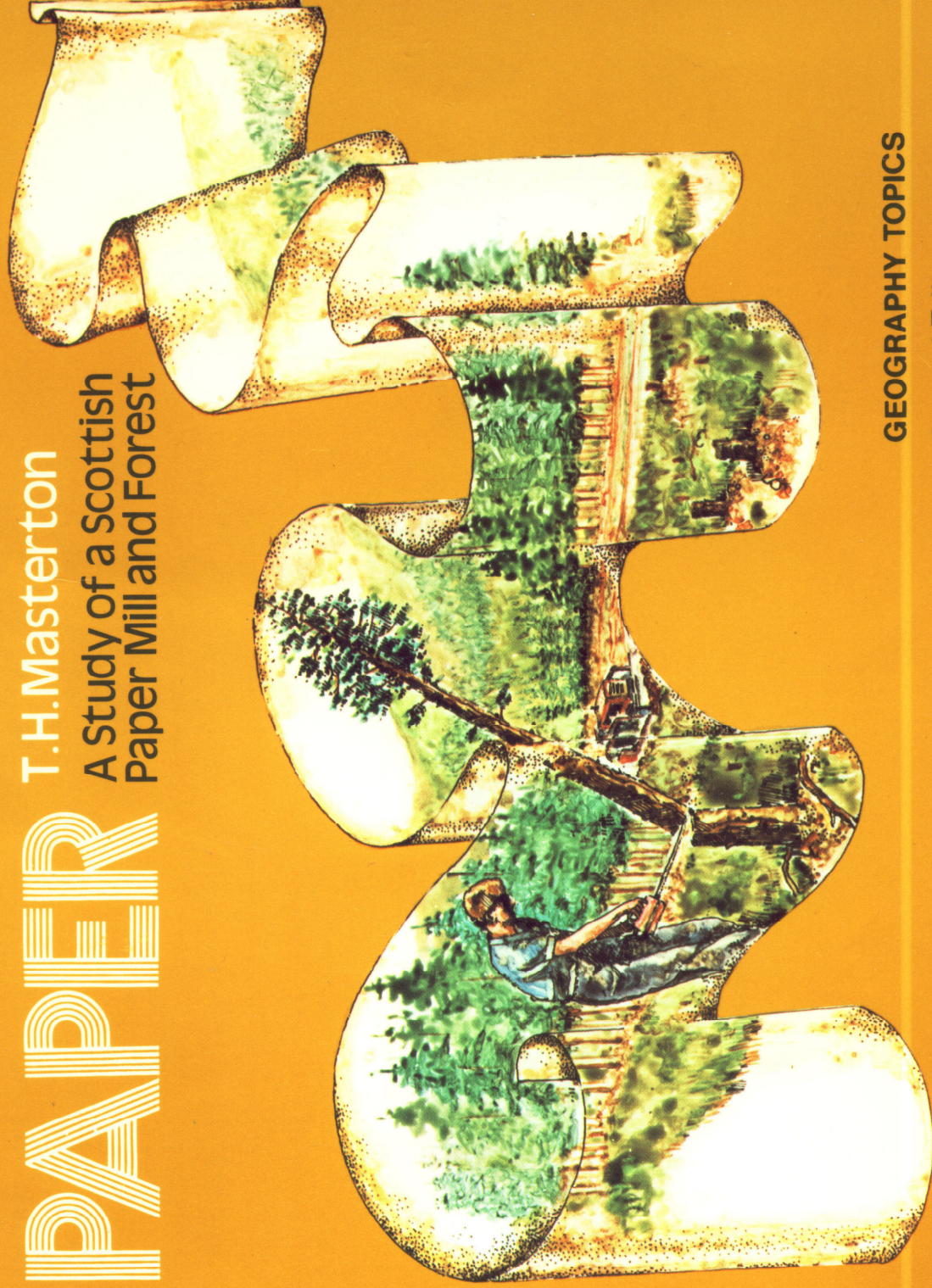


PAPER

T.H. Masterton
A Study of a Scottish
Paper Mill and Forest



GEOGRAPHY TOPICS

General Editor
T.H. Masterton

PAPER

A Study of a Scottish Paper Mill and Forest

What is paper, how is it made and where do the raw materials come from?

This booklet examines these questions through a study of an actual Scottish pulp and paper mill and a Highland forest.

The pupil's own environment and experiences are linked, through questions, exercises and illustrations, to the more remote situations described. Pupils are thus more able to become interested in and involved with unfamiliar environments and to appreciate their ultimate dependence on other people and places.

This topic can be expanded well beyond the scope of this book and the author has suggested possible sources for extra information and visual aids on the last page.

T. H. Masterton

Oliver & Boyd



What is paper?

What is this book made of?

Make a list of all the different things used by printers and publishers in order to make this book. Put down only the things you can actually see or touch.

How many things do you see around you that are made from paper? How would everyday life be different and difficult if all paper suddenly vanished. Keep a record of how much paper you *use* in a week.

Look at the picture of a papyrus plant. It is a kind of water reed. The ancient Egyptians made paper from such plants. Theirs was the first paper ever made.

We use a great deal of paper in our life today, and most of what we use is made from the wood of coniferous trees.

Look up "coniferous" in your dictionary, or a book about plants. Find out the names of some of the different coniferous trees. Make a short list and add sketches.

Look around your school district. Are there coniferous trees?



This map shows the location of paper mills which use British timber



A paper making factory

The factory we shall study is called the Wiggins Teape Paper Mill and is located at Corpach, very near Fort William.

