MATERIAL AND METHODS

The material was collected by undertaking extensive tours of remote areas in the interior of the eastern Himalayas. General observations were noted down in the field itself. For anatomical studies the material was cut into pieces of suitable sizes and fixed in FAA in plastic bottles. Type-specimens were pressed, and dried and have been deposited in the Herbarium of the Botany Department, Panjab University, Chandigarh (India). For detailed anatomical studies the various parts were treated as follows:

After dehydration in tertiary-butyl-alcohol series, the materials were infiltrated and embedded in paraffin wax (melting point 57-59°C). Sections were cut with the help of a "Spencer 820" rotary microtome at 12-14 μ thickness. Double staining was done by the usual safranin-fast green combination (Johansen, 1940), and the sections were mounted in Canada balsam.

Temporary mounts were made in 50% glycerine followed by ringing with nail polish.

LEAF

Smaller leaves such as those of Juniperus were embedded as such, while bigger leaves such as those of Abies, Tsuga, Larix and Podozamora were cut into smaller pieces with the help of a sharp razor-blade and then embedded.

Epidermal peelings of the complete leaf were easily removed by treatment with hydrogen peroxide and then scrapping gently. Peelings were stained with a mixture of safranin and basic fuchsin and mounted in 50% glycerine and photographed.
Permanent mount of some of the peelings was done in euparal after dehydration in alcohol series.

The resin gland shape and size in *Juniperus* leaves was studied by carefully operating and clearing the leaves on the abaxial side under a binocular and then the drawings were made with the help of a camera lucida.

**YOUNG SHOOTS**

The present year's shoots just near to the apex, were embedded and sections cut in transverse and longitudinal planes.

**WOOD**

Small wood samples, about 2 cm thick, were taken out with the help of a chisel and a hammer, at breast height from the main bole of the trees. In the case of shrubs the thickest available samples of wood were cut with the help of a saw.

Wood samples were cut into cubes of 1 cm³ before sectioning.

Sections of wood were cut in three planes (transverse, radial longitudinal and tangential longitudinal) with the help of a sliding microtome. The sections of each plane were divided into three groups and mounted as follows:

a) Untreated sections in 50% glycerine followed by ringing with nail polish.

b) Untreated sections double stained with safranin and fast green and mounted in Canada balsam.

c) Cleared sections by treatment with ammonia and single stained with safranin and mounted in 50% glycerine.

**BARK**

Transverse sections of mature bark were cut without any pretreatment and were stained with safranin-fast-green and mounted in Canada balsam.
Maceration of bark tissue was done with hydrogen peroxide and glacial acetic acid, with a view to make a study of the phloem fibres and the nature of crystals if any.

**FEMALE CONES**

Complete serial sections of the female cones of all the species except *Abies forrestii* were cut by paraffin method in both transverse as well as longitudinal planes. In case of *Abies forrestii*, the scale, the bract and the cone axis from a mature cone were sectioned separately after softening with hydrofluoric acid.

Epidermal peelings from the abaxial and adaxial surfaces of the scales and the bracts were removed as in case of leaf and the slides prepared by the same method.

The vasculature of the female cones of *Juniperus* was cleared out after boiling with 10% KOH for a few minutes and gently brushing away the soft tissues and removing the seed from the centre.

The vasculature of the mature scales of *Abies forrestii*, *Tsuga dumosa* and *Larix griffithii* was cleared out after boiling with 10% KOH and then brushing away the rest of the tissues under the binocular.

**DRAWINGS**

The schematic drawings were made with the help of a 'Beck Kassel' camera lucida. The original drawings were reproduced by photography to a calculated magnification.

**MEASUREMENTS**

Measurements in cms were taken with a meter scale; and those in mm were measured on a graph paper under the binocular;
and those in microns (μ) were measured with a standardised ocular micrometer scale through an 'Olympus' microscope.

For determining the cross-sectional dimensions of wood elements, the principles laid down by Smith (1967) were followed.

For measuring the percentage of summer wood, the boundary between the springwood and summerwood was first determined under the microscope using Mark's (1926) definition which reads:

"All tracheids in which the common wall between two cell cavities multiplied by 2 is equal to or greater than the width of the lumen are considered as summerwood; those in which this value is less than the width of the lumen are considered as springwood (all measurements being made in the radial direction)."

SPECIFIC GRAVITY OF WOOD

The specific gravity of wood samples was determined by the "Maximum-Moisture Method" devised by Smith (1955) by using the following formula:

\[ G_f = \frac{1}{\frac{m_0 - m_w}{m_0} + \frac{1}{G_{so}}} \]

where \( m_w \) is the weight in grams of the completely water saturated sample, \( m_0 \) is the oven-dry weight of the sample in grams, and \( G_{so} \) is the specific gravity of dry cell wall substance. The average value of 1.53 obtained by Stamm (1929) was substituted for \( G_{so} \) in the above formula. All the weighings were done with the help of a single pan electronic balance.