest of Pachmarhi and east of Matkuli is steeply undulating, thickly forested, devoid of roads and largely inaccessible.

**TOPOGRAPHY**

The attractive feature of Satpura Gondwana basin is its varied topography with elevated hills and plateau in northwest and central part, and low lying undulating country of Pench valley coal basin located to the south and a small isolated Mohpani coalfield in the northeast. A schematic geological section (Fig. 2) illustrates the regional undulating topography across the Mahadeva range including stratigraphy and structure of the Gondwana Supergroup of Satpura basin, from Pench valley in the south through Pachmarhi to the north of study area.

The most prominent physiographic feature is defined by east-west trending Mahadeva range located to the north of Pench Valley coal basin with conspicuous undulating landforms are characterized by elevated sandstone ridges and plateau interrupted by basaltic traps. The highest part in whole Satpura range is Mahadeva hill. Pachmarhi plateau is about 1200 meters
Fig. 2 Regional cross-section (North-South) of Satpura Gondwana basin, central India, showing topographic setting, stratigraphy and structure.
above mean sea level, and surrounding peaks are on an average about 400 meters. Dhupgarh (1500 meters) is the highest point between the Nilgiri in the south India and Himalayas in the north. North of Mahadeva range shows comparatively levelled valleys of rivers Denwa and lower Dudhi. Beyond the northern margin lies the extensive plains of the Narmada river.

All the large rivers of the region namely Tawa, Denwa, Dudhi and Sitarewa originate in the trap plateau to the south and southeast with an important subsidiary source in the Mahadeva hills, which form an important water divide. Most of the rivers flow northward through precipitous gorges till they reach the plains of Narmada. Among the important rivers, the Tawa flows through Hoshangabad in the west, Denwa flows in central part as a tributary of Tawa, Dudhi and Sitarewa rivers flow northward into the Narmada valley in central part (Raja Rao, 1983).

SCOPE OF THE STUDY

The present study is concerned with the sedimentological investigations of Pachmarhi, Denwa and Bagra Formations of Mesozoic Gondwana rocks (Upper Gondwana) of Satpura Gondwana basin. The study aims at examining sedimentary facies, their lateral and vertical organizations, sandstone petrography, heavy minerals,
paleocurrent dispersal and tectono-sedimentary evolution etc. in three separate areas of Mohpani, Pachmarhi-Matkuli, and Bagra-Tawa. Extreme inaccessibility of the western part hampered proper coverage and collection of data.

The field work was carried out during winters of 1992 and 1994 and briefly in 1995 for final check-up. Field work included identification and examination of sedimentary facies systematically. The best available outcrop sections were measured and drawn for facies analysis. The paleocurrent data obtained from primary directional structures were recorded and some 100 suitable rock specimens collected for textural and petrographic analyses.

Integrated results from facies analysis, paleoflow and paleodrainage, texture and petrography would provide adequate evidence for reconstructing the sedimentation history, basin configuration, paleogeography and tectonic setting during deposition of Mesozoic Gondwana rocks of Satpura basin of central India.