Look at the map:

- (a) In which country is the Wiggins Teape mill located?
- (b) Where is it? (In the NE, NW, SW, SE)
- (c) Look in your own atlas and find Fort William. What sea-loch (sea-inlet) does it stand beside?
- (d) Find your own home town in your atlas.
- (e) In which direction does Fort William lie in relation to your home? Would you have to go N, NW, NE, W, E, S, or in another direction?
- (f) How far away is it from your home "as the crow flies"?
This is easy – it is a straight-line measurement.
- (g) Use your atlas again. Pin a piece of string down along the line of the most direct road route between your home and Fort William, then straighten it out and compare it with the scale on your atlas map. How far away is Fort William from your home?
- (h) How many paper mills are there in Britain which use British timber?
- (i) Try and describe where they are.

Wiggins Teape paper mill

The wood (375 000 tonnes) arrives there by road and rail from many forests in Western Scotland. This wood is stored before being chopped up, boiled, treated with chemicals and spread on a gauze with water to form the kind of paper this book is printed on.

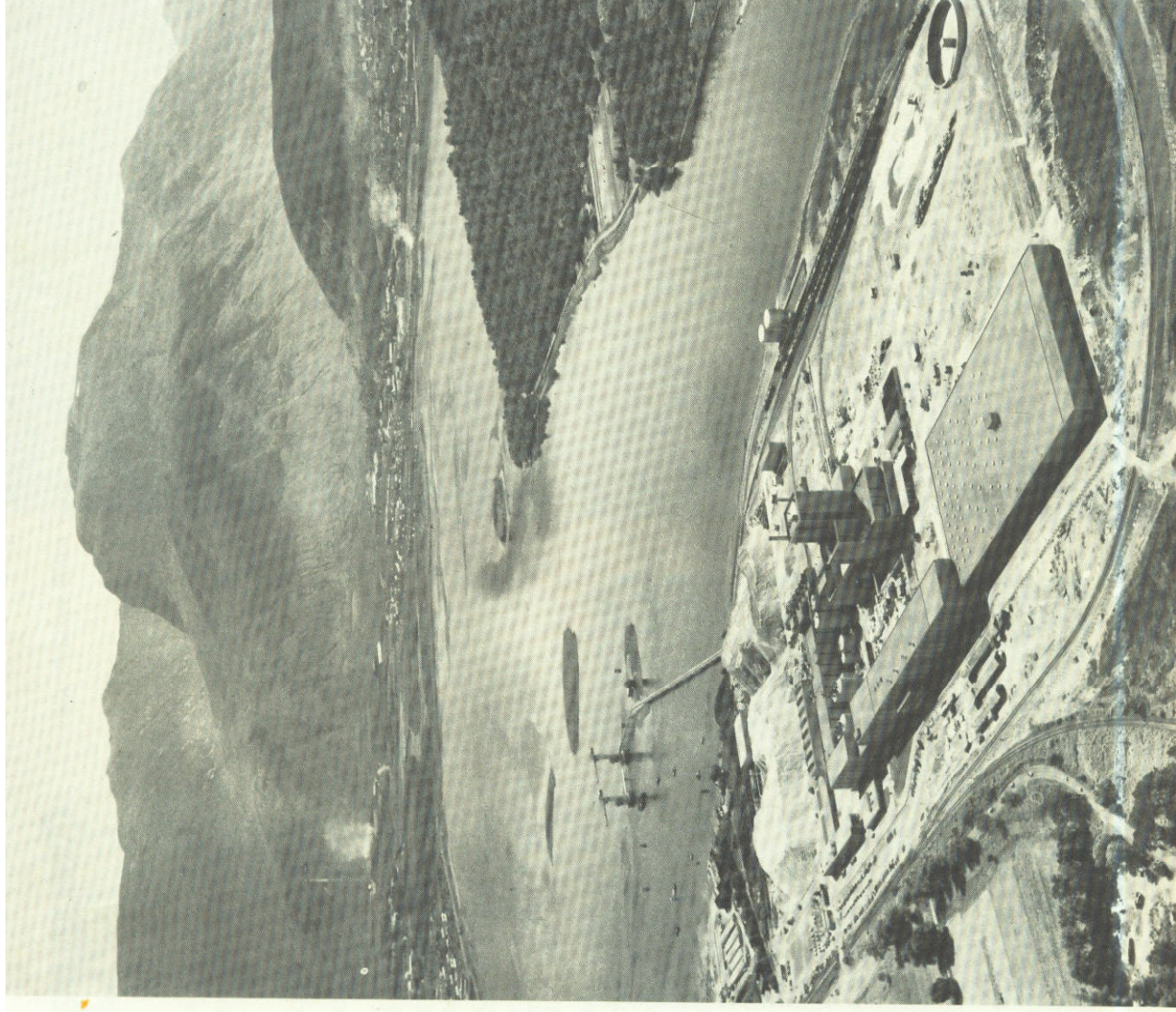
Can you find the following features on the photograph?

The loch;
factory;

flat land on which factory is built;
hills;

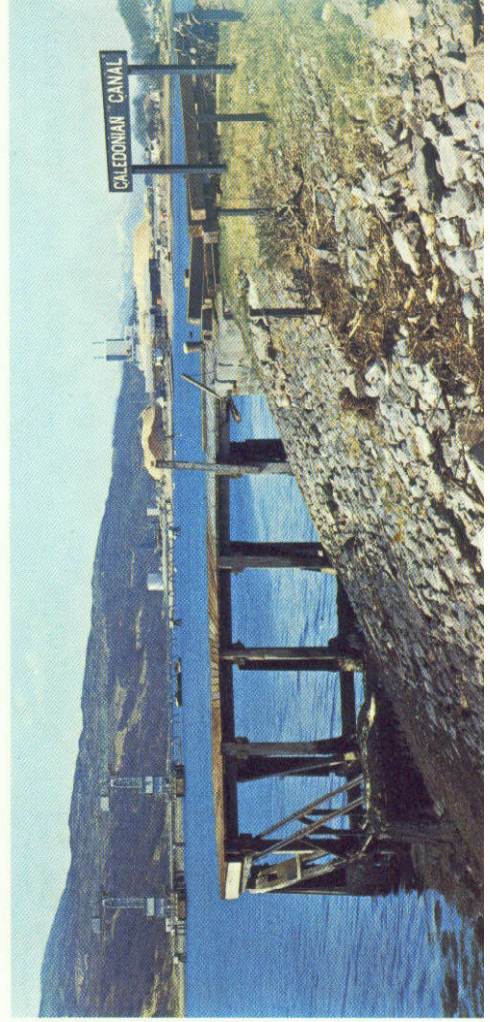
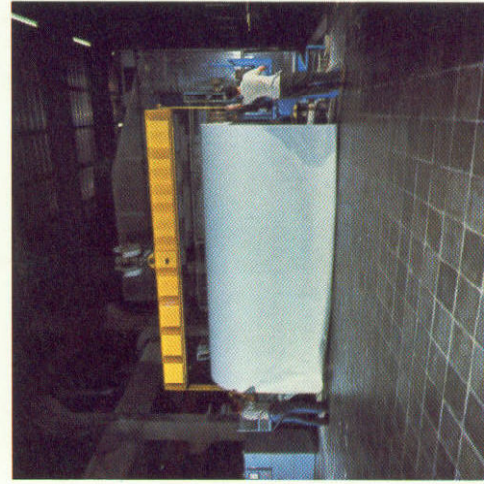
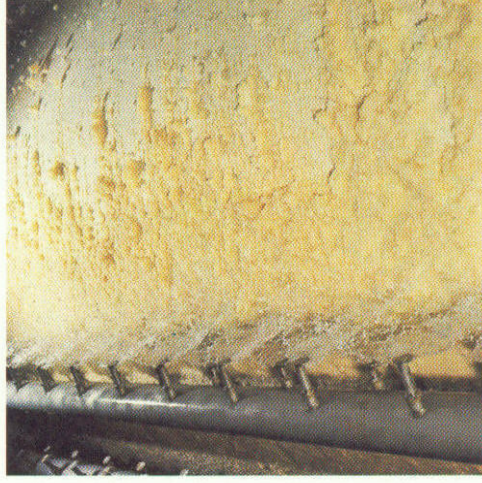
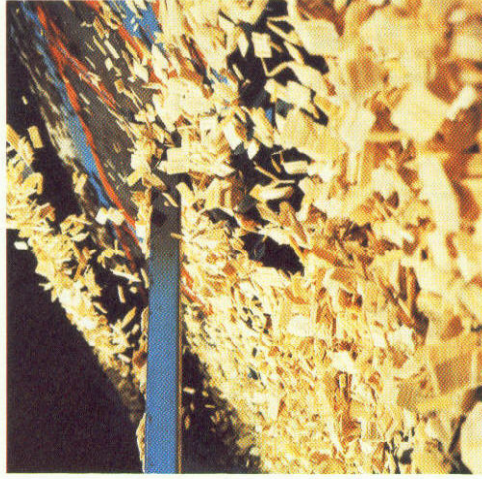
storage area for Scottish timber,
railway sidings, roads.

Fort William is the town in the
background.

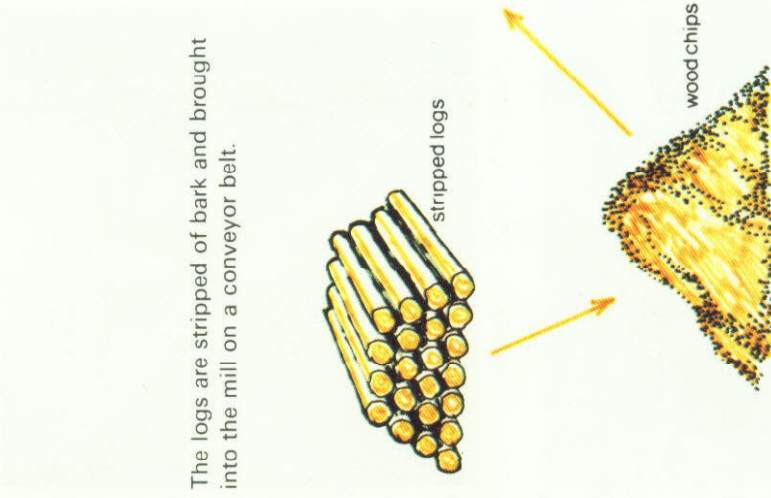


Here are some photographs showing some of the stages involved in the paper making process. When you have

studied pages 6 and 7, see if you can write two sentences saying what you think each photograph shows.



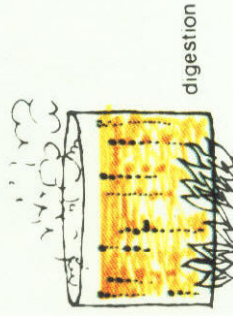
Here is a diagram of a paper-making machine at Wiggins Teape



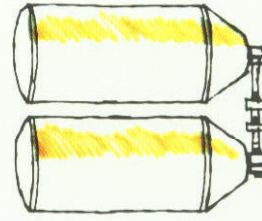
The logs are stripped of bark and brought into the mill on a conveyor belt.

The logs are cut up – chipped – into small pieces by a chipping machine which can chip a log, three metres long, in less than one second. Ask your teacher to borrow a kitchen liquidiser and show you how a carrot or turnip can be chopped by the whirling knives.

"Digestion" process
The wood chips are cooked in chemicals inside containers called "digesters". The chemicals dissolve away everything except the wood fibres, or "cellulose". Look up "cellulose" in an encyclopedia. The crude pulp is then washed to remove any chemicals that are left in the mixture.



digestion

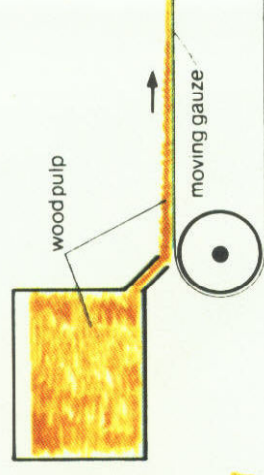


bleaching

"Bleaching" process
The crude pulp is bleached with bleaching chemicals until it is white and clean. It is then mixed with water and pumped from the pulp mill to the huge paper making machine.

WET END

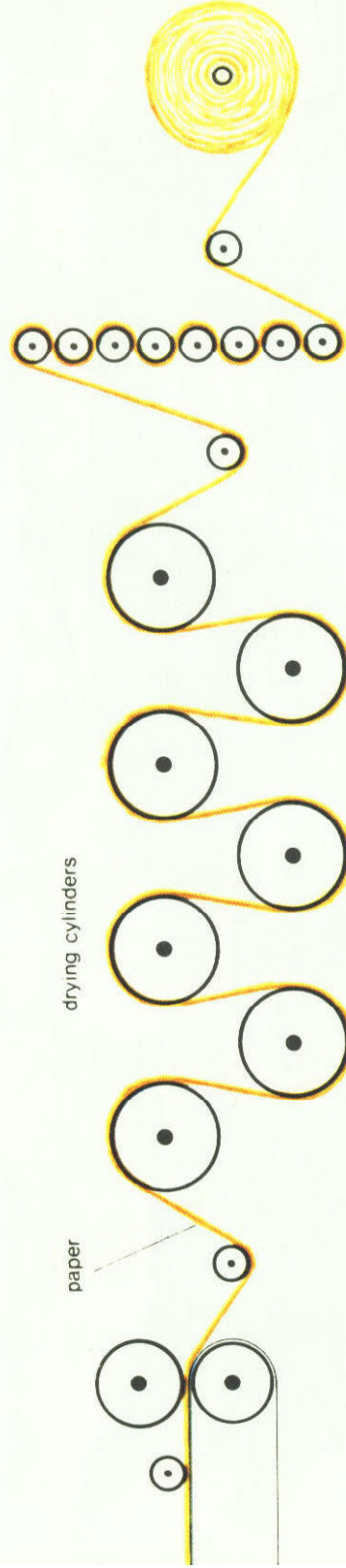
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The white pulp fibre is mixed with a large amount of water and run onto a wide, moving gauze. As the water pours through the gauze, the pulp fibres interlock to form a web of paper. While still wet, this paper web is picked off the gauze and it begins its journey through the huge rollers of the paper making machine.

The sheet is wound on to a big roller at the end of the machine and taken off to the "finishing department" where it is cut into sheets of various sizes.

DRY END
100 metres



- How long is the machine from the "wet end" to the "dry end"?
- How long is your classroom?
- How much bigger than your classroom will this have to be?
- What materials are needed in order to transform a log into paper?
- Describe *in your own words* what happens to the wood as it passes from being a coniferous tree log to where it becomes a roll of dry paper.

The first part of its journey involves pressing the web of paper through a series of "wringers" to remove most of the water. The web then passes over many large, steam-heated, drying cylinders which dry and iron the paper to produce a flat, perfect sheet.

Inverliever Forest – where the logs come from

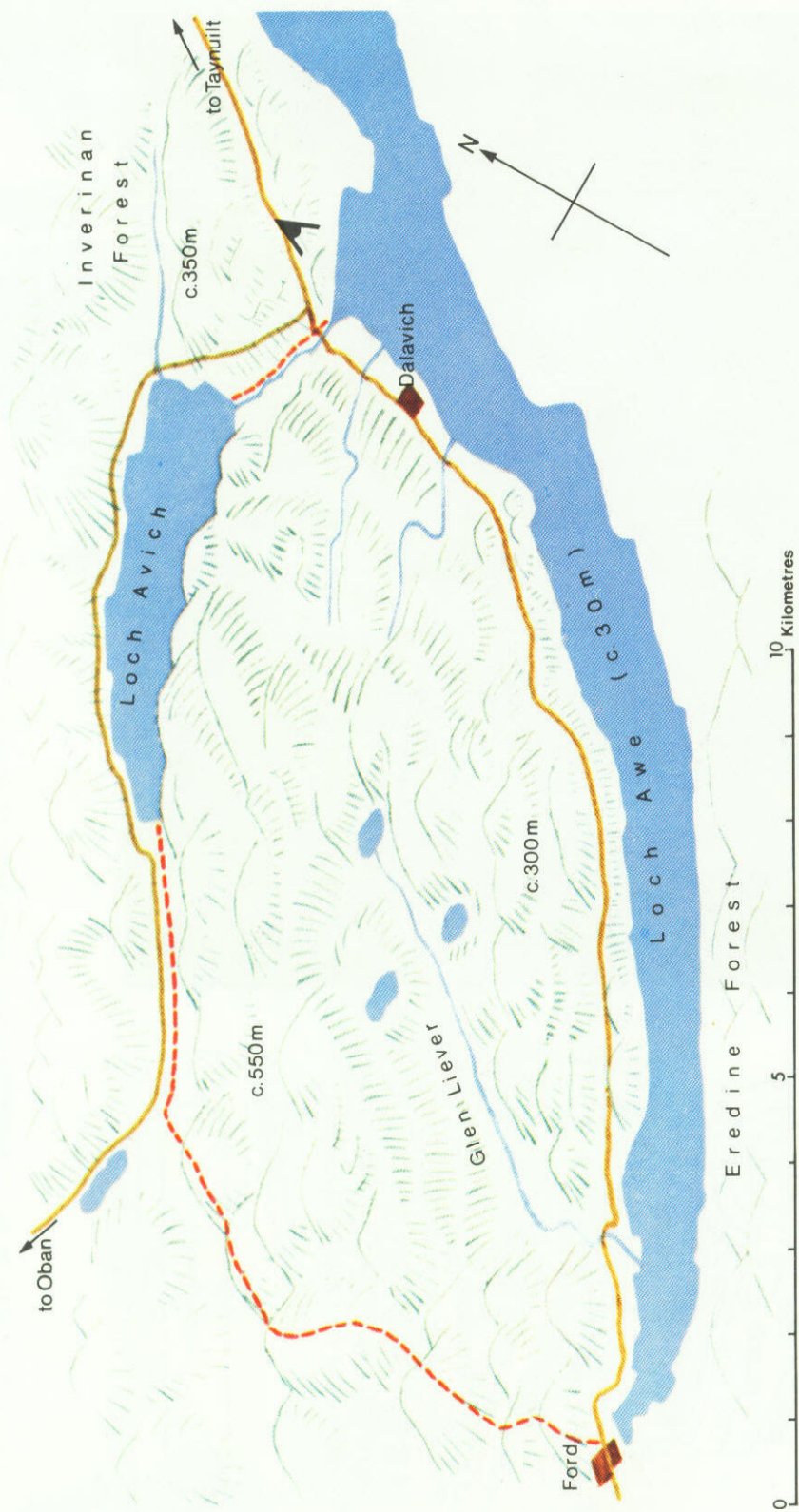
Many of the logs used at Corpach come from Inverliever Forest in Argyll. Inverliever is on the north side of Loch Awe. Find Loch Awe in your atlas.

Here is a picture, drawn in 1970, from the place marked as the "viewpoint" on the map on page 9.

Try and write a short description of the view. Find something to say about the foreground, the loch (lake), the village and where it is positioned, the shapes of the hills and the trees.



This is a map of the land covered by Inverliever Forest



- Compare this map with your atlas map. Is the whole of Loch Awe shown on this map?
- Put a kilometre grid on tracing paper. Lay it over this map and use it to work out the approximate size of the forest.

Boundary

Roads

Viewpoint for picture
on opposite page

Forestry is not the only activity, though it *is* the most important. There is a thriving fish farm at Ford, and many tourists visit the area.

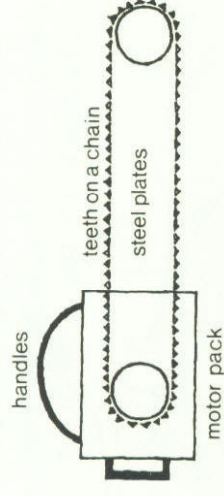
Felling the timber

Cutting down a tree in 1970



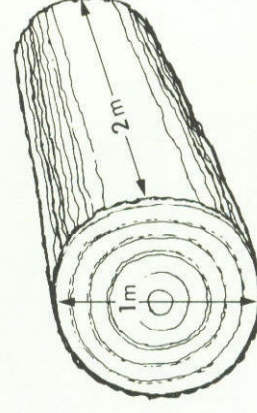
It needs only one man to cut down a tree, to trim the branches and cut the tree into logs ready for the transporter.

The forester on the left is using a chain saw. It is driven by a petrol motor.



This works rather like the chain drive on a bicycle. The teeth are on a chain and as the motor forces the chain into movement, the teeth are carried round and bite into the wood.

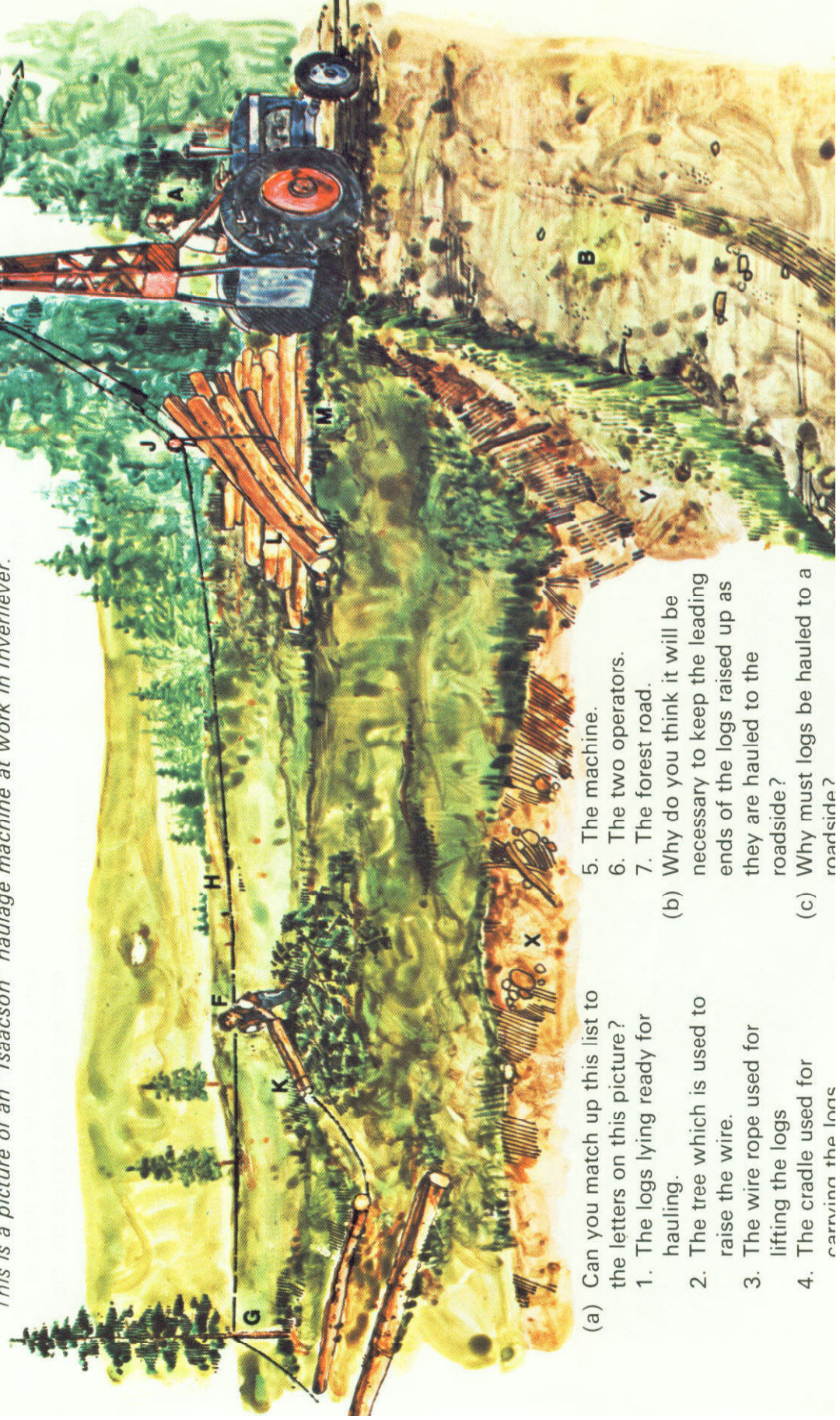
Here is a portion of a log.



Can you work out how much wood is in this log? It is a cylinder. Ask your teacher for help if you need it.

When the trees are cut down they must be hauled to a roadside.

This is a picture of an "Isaacson" haulage machine at work in Inverliever.



(a) Can you match up this list to the letters on this picture?

1. The logs lying ready for hauling.
2. The tree which is used to raise the wire.
3. The wire rope used for lifting the logs
4. The cradle used for carrying the logs

5. The machine.
 6. The two operators.
 7. The forest road.
- (b) Why do you think it will be necessary to keep the leading ends of the logs raised up as they are hauled to the roadside?
- (c) Why must logs be hauled to a roadside?

Cutting down a tree in 1960

The pictures on pages 10 and 11 show how logs are cut and taken to the roadside for loading into lorries. Compare these ways of working with the picture on this page. It shows what happened in 1960.

- (a) Look for the two-handed saw, the axeman and the horse. Can you put into your own words what is happening?
- (b) What has brought about the differences between the methods used in 1960 and 1970? Think about machines and the number of men needed to use them.



The foresters' yearly work

A programme of work for any year in the forest

(1) *Afforestation*

January	Preparation for planting, cultivating deep ploughing, draining etc.
* February	As for January, with a start made to planting if the weather is good enough
* March	Planting
* April	Planting
* May	Planting
June	Planting of trees lifted in February and kept in polythene in cold store at -1°C .
July	As for June. Weeding of undergrowth begins.
August	Weeding of undergrowth.
September	Chemical spraying using <i>Paraquat</i> .
October	Grass weeding.
November	Preparation as for January.
December	As for January.

* There is a fire danger in these months, especially if it is a dry spring and there is dead grass under the trees.

The Forestry Commission undertakes protective burning of moors around forests. Surveying and fencing take place at any time.

(2) *Production*

Felling takes place throughout the entire year. In the months of May and June felled logs are sprayed against the pin hole borer, which can destroy much wood.

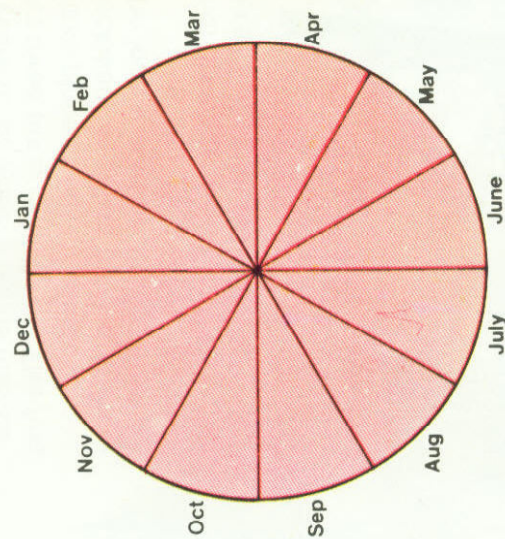
Work during the whole growing period of the Forest

1. Thinning (when the weaker trees are cut) first occurs at 15 years to 20 years. Forests may be thinned two to three times in their life. The final clearing will take place at 60–80 years.
2. Sometimes backward areas are cleared for pulp making but the logs should be at least 6 cm in diameter.
3. If a forest is not growing well, it will be cleared, drained, fertilised and replanted.



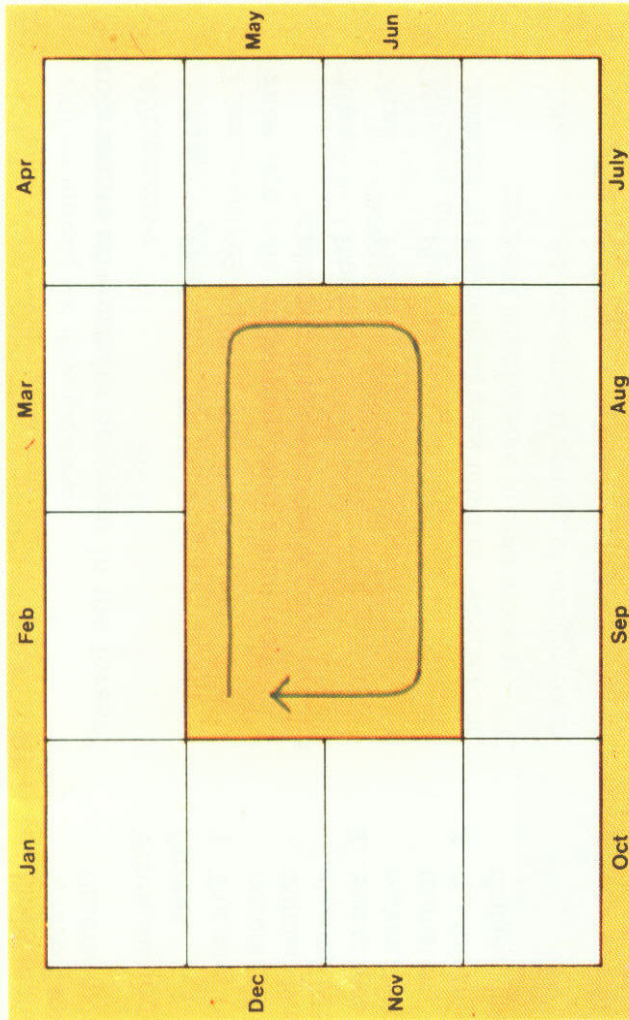
Work sheet to be used along with page 13.

1. Use your notebook or a piece of drawing paper. Draw a circle and divide it into 12 segments. Use it to show, in pictures and words, what happens in each month.



Why does the work vary throughout the year?

This can also be done by a group of pupils using rectangles of paper and mounting them on a large sheet of paper to form a wall chart like the one shown here.



2. Draw a line to the scale 5 mm equals 1 year to show the length of time a forest takes to grow. This line will have to be 40 cms long so get a piece of drawing paper. On it mark when the forest is likely to be thinned and the weaker trees removed. Also mark when the final clearing is likely to take place.

Below this line draw another line and on it mark when you

were born, when you started school, when you may leave school, how old your favourite pop singer is, how old the Queen is.

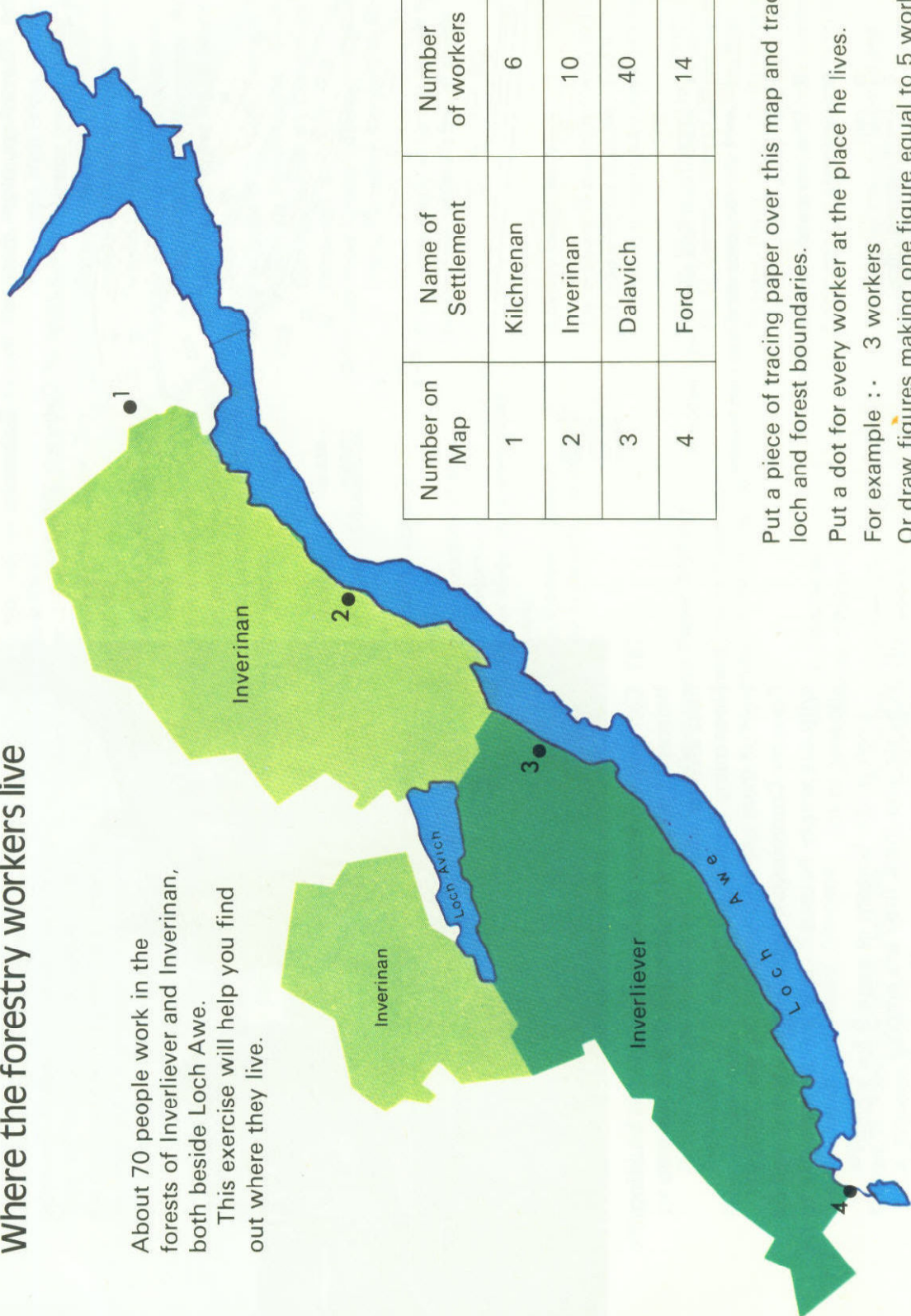
Do you know anyone who is 80 years old?

Look at both your line drawings. What do they show when you compare them? You may have to ask your teacher to help you with this one.

Where the forestry workers live

About 70 people work in the forests of Inverliever and Inverinan, both beside Loch Awe.

This exercise will help you find out where they live.



Put a piece of tracing paper over this map and trace loch and forest boundaries.

Put a dot for every worker at the place he lives.

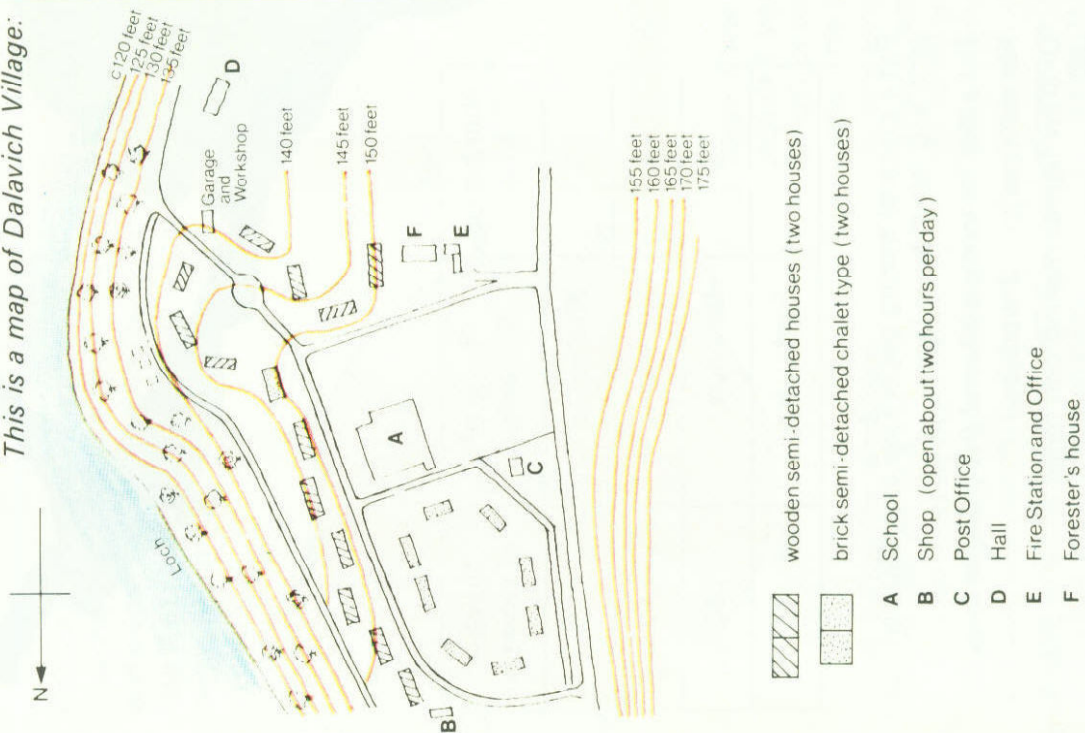
For example : • 3 workers

Or draw figures making one figure equal to 5 workers

Title your map, give it a scale and a key.

Of the 70 workers, more than half live in Dalavich

This is a map of Dalavich Village:



- Can you work out the materials used in building the houses? Look at the photograph and the map to help answer this.
- How many houses are there?
- Half of them are empty. What do you think the Forestry Commission (which owns them) will do with the empty houses? They are too valuable to be allowed to rot.
Look at the bottom of page 9 for a clue.
- Why do you think they are empty?
Look at your answers to the questions at the bottom of page 12.